



GEMTALK
SYSTEMS

Product Roadmap

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Agenda

- GemTalk addYears: 1
- GemStone/S 64 v 3.2
- GemStone/S 64 v 3.3
- New Licensing Options

GemTalk addYears: 1

- GemTalk Turned 1 on May 1!
- Year 1 Milestones:
 - 8 Product Releases
 - New Licensing Options
 - Financial Goals Achieved
 - Zero Staff Turnover



GemStone/S 64

- Latest Major Release: 3.2.0 (April, 2014)
 - Avoid 3.2.0. Use 3.2.2 or later.
- Latest Minor Release: 3.2.2
- Next Minor Release: 3.2.3 (TBD)
- Next Major Release: 3.3 (January, 2015)

GemStone/S 64 3.2

- Additional Unicode character features
 - Indexing Support
 - ICU package collators
 - Replace old CharacterTable Support in favour of libicu functionality

GemStone/S 64 3.2

- New Indexing Features
 - Set-valued path terms
 - New Query API
 - New Index Creation API
 - Selector Path Terms
 - Date and DateTime Encoding and Caching in B-tree nodes
 - Unicode String Indexes
 - More Info: Dale's Talk today @ 12:00

GemStone/S 64 3.2

- New Hot Standby Features
 - Support for automated restore-complete status check during planned failover event.
 - Use SSL socket for communication with hot-standby nodes (optional)
- Optional Thread-safe GCI C/C++ API
 - “preview” feature in 3.2
- Support for 64-bit Windows Clients
 - 64-bit VisualWorks®

GemStone/S 64 3.2

- Large Memory Page Support
 - Available on AIX and Linux
 - Enabled by `SHR_PAGE_CACHE_LARGE_MEMORY_PAGE_POLICY`
 - OS / Kernel Changes Also Required
- ProfMonitor Enhancements
 - Better object creation reporting: Full Smalltalk Stack

GemStone/S 64 3.2

- Reclaim Gem Changes
 - Previously (before 3.2.0)
 - N reclaims gem processes, 1 thread per gem
 - Now (3.2.0 and later)
 - 1 reclaim gem process, N threads per gem.
 - Each thread is a separate GemStone session
 - Pause Reclaim Upon Low Free Space
 - **See:** `UserGlobals at: #reclaimMinFreeSpaceMb`

GemStone/S 64 3.2

- New List References Method
 - `#listReferencesToInstancesOfClasses:`
`anArrayOfClasses`
 - Finds all objects that reference one or more instances of the classes in `anArrayOfClasses`.

GemStone/S 64 3.2

- Asynchronous #performOnServer:
 - System #performOnServer: blocks until the command completes.
 - New class GsHostProcess allows asynchronous execution:

```
| process |  
process := GsHostProcess fork: '/bin/ls'.  
<do something else>  
^ process stdout read: 1024
```

GemStone/S 64 3.2

- New Login Log File
 - A text file that logs every login and logout to GemStone.
 - Useful for security audits (SOX, etc.)
 - To enable:
 - `STN_LOGIN_LOG_ENABLED = TRUE;`
 - `STN_LOGIN_LOG_DIR = /logfile/path/;`

GemStone/S 64 3.2

- Login Log File Record Data:
 - Timestamp String
 - Timestamp Integer (seconds from the UNIX epoch)
 - EventKind
 - UserName
 - SessionId
 - ProcessId
 - Real UNIX ID
 - Effective UNIX ID
 - Gem host name
 - Gem IP address
 - Client IP address
 - Number of commits by this session
 - Login UNIX user ID

GemStone/S 64 3.2

Login Log File Record Data Example:

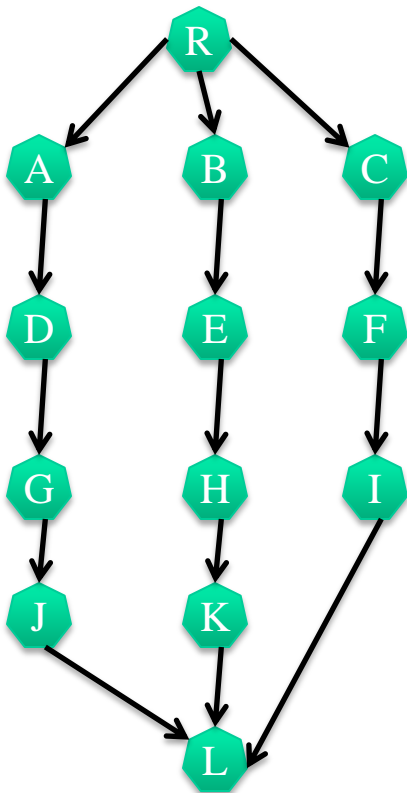
```
"08/20/14 02:24:50.498 PDT" 1408526690 STARTUP Stone 0 15373 300 300 Lehr ::ffff:10.94.141.26 0.0.0.0 0 300
"08/20/14 02:24:51.609 PDT" 1408526691 LOGIN GcUser 2 15401 300 300 Lehr ::ffff:10.94.141.26 ::ffff:10.94.141.26 0 300
"08/20/14 02:24:51.609 PDT" 1408526691 LOGIN GcUser 3 15399 300 300 Lehr ::ffff:10.94.141.26 ::ffff:10.94.141.26 0 300
"08/20/14 02:24:51.614 PDT" 1408526691 LOGIN SymbolUser 4 15403 300 300 Lehr ::ffff:10.94.141.26 ::ffff:10.94.141.26 0 300
"08/20/14 02:24:55.018 PDT" 1408526695 LOGIN SystemUser 5 15419 300 300 Lehr ::ffff:10.94.141.26 ::ffff:10.94.141.26 0 300
"08/20/14 02:24:56.651 PDT" 1408526696 LOGOUT SystemUser 5 15419 300 300 Lehr ::ffff:10.94.141.26 ::ffff:10.94.141.26 0 300
"08/20/14 02:25:02.435 PDT" 1408526702 LOGIN DataCurator 5 15426 300 300 Lehr ::ffff:10.94.141.26 ::ffff:10.94.141.26 0 300
"08/20/14 02:25:05.766 PDT" 1408526705 SHUTDOWN Stone 0 15373 300 300 Lehr ::ffff:10.94.141.26 0.0.0.0 0 300
"08/20/14 02:25:05.766 PDT" 1408526705 LOGOUT GcUser 2 15401 300 300 Lehr ::ffff:10.94.141.26 ::ffff:10.94.141.26 0 300
"08/20/14 02:25:05.766 PDT" 1408526705 LOGOUT GcUser 3 15399 300 300 Lehr ::ffff:10.94.141.26 ::ffff:10.94.141.26 0 300
"08/20/14 02:25:05.766 PDT" 1408526705 LOGOUT SymbolUser 4 15403 300 300 Lehr ::ffff:10.94.141.26 ::ffff:10.94.141.26 0 300
"08/20/14 02:25:05.766 PDT" 1408526705 LOGOUT DataCurator 5 15426 300 300 Lehr ::ffff:10.94.141.26 ::ffff:10.94.141.26 0 300
```

GemStone/S 64 3.2

- New Reference Path Scan Methods
 - #findAllReferencePathsToObject: anObject
 - Finds **all** references paths to a leaf object.
 - #findAllReferencePathsToObjects: anArray
 - Finds **all** references paths to an array of leaf objects.

GemStone/S 64 3.2

- “*Why didn’t my object get GC’ed?*”



- The object graph on the left has 3 Reference Paths from the R(oot) object to L(eaf) object:
 - R-A-D-G-J-L
 - R-B-E-H-K-L
 - R-C-F-I-L
- Before 3.2:
 - Each reference path found separately by invoking `findReferencePathToObject: L`
- 3.2 and Later
 - All reference paths can be found in a single scan by invoking `findAllReferencePathsToObject: L`

GemStone/S 64 3.2

- New Multi-threaded Operations
 - Previously, these were single-threaded:
 - #markGcCandidates
 - #pagesWithPercentFree

GemStone/S 64 3.2

- “Database In Memory” Optimizations
 - Controlled by config file option:
 - `GEM_REPOSITORY_IN_MEMORY`
 - Optimizes the following operations for database in memory:
 - `findReferencePathToObject`:
 - `findAllReferencesPathsToObject`:
 - `pagesWithPercentFree`:

GemStone/S 64 3.2

- Flexible Units in Config File
 - Several config file options now understand the following prefixes: KB, MB, GB
 - Examples:
 - DBF_PRE_GROW
 - DBF_EXTENT_SIZES
 - GEM_PRIVATE_PAGE_CACHE_KB
 - GEM_TEMPOBJ_CACHE_SIZE
 - SHR_PAGE_CACHE_SIZE_KB
 - STN_FREE_SPACE_THRESHOLD
 - STN_PRIVATE_PAGE_CACHE_KB
 - STN_TRAN_LOG_SIZES

GemStone/S 64 3.2

- New DBF Pregrow Options
 - Extents may now be pregrown to an initial size, but still have a (larger) maximum size.
 - Example:
 - Initial size: 4 GB, Max size: 64 GB:
 - `DBF_EXTENT_NAMES = /foo/bar.dbf;`
 - `DBF_PRE_GROW = 4GB;`
 - `DBF_EXTENT_SIZES = 64GB;`

GemStone/S 64 3.2

- Extents Permitted Over NFS
 - Generally not recommended!
 - Enable via:

- `STN_ALLOW_NFS_EXTENTS = TRUE;`

GemStone/S 64 3.2

- Persistent Shared Counters
 - Non-transactional – no database transaction required.
 - Persistent – updates are saved to the database immediately.
 - Value Range: $-2^{63} \rightarrow 2^{63}$
 - Applications: UUID, Unique serial numbers, atomic counters.
 - Counters Available
 - Increased from 128 to 1536

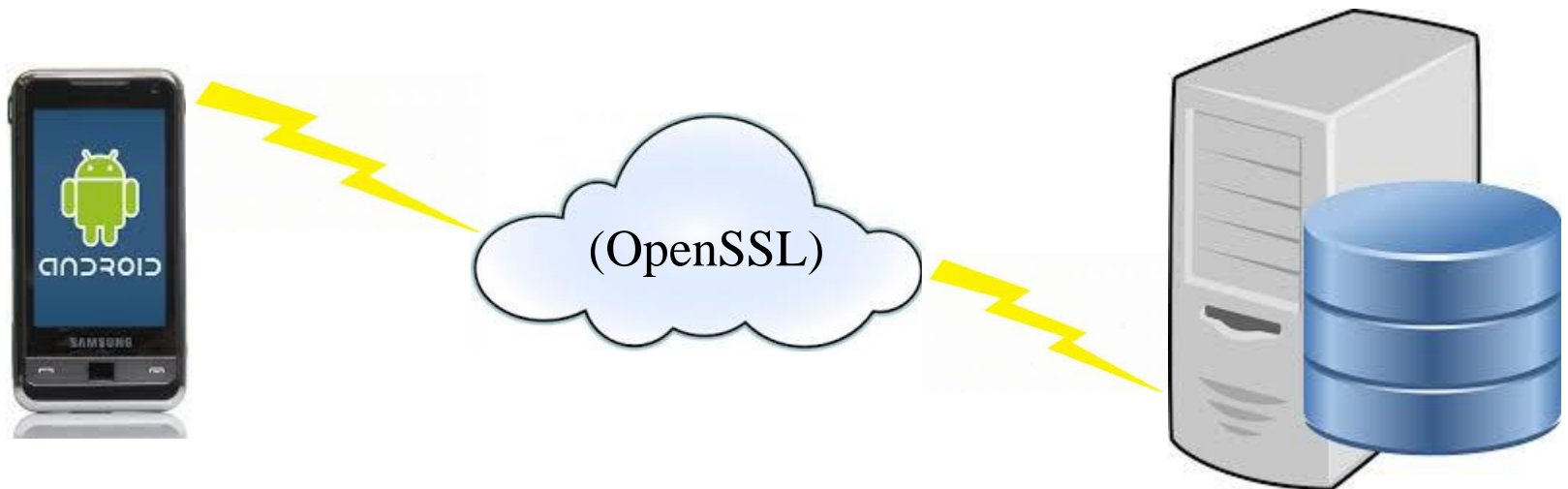
GemStone/S 64 3.2

- Some LDAP servers require *all* binds be authenticated.
 - Even binds only used to resolve a distinguished name (DN)!
- GemStone now supports this.
- Authenticated LDAP Bind Example

```
System validatePasswordUsingLdapServers:  
  (Array with: 'ldaps://myldap.mydomain.com')  
baseDn: 'ou=Users,dc=GemTalk,dc=com'  
filterDn: '(uid=%s)'  
userId: `stephane`  
password: 'SacréBleu'  
bindDn: 'LdapBindUser'  
bindPassword: 'LdapBindPassword'
```

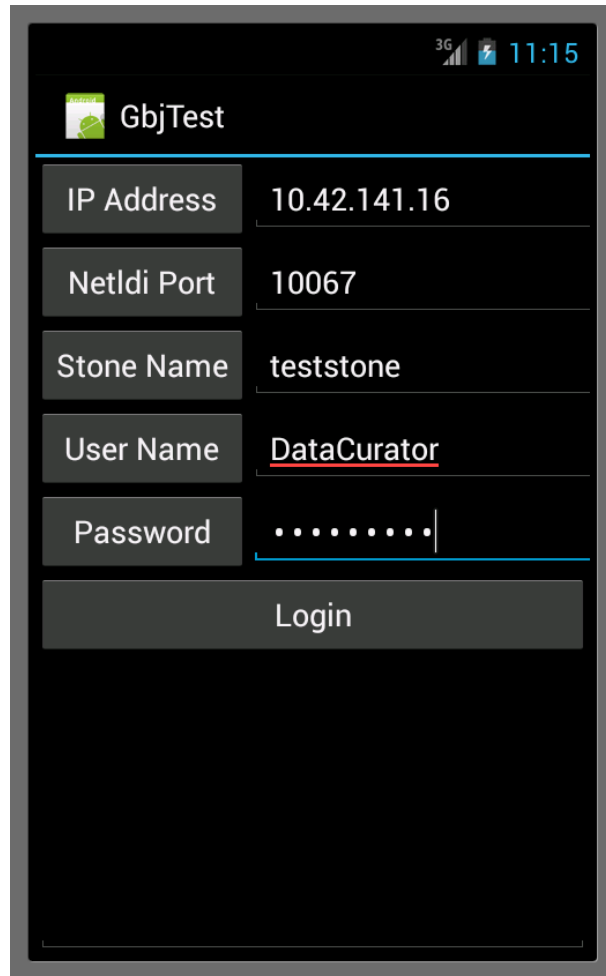
GemBuilder for.....Android?!?

- Experimental Project to Access GemStone from Android Devices
- Uses GemBuilder for Java (GBJ)



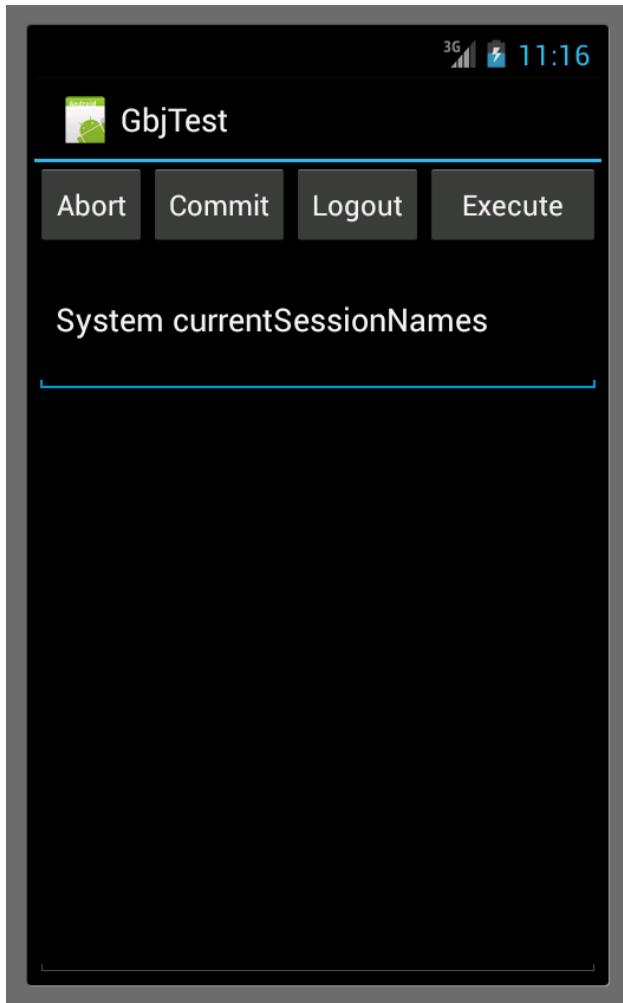
GbjTest App on Android

Login Screen

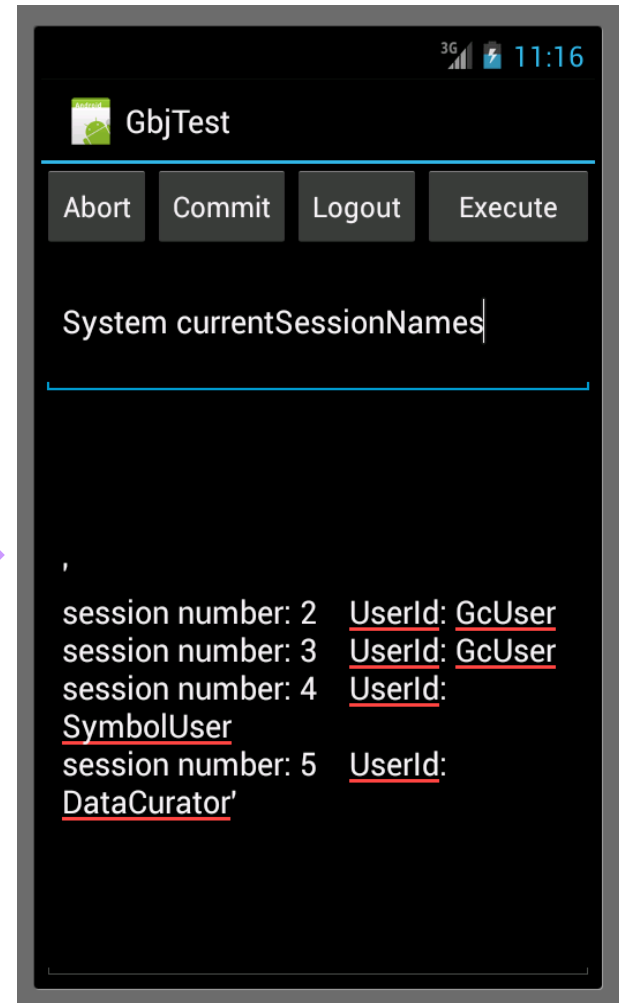


IP Address	10.42.141.16
Netldi Port	10067
Stone Name	teststone
User Name	<u>DataCurator</u>
Password
Login	

GbjTest App on Android



Command Execution

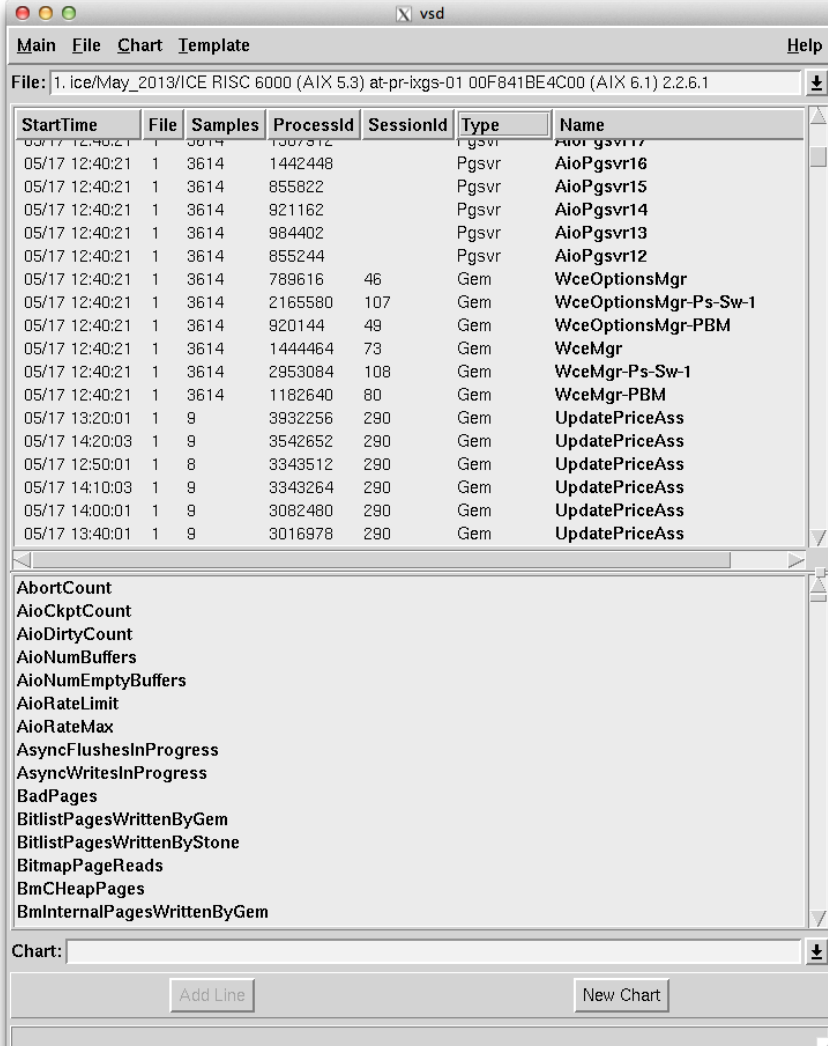


Android Test App Source Code

- Application Code:
 - <ftp://ftp.gemtalksystems.com/pub/GBJ/GbjTest.zip>
- Contact:
 - bill.erickson@gemtalksystems.com

GemStone/S 64 3.2

- VSD Improvements
 - 64 bit program
 - (Much) Faster file loading
 - Session ID Column
 - Enable Mouse Wheel scrolling.
 - MS Windows:
 - Rebuilt for Windows 7



The screenshot shows the VSD application window with the following data:

StartTime	File	Samples	ProcessId	SessionId	Type	Name
05/17 12:40:21	1	3614	1307512		Pgsvr	AioPgsvr17
05/17 12:40:21	1	3614	1442448		Pgsvr	AioPgsvr16
05/17 12:40:21	1	3614	855822		Pgsvr	AioPgsvr15
05/17 12:40:21	1	3614	921162		Pgsvr	AioPgsvr14
05/17 12:40:21	1	3614	984402		Pgsvr	AioPgsvr13
05/17 12:40:21	1	3614	855244		Pgsvr	AioPgsvr12
05/17 12:40:21	1	3614	789616	46	Gem	WceOptionsMgr
05/17 12:40:21	1	3614	2165580	107	Gem	WceOptionsMgr-Ps-Sw-1
05/17 12:40:21	1	3614	920144	49	Gem	WceOptionsMgr-PBM
05/17 12:40:21	1	3614	1444464	73	Gem	WceMgr
05/17 12:40:21	1	3614	2953084	108	Gem	WceMgr-Ps-Sw-1
05/17 12:40:21	1	3614	1182640	80	Gem	WceMgr-PBM
05/17 13:20:01	1	9	3932256	290	Gem	UpdatePriceAss
05/17 14:20:03	1	9	3542652	290	Gem	UpdatePriceAss
05/17 12:50:01	1	8	3343512	290	Gem	UpdatePriceAss
05/17 14:10:03	1	9	3343264	290	Gem	UpdatePriceAss
05/17 14:00:01	1	9	3082480	290	Gem	UpdatePriceAss
05/17 13:40:01	1	9	3016978	290	Gem	UpdatePriceAss

Below the table, the following statistics are listed:

- AbortCount
- AioCkptCount
- AioDirtyCount
- AioNumBuffers
- AioNumEmptyBuffers
- AioRateLimit
- AioRateMax
- AsyncFlushesInProgress
- AsyncWritesInProgress
- BadPages
- BitlistPagesWrittenByGem
- BitlistPagesWrittenByStone
- BitmapPageReads
- BmCHeapPages
- BmInternalPagesWrittenByGem

At the bottom, there is a 'Chart:' section with 'Add Line' and 'New Chart' buttons.

GemStone/S 64 v3.2 Platforms

- Object Server (Database)
 - Linux 64 bit
 - Apple Darwin 64 bit
 - Oracle Solaris 64 bit
 - Oracle Solaris SPARC 64 bit
 - IBM AIX 64 bit
- Cincom VisualWorks 7.9.1 / 7.10.1 Clients
 - MS Windows 7/8 32 bit
 - MS Windows 7/8 64 bit
 - Linux 32/64 bit
 - Solaris SPARC 32/64 bit
- Instantiations VA Smalltalk 8.6 / 8.5.2 Clients
 - MS Windows 7/8 32 bit

GemStone/S 3.3

- ✓ Faster Virtual Machine
 - Native code generator optimized for branch prediction.
 - ~25% performance gain vs. 3.2 VM
- ✓ New Immediate Class: SmallFraction
 - Value stored in OOP == #fast
 - Ranges:
 - Numerator: -536870912 -> 536870911
 - Denominator: 0 -> 134217727

GemStone/S 3.3

- ✓ Faster Tranlog Restore
 - Optimize object table generation during restore.
 - ~30% improvement
 - Affects:
 - #restoreFromLogs
 - Hot Standby Systems
- ✓ Access to syslog()
 - Write messages to the UNIX system log

GemStone/S 3.3

Things We Are Thinking About...

- Native XML Parsing
- Passwordless Logins
- Capture real-time delays in ProfMonitor
 - Semaphore wait
 - Socket wait
 - I/O Wait
 - Etc

GemStone/S 3.3

Things We Are Thinking About...

- Improved Indexed Searches:
 - Message send
 - Block evaluation
- gssapi Integration
- Access Current Context via `#thisContext`
- <Your Suggestions Here!>

GemStone/S Licensing Models

- Perpetual
 - Buy once, own it forever
- Annual Subscription
 - Pay annually, cancel any time.
- Value Added Reseller (VAR)
 - Percentage of royalties

GemStone Community Edition

- Formerly *GemStone Web Edition*
- New and Improved!
- As of April 30, 2014

	Starter	Limited	Full	Extended SPC	Extended CPU	Extended Full
License Kind	Perpetual	Subscription	Subscription	Subscription	Subscription	Subscription
Cores	2	2	2	2	4	4
SPC	1 G	2 G	2G	4G	2G	4G
Gems	10	20	Unlimited	Unlimited	Unlimited	Unlimited
Disk	10G	50G	Unlimited	Unlimited	Unlimited	Unlimited
Development DB	Unlimited	Unlimited	Unlimited	Unlimited	Unlimited	Unlimited
Production DB	1	2	Unlimited	Unlimited	Unlimited	Unlimited
Tech Support	Community	Community	5 tickets	10 tickets	10 tickets	20 tickets
Price	Free	Free	\$1500/yr	\$3000/yr	\$3000/yr	\$6000/yr
Distribution	With Product	Email addr	Sales	Sales	Sales	Sales

Questions?

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