GemStone®

GemStone/S Release Notes

Version 6.3

April 2008

GemStone™

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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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Preface

About This Documentation

These release notes describe new features and bugs fixed in the GemStone/S version 6.3 release.

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

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

Technical Support

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Email: support@gemstone.com

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

Requests for technical assistance may also be submitted by email or by telephone. We recommend you use telephone contact only for more serious requests that require immediate evaluation, such as a production system that is non-operational. In these cases, please also submit your request via the web or email, including pertinent details such error messages and relevant log files.

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

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

24x7 Emergency Technical Support

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

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- Training courses are offered periodically at GemStone's offices in Beaverton, Oregon, or you can arrange for onsite training at your desired location.
- Customized consulting services can help you make the best use of GemStone products in your business environment.

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

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Chapter 1

GemStone/S 6.3 Release Notes

Overview

GemStone/S 6.3 is a new version of the GemStone Smalltalk object server. This release contains new features, including improved support for distributed architectures, and fixes for a number of bugs and performance issues. We recommend everyone using GemStone/S to upgrade to version 6.3.

These release notes provide changes between the previous version of GemStone/S, version 6.2, and version 6.3. If you are upgrading from a version prior to 6.2, please also review the release notes for each intermediate release to see the full set of changes.

This release supports Solaris, AIX, and Linux. We are providing a beta-level release for Windows. Due to changes in our testing framework on Windows, at time of release, testing is not complete on Windows. As testing completes, we will certify 6.3 on Windows or provide a follow up certified release.

Although the 6.2 release was not available for Windows, Windows users should still review the release notes for 6.2, for platform-independent changes. Note that the tranlog analysis feature, introduced in version 6.1.6, is not available on Windows, nor is the startcachewarmers utility.

For details on supported platforms, and instructions for installing GemStone/S 6.3 or upgrading from a previous release of GemStone/S, see the *GemStone/S Installation Guide*.

Changes and New Features

Updated Documentation

The following manuals have been revised for this release:

- *System Administration Guide for GemStone/S* has been revised both for Windows and UNIX.
- *Gembuilder for C* has been revised, including Windows information.

Improved support for sessions over WAN

The 6.3 release includes changes to improve performance when some gem processes are on nodes of a Wide Area Network (WAN), far away from the machine on which stone is running.

It is assumed that if gem processes are running on more than one machine far from the stone, that all gems physically close to each other relative to the WAN topology will be using a mid-level cache close to those gems. See the *System Administration Guide for GemStone/S* v6.2 for documentation on the mid-level cache methods in class System.

A new configuration file parameter has been added: GEM_PGSVR_COMPRESS_PAGE_TRANSFERS. This configures compression of page transfers between gem and the gem's pgsvr on the stone's machine. The same configuration value is applied between the gem's pgsvr on a mid-level cache and the gem's pgsvr on the stone's machine. Page transfers between a gem and a pgsvr on a mid-level cache are not compressed, since it is assumed that mid-level cache is on a node close to the gem process. This can be configured at runtime using the runtime configuration option #GemPgsvrCompressPageTransfers.

Gems can be configured to get more free pages from stone each time it needs free pages, to reduce number of round trips to stone; see new configuration file parameter GEM_FREE_PAGEIDS_CACHE.

Page write operations from gem to pgsvr on the stone's machine are now asynchronous. Previously, each write waited for the pgsvr to respond. Now the gem issues the write to the pgsvr and checks for accumulated errors or lost commands before the next commit by that gem. This is not configurable; this is always true for any gem not running on the stone's machine.

The pagemanager's management of remote caches now uses the concept of subordinate caches to reduce communications between the stone machine and machines with remote caches. If a mid-level cache is in use, then for each gem process using the mid-level cache, all the shared caches (gemSCs) to which the gems are attached are subordinate to that mid-level cache. The pagemanager sends cache management commands to pagemanager's pgsvr (pgsvrM) on the mid-level cache machine, and pgsvrM then replicates those commands to the pagemanager's pgsvr's on each of the gemSCs caches. pgsvrM aggregates the responses from the pgsvr's on each of the gemSCs, and returns a combined response to pagemanager. This reduces the number of round trips from pagemanager to distant nodes.

Maximum number of remote caches is now configurable

In version 6.2, the maximum number of remote caches was raised to 1024. In this release, the upper limit has been made configurable. The limit is controlled by the new configuration parameter STN_MAX_REMOTE_CACHES.

Note that while this allows a setting of up to 65535, the upper limit will be unreachable since STN_MAX_SESSIONS is limited to 8192.

NaNs now always positive

The exceptional Floats MinusQuietNaN and MinusSignalingNaN are no longer returned from functions that return NaN types. A NaN is “not a number”, for example the results of evaluating “-1.0 sqrt”. Now, instead of returning the a Minus NaN type, PlusQuietNaN or PlusSignalingNaN are returned.

The reason for this change is that on different platforms, inconsistently signed NaN values were returned from mathematical operations, and this is permitted according to the specification. The IEEE Standard for Binary Floating Point states that “The Standard does not interpret the sign of an NaN.” The standard only specifies two kinds of NaNs: QUIET and SIGNALING.

Improvements to reclaimAll

Several internal improvements have been made to the single-user reclaimAll without GcGem support, which is done by the Stone. These changes improve the efficiency and performance of this operation. In addition, the following statistics are now updated during reclaimAll:

- **PagesNeedReclaimingSize** - will rise and fall during the course of the operations, ending at zero.
- **DeadNotReclaimedSize** - will consistently decrease as dead objects are reclaimed, also ending up at zero.

Specifying an extent for an object no longer supported

In past releases, it was possible use ClusterBuckets to assigning an object to a specific extent, using ClusterBucket>>extentId: or ClusterBucket>>newForExtent:. These methods are deprecated. Clustering will attempt to use the specified extent, but will be limited to pages that have already been provided to the session that is performing the clustering. Gems are given pages according to the setting for DBF_ALLOCATION_MODE.

Date format in log headers now localized and configurable

The format of the timestamps in GemStone log files now conforms to local date display conventions, and can be configured more specifically, if desired.

On UNIX and Linux platforms, if the locale is set (using the LC_ALL environment variable or similar), in the environment from which the process is started, the timestamp is now printed according the this locale’s date and time printing.

On Windows, or on any platform to override the locale information to set a specific time stamp display format, you may use the environment variable GS_CFTIME. For example,

```
% setenv GS_CFTIME '%Y-%m-%d %H:%M:%S'
```

results in a log header line of the form:

```
| PROCESS ID: 21586     DATE: 2008-03-21 12:33:00 PDT
```

If the timestamp display is non-US default, either due to localization or specification using GS_CFTIME, an extra line is printed in the log header with the format. This avoids risk of ambiguous timestamp formatting.

```
| DATEFORMAT: %Y-%m-%d %H:%M:%S
```

Change in object change tracking, affecting GemConnect

There was a inconsistency in the object change tracking indexing offset for delete operations on SequencableCollections. Formerly, this used an offset into the object size (including named instance variables), while the insert operation used the offset from the first unnamed slot. Now, both operations use an index offset based on the first unnamed slot.

This change affects GemConnect use of modification tracking. Contact GemStone Technical Support for a patch for GemConnect.

Windows-specific changes

GS_MAKE_EVENTS_GLOBAL now on by default on Windows

In past releases, setting the Windows environment variable GS_MAKE_EVENTS_GLOBAL made certain GemStone resources globally visible. These resources are now globally visible by default; the variable may be set to 0 (zero) to prevent making these resources global.

Native Code not supported on Windows

In this release of GemStone/S, native code generation is not supported on the Windows platform.

Installation process changed on Windows

The installation program, setup.exe, is no longer supplied or used for installing GemStone on the Windows platform. For the new installation process on Windows, see the updated Installation Guide.

Configuration parameter changes

The following configuration parameters have been added:

GEM_FREE_PAGEIDS_CACHE

Specifies the maximum number of free pageIds to be cached in gem. Larger values reduce number of calls to stone, at the cost of needing more free space within the extents.

Runtime equivalent: #GemFreePageIdsCache (read-only access)
Default: 200
minimum: 40
maximum: 1000

GEM_PGSVR_COMPRESS_PAGE_TRANSFERS

If TRUE, use compress2() from zlib library with default compression level to compress page transfers between pgsvr on stone's machine and gem or mid-cache pgsvr.

For the first gem to login on a remote machine, that Gem's configuration file value of this parameter is propagated to the pagemanager and used to configure the pagemanager's communication to pagemanager's pgsvr on the new remote cache.

When a gem triggers creation of a mid-level cache, via the method midLevelCacheConnect:cacheSizeKB:maxSessions: that Gem's current runtime value of this parameter is propagated to the pagemanager and used to configure the pagemanager's communication to pagemanager's pgsvr on the new mid-level cache.

Runtime equivalent: #GemPgsvrCompressPageTransfers
Default: FALSE

STN_MAX_REMOTE_CACHES

The maximum number of remote shared page caches that the system may have. This limit includes both midlevel caches and “leaf” caches.

Default: 255
minimum: 0
maximum: 65535

Changes in Errors

The following error has been added:

GS_ERR_MAX_REMOTE_CACHE_LIMIT

4300 - Login attempt failed - the maximum number of remote caches already exists.

Changes in Cache Statistics

The following statistics have been added:

RemoteSharedPageCacheMax (Stone)
Maximum number of remote shared page caches that may be used with this system.

CheckpointSequence (pgsvr only)
This increments to indicate checkpoint status; visible via VSD, but not returned by System>>cacheStatistics:

The pgsvr statistic **AsyncWritesInProgress** has been removed; it is functionally replaced by Checkpoint Sequence.

The statistic **WaitsForOtherReader**, which was added in v.6.2, is now available programmatically, via System >> cacheStatistics.

Bugs Fixed

The following bugs in GemStone/S 6.2, or in GemStone/S 6.1.5 for Windows, have been fixed in GemStone/S 6.3:

Remote cache creation fails in netldi secure mode

With netldi running in secure mode, login of remote gems failed. Due to changes in 6.2, the startup of the remote cache failed authentication. (#38239)

Page leak causing repository growth

A page leak was introduced by changes in version 6.2; this leak caused processes performing certain types of operations to gradually use more and more space, which was only released when the process exited. (#38730)

Could not set runtime configuration parameter #StnSignalAbortCrBacklog

Due to an error in bounds checking, it was not possible to set the value of StnSignalAbortCrBacklog at runtime. (#38491).

Problems in signal handling code

Messages that were printed from signal handling code, including printing of the Smalltalk stack by SIGUSR1, were not printed signal handler safe, and could cause various problems. (#38546)

copydbf of tranlog across network was broken

Using copydbf to copy a transaction log across a network (requiring a netldi on the remote machine) was broken. (#37982).

Possible corruption with mid-level caches and replicate extents

Shared cache corruption was possible if you use replicates of extents in combination with a mid-level cache. Now, attempting to use configurations with both replicate extents and mid-level caches will result in an error, preventing corruption. (#37873)

If you have replicate extents, and want to use mid-level caches, you must stop the stone, edit the configuration files to unset replicates, delete the replicate files, and restart the stone.

RcQueue>>removeObject:addedBySessionId: incorrect behavior

This method did not ensure that the specified item was the item to remove, and did not update internal settings correctly. This could result in errors in subsequent RcQueue operations. (#38419)

RestoreReclaimPages failed

GemStone/S v. 6.2 included changes that require a login after each step of restoring from backup and transaction logs. Due to loss of state on this logout, the method Repository >> restoreReclaimPages failed with an out of range error. (#38577)

GciStoreClassMismatch error during StoreTraversal from a C client

Implementation of StoreTraversal could have incorrectly faulted in dead lifetimes of objects when determining whether an object report in the buffer represented store into an already existing object or represented an object creation request. This would result in intermittent GciStoreClassMismatch errors.

This was a GemStone/S 64 Bit that has not been seen in GemStone/S, but the fix has been implemented in GemStone/S. (#38182)

Incorrect argument in configuration parameter out of bounds error

The error message provided when a configuration parameter was out of bounds used the incorrect variable as the out of range value. (#38492)

Incorrect results in high elements of cacheStatistics: results

When using the method System Class >> cacheStatistics: with an argument other than 1 (the Stone), the results array would have incorrect values for elements above 169. (#38513)

Improvements in reporting oldestCrSession

The underlying code to return oldestCrSession included a logic error that could incorrectly leave this stat at -1. The method oldestCrSessionNotInTrans has also been corrected. Both methods are now correct and updated after each CR disposal. (#37992, #38002)

throughAll: produced incorrect results for some cases

Some receiver and argument sequences caused PositionableStream >> throughAll: to return incorrect results. (#38371)

Wrong path reported for log in Windows command line errors

On Windows, when errors are encountered executing GemStone utilities from the command line, it reports the log file path and name to check for error details. This incorrectly gave the path as the current directory, rather than the actual directory containing the log file. (#29603)

CharacterCollection >> _at:equals:ignoreCase: false success

If a Character was passed into this method, rather than the expected type CharacterCollection, the primitive that implemented this method would return a false success rather than a primitive failure. All methods that called this method, such as matchesAnyOf:, were affected. (#38265)

Divide by Zero return type

Division of an Integer by Float 0.0 returned an error, rather than PlusInfinity or MinusInfinity. (#38528)

Zero divided by return type

An Integer 0 divided by a non-Integer non-zero number returned Integer 0 rather than 0 of the type of the argument. This did not agree with the ANSI specification. (#38142)

Out of range GEM_PRIVATE_PAGE_CACHE_KB used max not default

If an out of range setting was specified for GEM_PRIVATE_PAGE_CACHE_KB, rather than defaulting to use a setting of the default, it used the maximum, 524288K. (#38662)

Float fromString:locale: failed

Calls to the method Float Class >> fromString:locale: failed with a primitive error, due to faulty code in the primitive implementation. This method was introduced in version 6.2. (#38658)

MGC not immune from lostOTRoot

Previously, it was possible for a session performing markGcCandidates (MGC) to receive a lostOTRoot signal. This has been fixed, so MGC, like FDC and MFC, is immune from lostOTRoots. (#38445)

Password age warnings when no password expiration set

If passwordAgeWarning is set, but passwordAgeLimit is set so that passwords never expire, a passwordAgeWarning was still being reported to the user. (#38423)

timezone.txt script location

In the distribution tree, the timezone.txt script was incorrectly located in the /install directory, instead of the /upgrade directory.

Error in primitive error checking for _reloginAsUser:...

The primitive failure error checking code referenced the incorrect variable. (#35273)

Method comments included non-ASCII characters

Several method comments included non-ASCII characters, which created problems with certain tools. (#38383)