



**GEMTALK**  
SYSTEMS

## **GemStone Update**

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ESUG 2018  
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**How Many Have A Good  
Feel For What  
GemStone Is?**

**How Many Have Actually  
Tried GemStone ?**

## So What Is This GemStone Thing?

- A solution to the limitations of traditional Smalltalk:
  1. Object space limited to one VM.
  2. Object space limited to one host.
  3. Object space limited to available RAM.
  4. Object changes (since last image save) lost when VM exits.

# Welcome To The World Of GemStone!

- Object space visible to thousands of VMs on thousands of machines.
- Object space limited by disk, not RAM.
- Object changes managed by ACID transactions
  - Atomic
  - Consistent
  - Isolated
  - Durable
- Object changes guaranteed persistent once committed.

# Key Features Of GemStone

- Scalability
  - Billions of objects
  - Thousands of users.
  - Thousands of machines.
  - Thousands of transactions per second.
  - Terabytes of data.

# Key Features Of GemStone

- Concurrency
  - Multiple user sessions.
  - Built-in database transactions.
    - Commit
    - Abort
    - Continue
  - Optimistic Concurrency
    - Reduced Conflict Collections
  - Pessimistic Concurrency
    - Object-level read/write locks.
  - Namespaces
    - Shared and private.

# Key Features Of GemStone

- Security
  - Object-level security.
    - User, group, world permissions.
  - Login Security
    - Traditional User-id / Password
    - Single-Sign-On (GSSAPI/Kerberos)
    - LDAP
    - PAM
    - X509 Certificates (new in 3.5)
  - Privileged Operations
    - #GarbageCollection
    - #OtherPassword
    - #SystemControl

## Key Features Of GemStone

- 100% Smalltalk
  - All objects, all the time.
  - Classes, methods, blocks.
  - ANSI-Smalltalk compliant



## Key Features Of GemStone

- Very Large Collection Support
  - Collections of millions of objects.
  - Optimized searches using b-tree Indexes:
    - Equality Indices ( $a = b$ )
    - Identity Indices ( $a == b$ )
    - Reduced Conflict Indices

## Key Features Of GemStone

- Interfaces to Other Smalltalks
  - VisualWorks® - GemBuilder for VisualWorks®
  - VA Smalltalk® - GemBuilder for VA Smalltalk®
  - Pharo – tODE, gt4Gemstone
  - Jade / Jadeite (Dolphin)
- Interfaces To Other Languages
  - C/C++ - GemBuilder for C
  - Java – GemBuilder for Java
- Interfaces to Relational Databases
  - Oracle – GemConnect for Oracle
  - Sybase – GemConnect for Sybase (open source)

## GemStone Security Features

- Crypto provided by OpenSSL 1.1
- GsSecureSocket
  - Secure network connections with SSL/TLS
- Secure Database Backup/Restore
  - Encrypted and signed database backup files.
- External Password Authentication
  - LDAP – OpenLDAP
- Single Sign On (SSO) Support via MIT Kerberos
  - Login with Kerberos or Windows credentials
- Smalltalk support for encryption, decryption, message digests, HMAC, base64, etc.

# GemStone Platforms

- Object Server (Database)
  - Linux x86\_64
  - Apple Darwin 64 bit
  - Oracle Solaris amd64
  - Oracle Solaris SPARC 64 bit
  - IBM AIX PowerPC 64 bit
- Object Client
  - All of the above, and:
  - Microsoft Windows 7, 8, 10

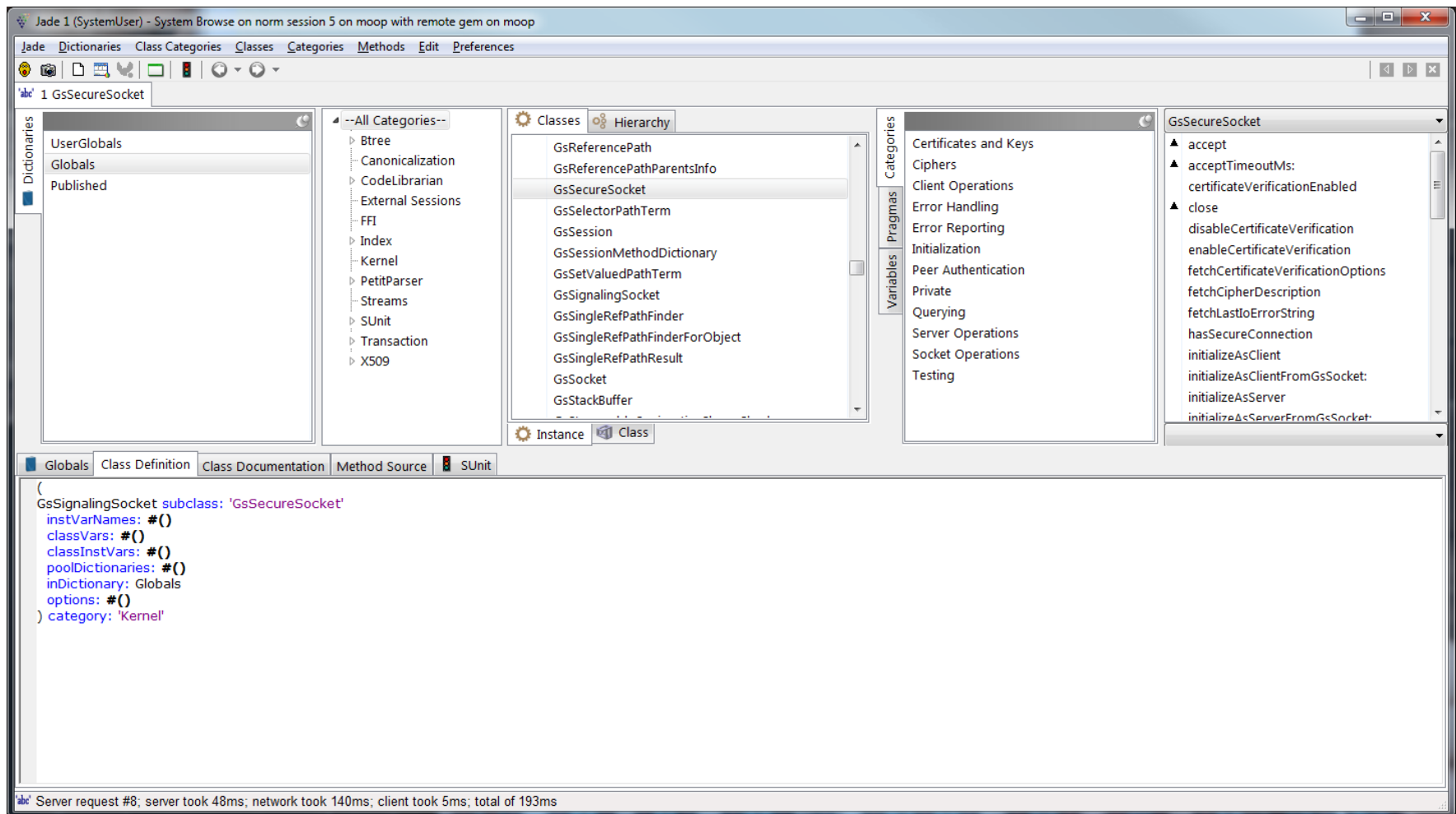
# Client Smalltalk - GBS Platforms

- Cincom<sup>®</sup> VisualWorks<sup>®</sup> 8.2.1, 8.1.1, 7.10.1
  - MS Windows 7/8 32 bit
  - MS Windows 7/8/10 64 bit
  - Linux 32/64 bit
- Instantiations VA Smalltalk<sup>™</sup> 8.6.3
  - MS Windows 7/8

# Client Smalltalk – non GBS

- Jade IDE
  - Open source IDE for all versions of GemStone
  - Written in Dolphin Smalltalk by James Foster
  - Microsoft Windows only (or wine on Mac)
  - Supports all versions of GemStone
  - Rich set of tools
    - Browsers
    - Inspectors
    - Debuggers
  - <https://github.com/jgfoster/Jade>

# Jade System Browser



The screenshot shows the Jade System Browser interface. The window title is "Jade 1 (SystemUser) - System Browse on norm session 5 on moop with remote gem on moop". The menu bar includes "Jade", "Dictionaries", "Class Categories", "Classes", "Categories", "Methods", "Edit", and "Preferences". The toolbar contains icons for file operations and navigation.

The interface is divided into several panes:

- Dictionaries:** Lists "UserGlobals", "Globals", and "Published".
- All Categories--:** A tree view showing categories like Btree, Canonicalization, CodeLibrarian, External Sessions, FFI, Index, Kernel, PetitParser, Streams, SUnit, Transaction, and X509.
- Classes:** A list of classes including GsReferencePath, GsReferencePathParentsInfo, GsSecureSocket (selected), GsSelectorPathTerm, GsSession, GsSessionMethodDictionary, GsSetValuedPathTerm, GsSignalingSocket, GsSingleRefPathFinder, GsSingleRefPathFinderForObject, GsSingleRefPathResult, GsSocket, and GsStackBuffer.
- Categories:** A list of categories for the selected class, including Certificates and Keys, Ciphers, Client Operations, Error Handling, Error Reporting, Initialization, Peer Authentication, Private, Querying, Server Operations, Socket Operations, and Testing.
- GsSecureSocket:** A list of methods for the selected class, including accept, acceptTimeoutMs, certificateVerificationEnabled, close, disableCertificateVerification, enableCertificateVerification, fetchCertificateVerificationOptions, fetchCipherDescription, fetchLastIoErrorString, hasSecureConnection, initializeAsClient, initializeAsClientFromGsSocket, initializeAsServer, and initializeAsServerFromGsSocket.

The bottom pane shows the class definition for GsSecureSocket:

```
(
GsSignalingSocket subclass: 'GsSecureSocket'
instVarNames: #()
classVars: #()
classInstVars: #()
poolDictionaries: #()
inDictionary: Globals
options: #()
) category: 'Kernel'
```

The status bar at the bottom indicates: "Server request #8; server took 48ms; network took 140ms; client took 5ms; total of 193ms".

# Client Smalltalk – non GBS

- Jadeite
  - Fork of Jade
  - Currently in development at GemTalk for a customer in Europe
  - Support for source code control with Rowan and Git
  - Support for Tonal file format
  - Migration tools from other SCM systems





**GEMTALK**  
SYSTEMS

**Smalltalk - Powered  
Business**

# GemTalk History

- 36 Years of Continuous Operation!
  - Founded: 1982 (as Servio Logic Corporation)
  - First Version of GemStone Shipped: 1986
  - Name Changed from Servio to GemStone: 1995
  - Acquired by Brokat: July 2000
  - Management buyout: June 2001
  - Acquired by VMware: May 2010
  - Acquired by GemTalk Systems: May 2013

# GemStone Powered Business

## Container Shipping Vertical



- since 2016



- since 2000

# GemStone Powered Business

## Financial and Trading Vertical

JPMorganChase 

**Kapital** is the world's leading derivatives trading and management system – since 1993



**DBO** is a very large precious metals trading and settlement system.  
- since 1990



**ICE** is the world's fastest growing electronic trading exchange  
– since 1994

**momentum**

**MAS** – Investor call management workflow system. – since 1995

# GemStone Powered Business

## Manufacturing Vertical



**Works** application for semiconductor manufacturing  
– since 1991



Semiconductor manufacturing software – since 1998



Manufacturing software – since 2012



Adhesives Manufacturing – since 1997

# GemStone Powered Business

## Utilities Vertical



*TCMS II*- Trouble Call Management System V2

*Power Billing* – Customer Billing Application – since 1992

# GemStone Powered Business

## Telecommunications Vertical



*CONDIS* – Inventory and cable management – since 1993



Telecom Service Provisioning – since 2004

# GemStone Powered Business

## Government Vertical



Canada Border Services Agency  
Agence des services frontaliers du Canada

Border Security – since 1996



Norwegian Directorate  
of Immigration

Visa Processing – since 2004



Dutch Agricultural Institute – agriculture data collection  
– since 1998



# GemTalk Partners



SIEMENS



CCK. Financial Solutions.



sophisticated simplicity



# GemTalk In the Community...

## ■ Conferences and Groups

- Pharo Consortium (Industrial Member)



- ESUG (Platinum Sponsor)



- FAST (Platinum Sponsor)





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# **Product Roadmap**

# Trigger Warning!

I will be using the “C” word



# Buzzwords I will *not* use...

- Disrupt
- Blockchain
- Cryptocurrency
- ICO (Initial Coin Offering)
- Bitcoin
- Ecosystem
- Guru / Ninja
- Unicorn
- Big Data
- Data Scientist
- IoT (Internet of Things)

# Server Release Pipeline

- 3.3.x (previous release)
  - 3.3.8, released on 8/28
- 3.4.x (current release)
  - v3.4.2, released on 7/31
- v3.5 (Next Release)
  - December 2018

# GBS Release Pipeline

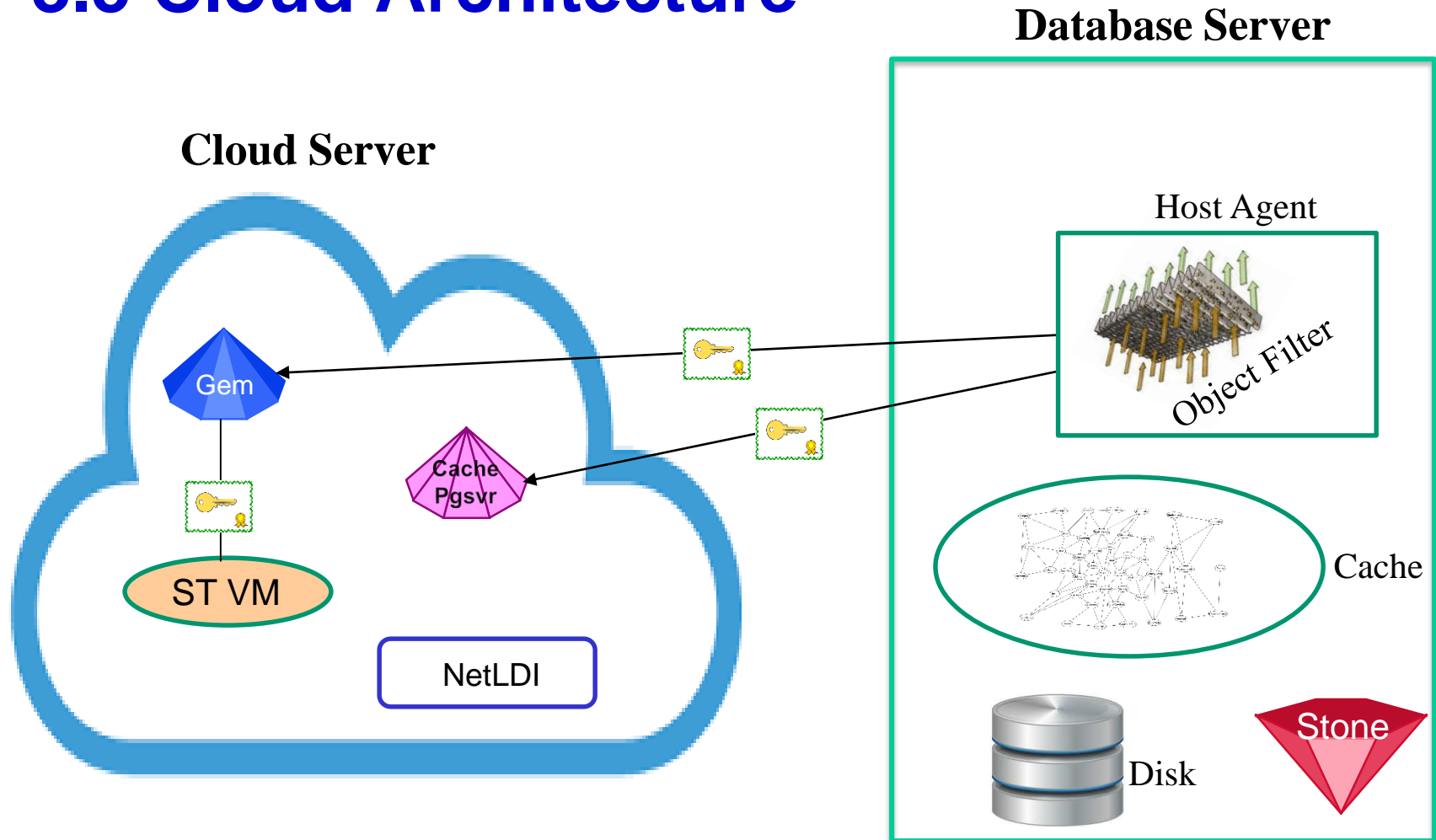
- GBS 8.3
  - Released on 10/2017
  - VisualWorks 7.10.1, 8.1.1, 8.2.1
- GBS 8.3.1
  - Planned release: December 2018
  - VisualWorks 8.3.1 Support

# Version 3.5

- ***Cloudifying GemStone***
  - X509 Certificate security for all connections
    - Login with certificate and private key instead of ID/password
  - Cloud/Firewall-friendly network connections
    - All connections are made *into* cloud, never *from* the cloud
  - Tolerance for high latency networks (aka the Internet)
  - Object Filtering
    - Restricts which objects may/may not go to the cloud



# 3.5 Cloud Architecture



# Version 3.5

- Stand-alone (Solo) Smalltalk Execution
  - No running database required!
  - Execute Smalltalk scripts from the command line

```
topaz> set solologin on
topaz> login
[Info]: Read-Only Repository: /export/koop2/users/normg/product/bin/extent0.dbf
successful Solo login
send GsSecureSocket httpsClientExampleForHost: 'www.google.com'
certificateDirectory: '/etc/ssl/certs'
Secure connection established
Current cipher in use is: ECDHE-RSA-CHACHA20-POLY1305 TLSv1.2 Kx=ECDH Au=RSA
Enc=CHACHA20/POLY1305(256) Mac=AEAD
Sending a 40 byte request to client: GET / HTTP/1.1 Host: www.google.com
Waiting for response from server...finished reading 1397 bytes from server.
HTTP/1.1 200 OK
```

# Version 3.5

- OpenSSL 1.1.1
  - TLS 1.3
  - SHA3
- Base Image Additions
  - Rowan
  - FileTree
  - Zinc (partial)
  - <your suggestions here>

# Version 3.6 and Beyond...



Smalltalk is our “Cowbell”

## More Cowbell...



- Native Support for Pharo is coming!
  - *GemBuilder for Pharo* (or something...)
  - Date: TBD

# GemStone Licensing Models

- Community Editions
  - Free (as in beer) for any use (including commercial)
- Perpetual
  - Buy once, own it forever
- Annual Subscription
  - Pay annually, cancel any time.
- Value Added Reseller (VAR)
  - Percentage of royalties

# As requested at ESUG 2017....

- GBS Added To Community Edition!
  - GemBuilder for Cincom<sup>®</sup> VisualWorks<sup>®</sup>
  - GemBuilder for Instantiations VA Smalltalk<sup>™</sup>
- Download from:  
`ftp.gemtalksystems.com/pub/GBS`

# GemStone Community Edition

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



# Support Models

- Web Support (24 x 7)
  - <https://techsupport.gemtalksystems.com>
  - Help requests processed 8 am – 5 pm Pacific Time
- Emergency 24 x 7 Support
  - Available for a premium
  - GemTalk provides an emergency phone number
  - Call back to the customer within 15 minutes
- List Server Support
  - [glass@lists.gemtalksystems.com](mailto:glass@lists.gemtalksystems.com)
    - GLASS
  - [GemStone-Smalltalk@lists.gemtalksystems.com](mailto:GemStone-Smalltalk@lists.gemtalksystems.com)
    - All things GemStone

# ***“GemStone is too expensive”***

- True 15 years ago, not true today.
- See Also:
  - *Vaccines cause autism*
  - *Fox News is News*

# Questions?

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