


GemStone/S 64 BitTM **Release Notes**

Version 3.6.7

December 2023



INTELLECTUAL PROPERTY OWNERSHIP

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

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 GemTalk Systems 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 GemTalk Systems.

This software is provided by GemTalk Systems LLC 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 GemTalk Systems LLC 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 © 1986-2023 GemTalk Systems LLC. All rights reserved by GemTalk Systems.

PATENTS

GemStone software has been covered by U.S. Patent Number 6,256,637 "Transactional virtual machine architecture" (1998-2018), Patent Number 6,360,219 "Object queues with concurrent updating" (1998-2018), Patent Number 6,567,905 "Generational garbage collector with persistent object cache" (2001-2021), and Patent Number 6,681,226 "Selective pessimistic locking for a concurrently updateable database" (2001-2021).

TRADEMARKS

GemTalk, **GemStone**, **GemBuilder**, **GemConnect**, and the GemStone and GemTalk logos are trademarks or registered trademarks of GemTalk Systems LLC, or of VMware, Inc., previously of GemStone Systems, Inc.

UNIX is a registered trademark of The Open Group.

Intel is a registered trademarks of Intel Corporation.

Microsoft, **Windows**, and **Windows Server** are registered trademarks of Microsoft Corporation.

Linux is a registered trademark of Linus Torvalds and others.

Red Hat, **Red Hat Enterprise Linux**, **RHEL**, and **CentOS** are trademarks or registered trademarks of Red Hat, Inc.

AlmaLinux is a trademark or registered trademark of AlmaLinux OS Foundation.

Rocky Linux is a trademark or registered trademark of Rocky Enterprise Software Foundation.

Ubuntu is a registered trademark of Canonical Ltd., Inc.

AIX, **Power**, **POWER**, **Power8**, **Power9**, and **VisualAge** are trademarks or registered trademarks of International Business Machines Corporation.

Apple, **Mac**, **macOS**, and **Macintosh** are trademarks of Apple Inc.

Instantiations is a registered trademarks of Instantiations, Inc.

CINCOM, **Cincom Smalltalk**, and **VisualWorks** are trademarks or registered trademarks of Cincom Systems, Inc.

Raspberry Pi is a trademark of the Raspberry Pi Foundation.

RabbitMQ is a trademark of VMware, Inc.

Prometheus is a registered trademark of The Linux Foundation.

Grafana is a registered trademark of Raintank, Inc. dba Grafana Labs.

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. GemTalk Systems 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.

GemTalk Systems LLC

15220 NW Greenbrier Parkway
Suite 240
Beaverton, OR 97006

Preface

About This Documentation

These release notes describe changes in the GemStone/S 64 Bit™ version 3.6.7 release. Read these release notes carefully before you begin installation, upgrade, or development with this release.

For information on installing or upgrading to this version of GemStone/S 64 Bit, please refer to the *GemStone/S 64 Bit Installation Guide* for version 3.6.7.

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

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.

- ▶ **Supplemental Documentation** and **TechTips**, providing information and instructions that are not in the regular documentation.
- ▶ **Compatibility matrices**, listing supported platforms for GemTalk product versions.

We recommend checking this site on a regular basis for the latest updates.

Help Requests

GemTalk Technical Support is limited to customers with current support contracts. Requests for technical assistance may be submitted online (including by email), or by telephone. We recommend you use telephone contact only for urgent 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

Email: techsupport@gemtalksystems.com

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

Please include the following, in addition to a description of the issue:

- ▶ The versions of GemStone/S 64 Bit and of all related GemTalk products, and of any other related products, such as client Smalltalk products, and the operating system and version you are using.
- ▶ Exact error message received, if any, including log files and statmonitor data if appropriate.

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

24x7 Emergency Technical Support

GemTalk 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 GemTalk Support Renewals.

Training and Consulting

GemTalk Professional Services provide consulting to help you succeed with GemStone products. Training for GemStone/S is available at your location, and training courses are offered periodically at our offices in Beaverton, Oregon. Contact GemTalk Professional Services for more details or to obtain consulting services.

Table of Contents

Chapter 1. Release Notes for 3.6.7

Overview	7
Supported Platforms	7
Platforms for Version 3.6.7	7
GemBuilder for Smalltalk (GBS) Versions	8
VSD Version.	8
Rowan	8
Open Source Library Versions	8
Changes in this version	9
Using setcap for large pages and OOM protection on Linux	9
Large Memory Pages	9
OOM Killer protection	9
Large Memory Pages and Locking SPC in memory	10
Raw partitions on Character devices no longer supported	10
GsTsExternalSession forkAndDetachBlock:	10
Added GCI flag	10
Terminating logsender and logreceiver programmatically	10
ClassOrganizer >> newExcludingGlobals	11
GsNMethod >> recompileFromSource	11
Converting Non-specials in special range	11
codePointAt:put: now performs auto-conversion if needed.	12
Empty Unicode7 string literals now canonicalized	12
GsTsExternalSession no longer requires cpp/gcc/g++	12
Better error message if reverse DNS fails for Single Sign-On (SSO)/Kerberos logins 12	
IndexManager added method	12
Added Repository methods	12
Added GCI function variant	13
GciDbgEstablishToFile_	13

Bugs Fixed	14
Very slow restore of compressed tranlogs	14
Performance regression in markForCollection.	14
Stone may have shutdown on checkpoint when tranlog disks full	14
NetLDI issues	14
NetLDI shutdown timing issue resulted in unable to restart	14
netldid executes without \$GEMSTONE but does not function.	14
Collection issues.	15
Finding references failed to report objects in large IdentityBags.	15
Array >> replaceFrom:to:with:startingAt: may not copy elements correctly .	15
RcIdentityBag >> remove:otherwise: errored	15
Dictionary become: does not update internal variables	15
GsSocket >> writeWillNotBlockWithin: does not handle nil returned by	
writeWillNotBlock	15
Issues relating to upgrades.	15
Upgrading did not preserve default legacy indexes.	15
Session methods must be disabled for upgrade	15
copydbf returns wrong version for secondary extents after upgrade . . .	16
Excessive attempts to start AdminGem during upgrade	16
GLASS/Seaside auto-migrate may error after GC operation	16
Issues with stacks and memory stats when using setcap to enable	
LargeMemoryPages or OOM killer protection.	16
Numeric and Time related issues	16
Float = and ~= always returned false for SmallScaledDecimal arguments	
Strings with leading '-0.' lose sign when converted using asNumber or	
Number fromString/Stream:	16
SmallDateAndTime passivate activate failed for years 2035-2072	17
asJson problems with Date, Time, DateTime, and DateAndTime	17
CharacterCollection >> isDigits incorrect for empty string.	17
A Time did not compare equal to equivalent SmallTime	17
Duration new created an uninitialized instance	17
File handle leak in GsTsExternalSession	17
Spurious OutOfMemory when in-memory pom_gen scavenge fails	17
commitRestoreForFailoverAfterWaitingUpTo: now stops logreceiver	17
stoned exited with code 3 on clean shutdown	17
SEGV when a terminated GsProcess is sent terminate	17
gemnetobject -T, -N argument was ignored if no separator	18
CodeModificaton required to list Pragmas with session methods enabled. . . .	18
Array with:* primitive failure error reports incorrect	18
PPParser >> child included a send to #assert:	18

Release Notes for 3.6.7

Overview

GemStone/S 64 Bit™ 3.6.7 is a new version of the GemStone/S 64 Bit object server. Version 3.6.7 provides new features and fixes for a number of significant bugs. We recommend everyone using or planning to use GemStone/S 64 Bit upgrade to this new version.

These Release Notes include changes between the previous version of GemStone/S 64 Bit, v3.6.6, and v3.6.7. If you are upgrading from a version prior to 3.6.6, review the release notes for each intermediate release to see the full set of changes.

For details about installing GemStone/S 64 Bit 3.6.7 or upgrading from earlier versions of GemStone/S 64 Bit, see the *GemStone/S 64 Bit Installation Guide* for v3.6.2 for your platform.

Supported Platforms

Platforms for Version 3.6.7

GemStone/S 64 Bit version 3.6.7 is supported on the following platforms:

- ▶ Red Hat Enterprise Linux Server, CentOS Linux, Rocky Linux, and AlmaLinux 7.9, 8.8, and 9.2; Ubuntu 20.04 and 22.04; all on x86.
Ubuntu 20.04 on ARM (Ubuntu on ARM is supported for development only)
GemStone performs testing on a mixture of Red Hat, CentOS, Rocky Linux and AlmaLinux servers; these are all fully certified platforms. Any reference to Red Hat applies to all these distributions.
- ▶ AIX 7.1 and 7.2
- ▶ macOS 13.1 (Ventura) with Darwin 22.2.0 kernel, and macOS 12.6 (Monterey) with Darwin 21.6.0 kernel on x86; and macOS 11.6 (Big Sur) with Darwin 20.6.0 kernel on Apple silicon.
(Mac is supported for development only)

Distributions for Solaris/x86 and Solaris/SPARC are no longer available.

For more information and detailed requirements for each supported platforms, please refer to the *GemStone/S 64 Bit Installation Guide* for v3.6.2 for that platform.

GemBuilder for Smalltalk (GBS) Versions

The following versions of GBS are supported with GemStone/S 64 Bit version 3.6.7:

GBS/VW version 8.7

VisualWorks 9.1.1 32-bit and 64-bit
<ul style="list-style-type: none"> ▶ Windows 10 ▶ RedHat ES 7.9, 8.8, and 9.2; Ubuntu 20.04 and 22.04

GBS/VW version 8.6

VisualWorks 9.1.1 32-bit and 64-bit
<ul style="list-style-type: none"> ▶ Windows 10 ▶ RedHat ES 7.9, 8.8, and 9.2; Ubuntu 20.04

GBS/VA version 5.4.7

VAST Platform 11.0.1	VAST Platform 10.0.2	VA Smalltalk 8.6.3
<ul style="list-style-type: none"> ▶ Windows Server 2016 and Windows 10 	<ul style="list-style-type: none"> ▶ Windows Server 2016 and Windows 10 	<ul style="list-style-type: none"> ▶ Windows Server 2016 and Windows 10

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

VSD Version

The GemStone/S 64 Bit v3.6.7 distribution includes VSD version 5.6.1. The previous version of GemStone/S 64 Bit, v3.6.6, included VSD v5.6. VSD version 5.6.1 includes minor bug fixes. For details on the changes, see the [Release Notes for VSD v5.6.1](#).

VSD v5.6.1 is included with the GemStone distribution, and can also be downloaded as a separate product. For details or to download, go to <https://gemtalksystems.com/vsd/>.

Rowan

The GemStone/S v3.6.7 distribution includes Rowan v 2.3.1.

Open Source Library Versions

The version of OpenSSL has been updated to 1.1.1w

Changes in this version

Using setcap for large pages and OOM protection on Linux

In previous releases, the *Installation Guide* has specified operating system configuration steps to enable use of large memory pages and for protecting processes from the OOM killer, using setcap to give the executables specific Linux capabilities. This is not optimal for security, and has a side effect of disallowing stack traces, since gdb did not have privileges to attach to the process, and prevented statmonitor from reading certain memory statistics. (#50580)

Alternate ways to configure large memory pages and OOM protection have been determined, and the way GemStone uses capabilities has been modified for v3.6.7. The previously existing techniques work, but for security and usability reasons are no longer recommended.

Large Memory Pages

Previously, it was recommended to give the Shared Page Cache Monitor the `cap_ipc_lock` capability.

Now, you can avoid giving this capability, by instead selecting and configuring a huge pages group. This is the procedure:

Select or create a group that includes the Linux user that will be starting up the shared page cache, and all users who will be accessing the shared page cache.

Then create the file `/etc/sysctl.d/64-gemstone-local.conf`, to set this group's numeric id to the huge pages group. Add a line to the file:

```
vm.hugetlb_shm_group = numericGidOfGroup
```

You can determine the gid of a group from the name using:

```
os$ getent group groupName
```

This will take effect on reboot; you can apply immediately by executing:

```
os$ sysctl --system
```

To verify the current value, cat `proc/sys/vm/hugetlb_shm_group`, which will show the group id. To enable large pages transiently without rebooting, you can set the gid of the group directly in `/proc/sys/vm/hugetlb_shm_group`. This will be reset on reboot if not configured as by `/etc/sysctl.d/64-gemstone-local.conf`.

For full details, see the updated instructions in the *Installation Guide for v3.6.2*.

OOM Killer protection

Previously, a number of executables were given the `cap_sys_resource` capability, to allow them to modify their `oom_score_adjust`; critical processes reduced their scores, and less critical processes, such as gems, increased their score.

Now, only the Stone itself, and the pgsvrmain for remote configurations, need the capability. The only setcap executions needed are:

```
os$ setcap cap_sys_resource=pe $GEMSTONE/sys/stoned
os$ setcap cap_sys_resource=pe $GEMSTONE/sys/pgsvrmain
```

On startup, these processes use this capability to set their `oom_score_adjust`, then release the capability. Other critical processes are spawned by the Stone and inherit the Stone's `oom_score_adjust`, or for remote caches, are spawned by the `pgsvrmain` and likewise inherit `oom_score_adjust`. The spawned processes that inherit an `oom_score_adjust` do not report the protection in their log files. The scores for Gems can be safely left at the default. The GemStone code changes to release the capability, avoid the previous issues with `gdb` and `statmonitor`, including for processes that have explicit `setcap`.

Large Memory Pages and Locking SPC in memory

If you configure your Shared Page Cache to use large memory pages, the cache is inherently then locked into memory. In this case, there is no need to additionally configure the administrative user to support `SHR_PAGE_CACHE_LOCKED`.

Raw partitions on Character devices no longer supported

The RAW driver for direct I/O has been deprecated for many years (superseded by the `O_DIRECT` flag for a block device). With Linux kernel 5.14, the RAW driver was dropped; this or later versions are used by Ubuntu 22.04 and RedHat 9.x.

With v3.6.7, raw partitions on character devices are no longer supported for GemStone dbf files, on older as well as recent kernels. v3.6.7 supports raw partitions on block devices.

GsTsExternalSession forkAndDetachBlock:

Normally, processes started by `GsTsExternalSession` are limited to execute while the `GsTsExternalSession` is logged in. This limits its value for starting background processes and running scripts.

The following methods have been added to support this use case:

```
GsTsExternalSession >> forkAndDetachBlock:
GsTsExternalSession >> forkAndDetachBlock:withArguments:
GsTsExternalSession >> forkAndDetachString:
```

These methods perform a non-blocking execute the given string or block. If the operation returns, it must be followed by `GsTsExternalSession >> nbResult`. Execution will continue running after `nbLogout` of this session, but until logout, it will respond to `softBreak` or `hardBreak` from the external session.

Note that the argument should include error handling and printing, so that there is enough information in the Gem log to allow problems to be debugged.

Added GCI flag

The flags available for `GciPerformNoDebug` (and other continue and perform calls) now include `GCI_PERFORM_DETACH`.

Terminating logsender and logreceiver programmatically

You may now stop the primary logsender and the logreceiver using Smalltalk expressions. The following methods have been added.

Note that these methods are in `System` class and require `SystemControl` privilege, as with any method that terminates server processes.

System class >> killLogReceiver

Causes stone to send SIGTERM to the log receiver process. Returns true if the SIGTERM signal was sent, false if no signal was sent because no log receiver process was running or a SIGTERM signal had already been sent.

System class >> killLogSender

Causes stone to send SIGTERM to the log sender process. Returns true if the SIGTERM signal was sent, false if no signal was sent because no log sender process was running or a SIGTERM signal had already been sent.

ClassOrganizer >> newExcludingGlobals

This method allows you to perform ClassOrganizer queries that do not return results exclusive to Globals. This can be used, for example, to find application methods that reference GsHostProcess or JsonParser classes (which may need to be recompiled; see the *Installation Guide* upgrade instructions), without including kernel methods that do not need recompiling.

ClassOrganizer >> newExcludingGlobals replaces the private method `_newExcludingGlobals`, which was available in some recent releases. Note that `_newExcludingGlobals` did not reliably exclude methods on classes in Globals.

GsNMethod >> recompileFromSource

This method has been added for convenient recompilation of a method from source code, such as the recompile needed for GsHostProcess and JsonParser. Existing recompile methods were designed for recompiling after bytecode changes; since they relied on the existing literal references, they did not update references to the obsolete class.

Note that if the symbolList of the user that is executing the recompile resolves literal names to different objects than the original compile, this may result in unexpected changes in behavior. Depending on the complexity of your application's use of users' symbolLists, you may wish to examine the source code before recompiling.

Converting Non-specials in special range

A special object is one in which the OOP encodes the value, and thus requires no repository space; this is a canonical form of that value. A number of magnitude classes have subclasses with the prefix 'Small', which provide a special/canonical form of a subset of that class's potential values. While new values are created in canonical form, it is possible to have non-canonical instances that have an exactly equivalent canonical value. For example, an upgraded application may have an instance of Fraction with the value 1/3, rather than a SmallFraction with the value 1/3.

To convert a non-canonical to the canonical equivalent, the method `asCanonicalForm` has been added. This either returns self, or the canonical object exactly equivalent to the receiver. Specific implementations apply to Float, Date, DateAndTime, Time, Fraction, LargeInteger, and ScaledDecimal.

Note that this cannot perform a conversion in place; you must modify the object referring to the non-canonical value to refer to the canonical value.

codePointAt:put: now performs auto-conversion if needed

Previously, sending `codePointAt:put:` to a `String` or `DoubleByteString`, with a `codePoint` that is out of range for that class, resulted in an `OutOfRangeException` error.

Now, the receiver will be transparently converted to the class that can contain the given `codePoint`; that is, converted from a `String` or `DoubleByteString` to a `DoubleByteString` or `QuadByteString`).

Empty Unicode7 string literals now canonicalized

In traditional `String` comparison mode, the string literal `"` creates an instance of `String`, which is canonicalized (to the kernel OOP 233473). In Unicode comparison mode, in which `"` creates an instance of `Unicode7`, these were previously not canonicalized. Now, these are canonicalized (to kernel OOP 165377).

GsTsExternalSession no longer requires cpp/gcc/g++

Previously, `GsTsExternalSessions` computed the FFI calls for the `GciTsLibrary` on demand, using `cpp` to parse `gcits.hf`. This required `cpp`, and the `gcc/g++` compilation environment; including for production use of `GsTsExternalSessions`.

Now, the FFI calls are precomputed for the current version, and provided in a new file that is loaded during upgrade, `$GEMSTONE/upgrade/GciTsLibrary.dat`.

Note that this applies to `GsTsExternalSessions` that login with the same `GemStone` version as the current `Gem`. For logins to `Stones` running a different version of `GemStone/S 64 Bit`, `gcits.hf` still must still be parsed, and `cpp/gcc/g++` continues to be required.

Better error message if reverse DNS fails for Single Sign-On (SSO)/Kerberos logins

In order to use SSO logins using Kerberos, it was and is required that you have reverse DNS lookup setup and operating correctly; see the informational bugnote for #50507. This case will now provide a more useful error message.

IndexManager added method

The method `IndexManager >> allIndexesReport` has been added to provide a report on all indexes in the image.

Added Repository methods

The following methods have been added:

```
Repository >> countInstances: anArray numThreads: maxThreads
                objMaxSize: aSize
```

Scans the entire `Repository` and generates an array of instance counts of the the classes contained in *anArray*, counting only objects with size \leq *aSize*. Does not include in-memory objects.

```
listInstances: anArrayOfClasses toDirectory: aString
                numThreads: maxThreads objMaxSize: aSize
```

List instances of specified classes, listing only objects with size \leq *aSize*. Writes files named *className*-instances.bm files in the directory specified by *aString*.

`listReferencesFromBmFiles: anArray numThreads: numThreads`
`toDirectory: aDirectoryString`
Reads bitmap files of instances whose paths are listed in *anArray*. Writes files, one per thread, in the directory specified by *aDirectoryString*. Files are named `references-N.txt`, where *N* is thread number, containing one line per object containing a reference, with the format
`<objId> <1-based iv offset>:<objId of value> <ivOffset>:<valueId>`
Excludes references to `OOP_EMPTY_INVARIANT_ARRAY`, `OOP_EMPTY_INVARIANT_STRING`, and `OOP_EMPTY_SYMBOL`, which have oops 233217, 233473, and 233729. Also excludes references from instances of `VariableContext`, `GsNMethod`, and `GsProcess`.
Returns a report of classes and number of instances of each class containing references to objects specified by *anArray*.

Added GCI function variant

The following added function is a variant of `GciDbgEstablishToFile()`, with the additional argument **err*. `GciDbgEstablishToFile_()` returns error info in **err* if the function result is `FALSE`.

GciDbgEstablishToFile_

```
(BoolType) GciDbgEstablishToFile_(  
    const char *fileName,  
    GciErrSType *err);
```

Bugs Fixed

Very slow restore of compressed tranlogs

Restoring compressed tranlogs is unusably slow; the restore is doing excessive seeks due to a prematurely cleared buffer. This affects both gzip and lz4 compressed tranlogs. (#50692)

Performance regression in markForCollection

In v3.6, code changes were introduced to avoid thread-safety issues in garbage collection leaf caches. This change resulted in significantly slower performance (for some configurations) in v3.6 and later 3.6.x version, vs. 3.5.x and earlier. The fix has been rewritten and performance is now significantly faster than pre-3.6 releases as well as faster than 3.6.6 and earlier 3.6.x versions. (#50770).

Stone may have shutdown on checkpoint when tranlog disks full

When the tranlog disks are full, and the stone has paused checkpoints waiting for tranlog disk space to become available, if the checkpoint timeout interval expires and a checkpoint initiated, the stone shut down. (#50744)

NetLDI issues

NetLDI shutdown timing issue resulted in unable to restart

When a NetLDI services a request to fork a gem, it forks a child process and then does an exec. During the period after the fork and before the exec, a thread in the child process makes system calls to collect information for printing the log file banner. If the NetLDI is stopped using either kill -TERM or stopnetldi while a thread is making a system call, this can result in a deadlock in the child.

The fix removes the system call in which the deadlock has been observed. The forked child also now immediately closes its inherited file descriptor for the NetLDI's listening socket, rather than waiting for the close-on-exec of that socket to take effect.

Since informational system calls are no longer made during the forked period, the Gem log headers now show a reduced section for "NetLDI Child Task", which includes only the Gem command line. The system information is already duplicated in the header information printed by the Gem. (#50697)

netldid executes without \$GEMSTONE but does not function

The netldid executable started up without the \$GEMSTONE environment variable correctly set, however, it could no locate services.dat, and did not function correctly. Now, this case will error on startup attempt. (#50782)

Collection issues

Finding references failed to report objects in large IdentityBags

The results returned by the operations `Repository >> allReferences:`, `Object >> findAllReferences`, and `Object >> findReferences`, and methods that invoked these methods, did not include references for objects that were located in a large `IdentityBag` (more than 2K elements). (#50163)

Array >> replaceFrom:to:with:startingAt: may not copy elements correctly

Using `replaceFrom:to:with:startingAt:` where the source for the replace is the same as the receiver and the starting position in the source for the replace is less than the target starting index, the replace must copy in reverse. This case did not correctly perform all the copy operations for large collections, and produced incorrect results. (#50721)

RcIdentityBag >> remove:otherwise: errored

The inherited implementation was not appropriate for `RcIdentityBag`, so this method errored; an `RcIdentityBag`-specific method has been added. (#50588)

Dictionary become: does not update internal variables

After sending `become:` to a `Dictionary` containing `EqualityCollisionBuckets`, the back references from the `EqualityCollectionBucket` to the `Dictionary` will incorrectly be to the `become:` argument dictionary, not the receiver. (#50717)

GsSocket >> writeWillNotBlockWithin: does not handle nil returned by writeWillNotBlock

It is possible for `GsSocket >> writeWillNotBlock` to return a `nil`, which resulted in an error in `GsSocket >> writeWillNotBlockWithin:`. (#50775)

Issues relating to upgrades

Upgrading did not preserve default legacy indexes

In v3.4, the `BtreePlus` indexes were introduced, and are used by default in new repositories. Upgraded repositories defaulted to legacy indexes. This behavior on upgrade was lost due to code reorganization in v3.6; upgrading from pre-3.4 to 3.6 or later would result in the default for `GsIndexOptions` to include `btreePlusIndex`, rather than `legacyIndex`. (#50318)

Session methods must be disabled for upgrade

Session methods are a feature used by `GsDevkit` and `GLASS`, but should not be enabled in the ordinary base `GemStone` without knowledgeable assistance. If `GsPackagePolicy current` is inadvertently enabled, it causes a number of problems. This is not a supported configuration for upgrade; now, upgrade will error if `GsPackagePolicy current` enabled returns `true`. (#50453)

copydbf returns wrong version for secondary extents after upgrade

After upgrade, the dbf version in the extent is updated with the new version; this is the version reported by `copydbf -i`. This update was incorrectly only applied to the primary extent. For repositories with multiple extents, `copydbf -i` on any of the secondary extents reported the old version. (#50749)

Excessive attempts to start AdminGem during upgrade

During upgrade, after the Stone has been started but before `upgradeImage` has been run, the Stone continuously attempted to start the Admin GcGem, which failed due to the version mismatch until `upgradeImage` completes. (#50773)

GLASS/Seaside auto-migrate may error after GC operation

In the GLASS/Seaside environment, Class versioning (including that done by `upgradeSeasideImage`, as well as code development), automatically migrates instances to the new Class version, which invokes a repository scan operation to detect the instances. This scan operation may conflict with voting or promote operations that occurs as part of an Epoch or after a `markForCollection`. (#50078)

Issues with stacks and memory stats when using setcap to enable LargeMemoryPages or OOM killer protection

To configure Linux to allow huge pages, to protect critical processes from the Linux OOM killer, and to lock the shared page cache in memory, the Installation Guide directed using setcap to provide specific capabilities to GemStone executables. Setting these capabilities has the effect of preventing gdb from attaching to generate C stacks, and statmonitor from collecting certain host process statistics. (#50580).

See “Using setcap for large pages and OOM protection on Linux” on page 9 and the updated *Installation Guide* for more information.

Numeric and Time related issues

Float = and ~= always returned false for SmallScaledDecimal arguments

The primitives supporting the Float methods `=` and `~=` return false, rather than failing the primitive, for `SmallScaledDecimal` arguments. This bypasses the handling that converts the `SmallScaledDecimal` to a comparable value. (#50597)

Strings with leading '-0.' lose sign when converted using asNumber or Number fromString/Stream:

Converting a string containing a decimal number that is less than zero and greater than -1, such as `'-0.1'`, using an unspecific conversion `asNumber` or `Number fromString:` or `fromStream:`, resulted in a positive value, the absolute value of the correct result. (#50751)

SmallDateAndTime passivate activate failed for years 2035-2072

Activating a passivated SmallDateAndTime in the approximate year range 2035 to 2072 errored; the activation expected a SmallScaledDecimal value in the internal storage, but the stored value was not in the SmallScaledDecimal range. (#50172)

asJson problems with Date, Time, DateTime, and DateAndTime

The results produced by sending asJson were empty for instances of Date, Time, and DateAndTime. While DateTime produced a valid string, it was not quoted correctly. (#50391)

CharacterCollection >> isDigits incorrect for empty string

For an empty String, this method incorrectly returned true. (#50145)

A Time did not compare equal to equivalent SmallTime

A SmallTime and a Time that represent equivalent points in time did not compare as equal using = (equal sign). (#50118)

Duration new created an uninitialized instance

Duration new now returns Duration zero rather than an uninitialized instance. (#50710)

File handle leak in GsTsExternalSession

In-memory GC of a logged-in GsTsExternalSession caused a file handle leak (#50624)

Spurious OutOfMemory when in-memory pom_gen scavenge fails

When pom_gen scavenge fails, in-memory GC may signal an OutOfMemory error when not actually out of memory. (#50711)

commitRestoreForFailoverAfterWaitingUpTo: now stops logreceiver

This method now will stop the logreceiver, if it is running, as well as stopping continuous restore. (#50512)

stoned exited with code 3 on clean shutdown

On a clean stone shutdown using stopstone, stopstone exited with code 0. However, the stoned process itself exited with code 3. Now, stoned will exit with code 0 on clean stopstone. (#50222)

SEGV when a terminated GsProcess is sent terminate

From GBS, it was possible to interrupt a GsProcess that was in the process of being terminated, and send another #terminate message to it. This SEGVed if the timing was such that the GsProcess had already been terminated. (#50702)

gemnetobject -T, -N argument was ignored if no separator

When setting the temporary object cache size or native code using arguments to the gemnetobject script (e.g. set gemnetid 'gemnetobject -T *value*'), the -T -N argument was ignored if there was no space between the -T or -N and the argument. (#50338)

CodeModification required to list Pragmas with session methods enabled

When session methods are enabled (this is a feature that is used in Seaside and GsDevKit), finding or enumerating Pragmas required the user to have #CodeModification privilege; which should not be needed for a view-only operation. (#50620)

Array with:* primitive failure error reports incorrect

The Array with:with:with:[with:]+ methods invoke a primitive; if this primitive fails, the error message did not correctly report the number of with: arguments in the selector and/or the argument list. (50786)

PPParser >> child included a send to #assert:

The PetiteParser class PPParser method #child included a send to #assert:, although #assert: is not implemented within that hierarchy. (#50193)