GemStone®

GemStone/S Release Notes

Version 6.5.6

March 2010

GemStone S™

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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 changes in the GemStone/S version 6.5.6 release. We recommend that everyone migrating to this version read these release notes before beginning installation, testing or development.

For information on installing or upgrading to this version of GemStone/S, please refer to the *GemStone/S Installation Guide* for version 6.5.6.

These documents are also available on the GemStone customer website, as described below.

Technical Support

GemStone provides several sources for product information and support. The product-specific manuals provide extensive documentation, and should be your first source of information.

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:

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, and past and current versions of GemBuilder for Smalltalk.

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.

TechTips, also in the Learning Center section, provide information and instructions for topics that usually relate to more effective or efficient use of GemStone products.

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.

Help Requests

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.

Website: http://techsupport.gemstone.com

Email: support@gemstone.com

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

Requests for technical assistance may be submitted online, or 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.

Training and Consulting

Consulting and training for all GemStone products are available through GemStone's Professional Services organization.

- 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 6.5.6 Release Notes

Overview

GemStone/S 6.5.6 is a new version of the GemStone Smalltalk object server. This release provides significant new features, such as the ability to reset the SystemUser password while restoring a backup, as well as fixing a number of significant bugs. We recommend all customers using GemStone/S upgrade to version 6.5.6.

These release notes provide changes between the previous version of GemStone/S, version 6.5.5, and version 6.5.6. If you are upgrading from a version prior to 6.5.5, please also review the release notes for each intermediate release to see the full set of changes.

For details about installing GemStone/S 6.5.6 or upgrading from earlier versions of GemStone/S or other GemStone server products, see the *GemStone/S Installation Guide* for version 6.5.6 for the appropriate platform.

This release supports Solaris, Linux, AIX, and Windows.

Changes and New Features

Support for Linux Red Hat 5, AIX 6.1, and Windows Vista

This release adds support for several new operating system versions:

- Linux Red Hat ES 5.0

  Support for RedHat ES 5.0 requires compatibility libraries to be installed. For detailed requirements, see the *GemStone/S Installation Guide for Linux* for version 6.5.6.

- AIX 6.1
- Windows Vista

Allow restore from backup to reset SystemUser's password

New methods have been added to support resetting the SystemUser password during restore from backup. In systems where the administration passwords must be changed regularly, this avoids the keep to keep an external list of passwords for archived backups. Any backup can be restored and read, regardless of the password that was in place at the time the backup was taken.

These methods may only be executed by SystemUser.

`Repository >> restoreFromBackup:` *fileOrDevice*
`newSystemUserPassword:` *aString*

Same as the `restoreFromBackup:` method, except that a new password is set for SystemUser in the restored repository. Passwords for all other user profiles will be restored to their values at the time the backup was taken. If *aString* is nil, then the SystemUser password is not changed.

`Repository >> restoreFromBackups:` *arrayOfFilesOrDevices*
`newSystemUserPassword:` *aString*

Same as the `restoreFromBackups:` method except that a new password is set for SystemUser in the restored repository. Passwords for all other user profiles will be restored to their values at the time the backup was taken. If *aString* is nil, then the SystemUser password is not changed.

`Repository >> restoreNoShadowsFromBackups:` *arrayOfFilesOrDevices*
`newSystemUserPassword:` *aString*

Same as the `restoreNoShadowsFromBackups:` method except that a new password is set for SystemUser in the restored repository. Passwords for all other user profiles will be restored to their values at the time the backup was taken. If *aString* is nil, then the SystemUser password is not changed.

Added method to terminate sessions holding commit record

In unusual cases where the session holding the oldest commit record is not a regular logged-in session, it can cause a commit record backlog that is difficult or impossible to release. For use in situations like this, the following method has been added:

System class >> terminateAllSessionsReferencingOldestCr

This method causes the stone to immediately log off all sessions which reference the oldest commit record, except for the current session, and to dispose the oldest commit record and all other commit records eligible for disposal.

WARNING: This method bypasses internal mechanisms which prevent the immediate termination of active sessions, and therefore should only be used if the oldest CR session(s) could not be stopped by any other means. Usage of this method when one or more sessions referencing the oldest CR are active may cause cache coherency errors.

Keepalive on OOB socket

An option has been added to enable sending keep-alive packets on the out-of-band (OOB) socket between the GCI client and the gem. This socket has little activity and may be closed as inactive by firewall software.

This option is enabled by the new gem configuration option, GEM_RPC_KEEPALIVE_INTERVAL. The keep-alive consists of the GCI client sending a single byte to the gem on the OOB socket. It then does a blocking read and waits for a reply. The gem will send a single byte back to the GCI acknowledging the keep alive. The new gem cache statistic GciRpcKeepAlivePacketCount tracks the number of keep-alives received by the gem (see page 13, in the section 'Cache Statistics Changes').

This option is intended for use with GBS client. Keep-alives are only sent at the end of the GciPollForSignal() call. GBS makes this call every 300 ms by default. On some older GBS versions, it is only made if the client is out of transaction, but recent GBS versions make the call for all transaction states.

For more information, see "GEM_RPC_KEEPALIVE_INTERVAL" on page 12.

Login details recorded in tranlogs

Tranlog analysis allows searching the transaction logs for exact details on data modifications, useful for audits under Sarbanes-Oxley. Now, addition information is written to the logs when a user logs in:

timestamp
real user ID (integer)
real user ID name (string)
effective user ID (integer)
effective user ID name (string)
gem process ID

The GemStone scripts `searchlogs.sh` and `printlogs.sh` have been modified to process these records.

For information on transaction log analysis, see the System Administration Guide for GemStone/S 64 Bit, appendix H.

Log file name change

Certain log files that contained the PIDs of the parent as well as the process' PID now have an additional underscore to distinguish the two sets of digits.

Specifically, the format:

```
name%P%p.log
```

now is:

```
name%P_%p.log
```

where `%P` is the parent PID and `%p` is the process ID of the process.

Additional information in login header information

Topaz logins report several items of information, such as user id and repository, to stdout. This information now also include the gem PID.

Improved log timestamps

The printing of timestamps to logs has been adjusted to ensure it is consistent in all log files. Also, timestamps are not printed unless at least 10ms has passed since the last timestamp, to avoid rapidly repeating timestamps.

Renamed Character Data Table file

The file $GEMSTONE/goodies/CharTableDefault.dat has been renamed to CharTableDefault.tab. The change in the filename extension is to indicate that this file is in structured table format, unlike CharTableUnicode*.dat, which is in primitive table format.

Added configuration parameters

The following configuration parameters have been added:

GEM_RPC_KEEPALIVE_INTERVAL

Interval in seconds for the RPC GCI client keep-alive packet to be sent on the seldom used out-of-band (OOB) socket between the gem and the GCI client (normally GBS). Has no effect for linked sessions or RPC sessions running the same host as the gem process.

If enabled, keep-alive packets are sent at the end of the GciPollForSignal() call. GBS clients make this call by default every 300ms. In some older versions of GBS, this call is only made when the client is out of transaction.

Default: 0 (disabled)
Minimum: 0
Maximum: 7200

STN_NUM_SMC_QUEUES

STN_NUM_SMC_QUEUES specifies the number of shared memory communication (SMC) queues used by gems and page servers to communicate with the stone. Valid values are: 0, 1, 2, 4 and 8.

A value of zero indicates the stone should compute the correct value based upon the maximum number of processes that can attach to the stone's shared page cache (SHR_PAGE_CACHE_NUM_PROCS) as follows:

SHR_PAGE_CACHE_NUM_PROCS	STN_NUM_SMC_QUEUES
< 256	1
256 - 1023	2
1024 - 2023	4
> 2024	8

Default: 0
Minimum: 0
Maximum: 8

Cache Statistics Changes

The Stone cache statistic **SmcQueueSize** is now obsolete.

The following cache statistics have been added:

ClientAborts (Page Server)
Number of times the client gem of this page server aborted a transaction.

ClientCallsToStone (Page Server)
Approximate number of times the client gem of this page server has made a call to stone. Some calls to stone during the login sequence are not included in this statistic.

ClientCommits (Page Server)
Number of times the client gem of this page server committed a transaction.

ClientFailedCommits (Page Server)
Number of times the client gem of this page server failed to commit a transaction because of concurrency conflicts.

ClientLostOtRoots (Page Server)
Number of times the client gem of this page server was sent a SigLostOtRoot.

ClientSigAborts (Page Server)
Number of times the client gem of this page server was sent a SigAbort.

ClientStopSessionRequests (Page Server)
Number of times the stone has requested this session to stop. Only updated for gems that running on the same host as the stone.

GciRpcKeepAlivePacketCount (Gem)
Number of keep-alive packets received from the GCI client on a remote host.

NumSlotsPendingReuse (SPC Monitor)
Number of slots in the shared page cache that will be reused when the stone completes cleanup of a session which previously used the slot.

PasswordPagesWrittenByGem (SPC Monitor)
Number of password pages written by a gem.

PasswordPagesWrittenByStone (SPC Monitor)
Number of password pages written by the stone.

ProcessesWaitingForQueueLocks (SPC Monitor)
Number of processes attached to the shared cache which are spinning while attempting to acquire a queue lock.

SmcQueuesInUse (Stone)
Number of shared memory queues in use on this shared page cache. On stone's cache, this value can be 1, 2, 4, or 8. It is always zero on remote shared page caches.

SmcQueueSize0 (Stone)
Number of sessions present in shared memory queue 0.

SmcQueueSize1 (Stone)
Number of sessions present in shared memory queue 1.

SmcQueueSize2 (Stone)
Number of sessions present in shared memory queue 2.

SmcQueueSize3 (Stone)
Number of sessions present in shared memory queue 3.

SmcQueueSize4 (Stone)
Number of sessions present in shared memory queue 4.

SmcQueueSize5 (Stone)
Number of sessions present in shared memory queue 5.

SmcQueueSize6 (Stone)
Number of sessions present in shared memory queue 6.

SmcQueueSize7 (Stone)
Number of sessions present in shared memory queue 7.

StopSessionCount (Gem)
Number of times the stone has requested this session to stop. Only updated for gems that running on the same host as the stone.

Bugs Fixed

The following bugs in GemStone/S 6.5.5 have been fixed in GemStone/S 6.5.6:

Stuck spin lock handling may cause CPU spike

A bug existed in the code that handled stuck spin locks, that could cause internal queue structures of the queue lock to become incorrect. This error could result in excessive CPU usage or processes deadlocking. (#40491)

SMC queue lock performance problem

Shared Memory Communication (SMC) between locals gems and the stone was managed by a queue; a local session placed itself on this queue when it needed to communicate with the stone. However, to get on this queue, the queue lock was required. On systems with many gems, sessions attempting to get the queue lock could overload the CPU. (#40456)

To avoid this problem, larger systems now may have up to eight SMC queues, specified by a new configuration parameter, STN_NUM_SMC_QUEUES. By default, the number of queues is calculated based on the maximum number of sessions for the system. See “STN_NUM_SMC_QUEUES” on page 12 for details on this parameter.

In addition, there have been code optimizations to reduce the CPU load when waiting for a queue lock.

Checkpoints can take too long on large shared page caches

One step of the checkpoint processing is a scan of pages in the cache. This scan was inefficient, and on large caches could result in the time to complete the checkpoint taking longer than the default checkpoint interval. Operations such as backup that cannot start during checkpoints could be difficult to start. (#40463).

Extent creation during checkpoint may hang checkpoint

When an extent is added programmatically while the system is performing a checkpoint, there is a small window during which the additional extent may cause the checkpoint to fail to complete. This effectively hangs checkpoints until the system is restarted. (#40438)

Simultaneous logins by the same userId could result in disabled account

If two logins for the same userId arrived within the same clock second, a logic error could result in the account being disabled due to “StaleAccount”. (#40475)

SPC Monitor and Page Manger logs no longer deleted on clean shutdown

Normally GemStone processes delete their log files on clean shutdown. This has been changed so the Shared Page Cache Monitor and Page Manager log files are not deleted on shutdown, for clean or unclean shutdowns. (#40433)

GcGems may have run hot and bloated log

During backup, if the GcGem attempts to reclaim a page that is greater than the current backup position, the commits fails and a message is written to the log. This was not handled correctly, so the GcGem immediately retried, resulting in continuous log messages until the backup progressed beyond that point. (#40432)

printlogs.sh and searchlogs.sh may have failed on Linux

Printlogs.sh and searchlogs.sh invoked /usr/bin/sh which does not exist on Linux. Now, these scripts use /bin/bash on all UNIX platforms. (#40498)

SPC Monitor death may cause SEGV in pgsvr

If the SPC Monitor died, it could have caused the AIO or Free Frame page servers to SEGV. (#40437)

Pagemanager log not flushed frequently enough

Remote cache information was not flushed to the log file until a later message was recorded. (#40353)

Inadequate information for rare error

More information is now included when the rare remote cache error is encountered, which previously printed out a message such as “Invalid remote cache state 1“. (#40458)

Default name for pageaudit

If no name is explicitly included as a for the pageaudit, it will now perform the audit using the default name **`gemserver65-audit`**, rather than **`gemserver65`**. (#40499)