

GemStone Update for ESUG 2009

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GEMSTONE®

Introductions

- James Foster
 - QA, Seaside, Consulting, Training
- Dale Henrichs
 - Seaside Lead
- Martin McClure
 - GBS Lead
- Monty Williams
 - MagLev, Business Development

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Agenda

- **What is GemStone?**
- Smalltalk Product Releases
- MagLev (Ruby) Demo
- Getting Started with GemStone
- Seaside
- Metacello
- Questions

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What is GemStone/S?

- A Smalltalk environment?
- A database system?
- Two in one!



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GS/S: Smalltalk Environment

- Virtual Machine (VM) compiles source code to machine code and executes it using Just-In-Time compiler (JIT)
- Object manager treats entire repository as object space (or image)
- In-memory garbage collection (GC) reclaims space used by unreferenced new objects

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GS/S: Database System

- Transactional persistence
- Multi-user
- Multi-machine
- Garbage collection for persistent objects which are no longer referenced

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Smalltalk Product Releases

- GS/S 6.5.x
- GS/S 64 Bit 2.3.x
- GS/S 64 Bit 2.4.0

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GS/S 6.5.x

- Performance improvements
 - Mark/sweep
 - Bitmap operations
- Repository >> countInstances: *anArray*
- Repository >> listObjectsInSegments: *anArray*
- Additional cache statistics
- Numerous bug fixes

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GS/S 64 Bit 2.3.x

- Supported Platforms
 - Solaris (Sparc & **x86**)
 - HP-UX (PA RISC & **Itanium**)
 - AIX (RS/6000 with Power5 or Power6)
 - Linux (SuSE Linux ES 10 & **Red Hat Linux ES 5.0**)
 - **Macintosh (Intel OS 10.5.5)**

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GS/S 64 Bit 2.3.x

- Improved Performance
 - Mark/sweep
 - Direct I/O (AIX)
 - Commit record disposal 64% faster
 - UnorderedCollection difference & intersection

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GS/S 64 Bit 2.3.x

- Extended characters – QuadByteString
 - Character codePoint maximum is 16r7FFFFFFF
- UTF8 encoding primitives
 - String >> encodeAsUTF8
 - String >> decodeFromUTF8
 - String >> decodeIntoDoubleByteStringFromUTF8
 - MultiByteString >> decodeFromUTF8
 - MultiByteString >> encodeAsUTF8

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GS/S 64 Bit 2.3.x

- Persistent shared counters (128 64-bit signed)
- GsFile support for GZIP compressed files
- ProfMonitor enhancements
- Repository >> listObjectsInSegments: *anArray*
- Repository >> countInstances: *anArray*
- Numerous cache statistics added & updated
- Numerous bug fixes

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GS/S 64 Bit 2.4.0 (September)

- Performance improvements
 - Parallel transaction log recovery/restore (5x)
 - Reduced network round trips
 - During login
 - System class >> currentSessionNames
 - Repository >> fileSizeReport
 - Parallel index creation
- Repository profiling
 - Class count & size

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GS/S 64 Bit 2.4.0 (September)

- Various new methods
 - Rename file
 - Time since stone startup
 - String formatting (centering)
 - ANSI Stream methods
 - Session login and last transaction time
- List instances in page order
- ProfMonitor now has tree output

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GS/S 64 Bit 2.4.0 (September)

- Extended character set collation support
- ANSI-compliant Stream position option
- Reflection API
- ANSI Exception improvements
- More statistics
- Many bug fixes

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GS/S 64 Bit 2.4.0 (September)

- Seaside 2.8.3
- Work on Seaside 2.9
 - Partial continuations
- Metacello

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GS/S 64 Bit 3.0 (next year)

- Major VM rewrite
- Significant performance improvements
- FFI (C callout to DLL)
- Ruby support
- Sandbox methods

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MagLev (Ruby) Demo

- Simple
 - Hello World!
- More complex
 - Ruby Gems
 - Rack
 - Sinatra
- Martin will discuss technology on Thursday
- Ask Monty questions about Ruby

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Getting Started with GemStone

- VMWare virtual appliance
- Native
- Cocoa Application

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Virtual Appliance

- GLASS
 - GemStone, Linux, Apache, Seaside, Smalltalk
 - Or: GemStone, Linux, Aida, Scribo, Smalltalk
- Virtual Appliance
 - VMware Server on Windows & Linux
 - Fusion on Macintosh
- Demo

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Native Install

- Linux
- Macintosh
 - Demo

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Cocoa Application

- GemStoneApp.dmg (78 MB disk image)
- GemStone.app (291 MB)
 - Manages stone & gems
 - Workspace
 - Start Hyper web server
 - Launch web browser
 - Launch GemTools
- Demo

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Seaside

- Tutorial
 - “Learning Web Development with Seaside”
- Scaffolding
 - Demo
- Support 2.9 development

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Metacello

- Monticello provides code management
 - Atomic loading of code in a package
 - Comparison of changes between two packages
- Metacello is a package management system
 - Packages are still Monticello
 - Packages are managed as projects & configurations

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Metacello: Declarative Modeling

- A Metacello **project** has named versions consisting of lists of explicit *Monticello package versions*.
- Dependencies are explicitly expressed in terms of named versions of *required projects*.
- A *required project* is a reference to another Metacello project.

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Metacello: Distributed Repositories

- Project metadata is represented as instance methods in a class.
- Metacello project metadata is just code stored in a Monticello package.
- As a result, it is easy for distributed groups of developers to collaborate on ad hoc projects.

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Metacello: Optimistic Development

- With Monticello-based packages, concurrent updates to the project metadata can be easily managed.
- Parallel versions of the metadata can be merged just like parallel versions of the code base itself.

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Metacello: Cross Platform

- Metacello must run on all platforms that support Monticello:
 - Squeak
 - Pharo
 - GemStone
 - ???

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Metacello: Conditional Monticello Package Loading

- Platform-specific Monticello packages can be conditionally loaded.
 - #common. Code that is common across all platforms.
 - #squeakCommon. Code that is common to Squeak and Pharo.
 - #squeak. Code that is specific to Squeak.
 - #pharo. Code that is specific to Pharo.
 - #gemstone. Code that is specific to GemStone.
- Project-specific attributes (GS 2.x vs. 3.x)

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Metacello: Support MC2

- It should be possible to manage Metacello projects that are based on alternate Distributed Source Code Management systems like Monticello2.

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Metacello: License

- MIT

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Monticello Package Dependencies

```

Filename: GLASS-230-dkh.231.mcz
Author: Dak Henrichs
Timestamp: 12 May 2009 14:25:43
UUID: 241321721081921966911713096300613789154134103
Accessors: GLASS-230-dkh.230.mcz
Dependencies: Bootstrap-dkh.157.mcz, FastCGI-dkh.26.mcz, FastCGIPool-dkh.2.mcz, Squeak-rj.192.mcz,
Monticello-g-dkh.346.mcz, FastCGI-Seaside-dkh.48.mcz, GsRandom-dkh.6.mcz, Hyper1.333-
dkh.16.mcz, Magritte-Model-dkh.344.mcz, Magritte-Tests-dkh.157.mcz, OB-GemStone-Platform-
dkh.61.mcz, OB-Tools-g-dkh.108.mcz, OmniBrowser-dkh.439.mcz, OpenGdx1.333-dkh.9.mcz,
PackageInfo-Base-g-dkh.28.mcz, Seaside2.8-g1-dkh.624.mcz, Sport3.010-dkh.14.mcz, OB-Monticello-
dkh.93.mcz, Scriptaculous-g-dkh.243.mcz, CalDemo-pmm.1.mcz, CheckboxExample-pmm.1.mcz,
GSSDock-tbn.1.mcz, Stone-dkh.2.mcz, SeasideKeynote-g-dkh.75.mcz, ErorrHandler-dkh.4.mcz,
HelloWorld-pmm.1.mcz, ImageDemo-pmm.1.mcz, LogoDemo-pmm.1.mcz, MicrocaseDemo-
tbn.2.mcz, MenuDemo-MiguelCoba.4.mcz, ScreenResolution-1.mcz, Magritte-Seaside-dkh.286.mcz,
Pier-Model-dkh.272.mcz, Pier-Tests-dkh.118.mcz, Pier-Seaside-dkh.341.mcz, Pier-Security-
7.121.mcz, Pier-Slog-r.106.mcz, RFBSS2-g-dkh.14.mcz, Pier-EditorEh-donmenecossou.17.mcz,
Announcements-g-dkh.11.mcz, SimaCC-dkh.14.mcz, UTF8Encoding-230-dkh.21.mcz, Base-Bootstrap-
tbl.12.mcz, GemStone-Examples-dkh.13.mcz, GemStone-Store-dkh.3.mcz, MockGemStone-g-
kdl.2.mcz, GemStone-Exceptions-dkh.32.mcz, OB-Standard-g-dkh.418.mcz, OB-SunInMigrator-
dkh.10.mcz, Pier-Design-g.5.mcz, Pier-Document-r.8.mcz, Pier-Google-r.6.mcz, Pier-Randomize-
r.4.mcz, Pier-TagCloud-dkh.12.mcz, Pier-Tiles-g.1.mcz, Pier-Setup-g-dkh.41.mcz, XML-Parser-g-
dkh.19.mcz, SIOX-dkh.165.mcz, System-Digital-Signatures-dkh.5.mcz, OB-SUIKUI-g-dkh.59.mcz,
SeasideTesting-g-R1.5-dkh.33.mcz, GemStone-Testing-Extensions-dkh.1.mcz, SMTPMail-dkh.6.mcz,
JaxbServer-dkh.2.mcz, HyperSeaside-dkh.8.mcz, SOXML-g-dkh.19.mcz, SOAP-Core-g-dkh.75.mcz,
SOAP-Client-g-dkh.15.mcz, SOAP-Server-g-dkh.20.mcz, SOAP-TestCases-dkh.46.mcz,
SOAP-Example-a-dkh.18.mcz, GemStone-Scaffolding-dkh.34.mcz

```

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Metacello Project Definition

```

packages#233
#packages: #'0.233' attribute: #'gemstone'>
self packagesSpec
add: 'Core project: GLASS Core Project' version: #'0.233';
add: 'Announcements project: Misc Project' version: #'0.233' loads: { 'Announcements' };
add: 'GemStone-Release-Support project: Misc Project' version: #'0.233' loads: { 'GemStone-Release-Support' };
add: 'MockGemStone project: Misc Project' version: #'0.233' loads: { 'MockGemStone' };
add: 'SIOX project: Misc Project' version: #'0.233' loads: { 'SIOX' };
add: 'SIOC project: Misc Project' version: #'0.233' loads: { 'SIOC' };
add: 'SMTPMail project: Misc Project' version: #'0.233' loads: { 'SMTPMail' };
add: 'System-Digital-Signatures project: Misc Project' version: #'0.233' loads: { 'System-Digital-Signatures' };
add: 'UTF8Encoding project: Misc Project' version: #'0.233' loads: { 'UTF8Encoding' };
add: 'XML-Parser project: Misc Project' version: #'0.233' loads: { 'XML-Parser' };
add: 'Monticello project: Monticello Project' version: #'0.233';
add: 'Metacello project: Metacello Core' version: #'0.15' requires: { 'Monticello' };
add: 'OB project: OB Project' version: #'0.233' requires: { 'Monticello' };
add: 'Magritte project: Magritte Project' version: #'0.233' loads: { 'Magritte-Tests' };
add: 'Seaside.8 project: Seaside.8 Project' version: #'0.233' loads: { 'Seaside.8' };
add: 'Scriptaculous project: Seaside.8 Project' version: #'0.233' loads: { 'Scriptaculous' };
add: 'SeasideKeynote project: Seaside.8 Project' version: #'0.233' loads: { 'SeasideKeynote' };
add: 'RFBSS2 project: Seaside.8 Project' version: #'0.233' loads: { 'RFBSS2' };
add: 'Seaside Examples project: Seaside.8 Project' version: #'0.233' loads: { 'Seaside Examples' };
add: 'Seaside.8-FastCGI project: FastCGI Project' version: #'0.233' loads: { 'FastCGISeaside' };
add: 'Seaside.8-Hyper project: Hyper Project' version: #'0.233' loads: { 'HyperSeaside' };
add: 'Seaside Testing project: Seaside Testing Project' version: #'0.233';
add: 'Pier-Seaside project: Magritte Project' version: #'0.233' loads: { 'Magritte-Tests', 'Magritte-Seaside' };
add: 'Pier project: Pier Project' version: #'0.233' loads: { 'Pier Core', 'Pier Addons' };
add: 'Pier Testing project: Seaside Testing Project' version: #'0.233' loads: { 'Pier Testing' };
add: 'GemStone-Scaffolding project: Scaffolding Project' version: #'0.233' loads: { 'GemStone-Scaffolding' };
add: 'SOAP project: SOAP Project' version: #'0.233';
yourself

```

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Metacello VersionSpec

- [MetacelloProjectTutorial](#)>>#Version10'

VersionSpec - 1

- blessing
 - A version can be tagged with a blessing like #alpha, #beta, #release, #development (or any other tag that is deemed useful).
 - The blessing is used as a version filter.
 - For example the latest version of a Metacello project is currently defined as the latest version whose blessing is not #development.

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VersionSpec - 2

- description
 - Useful information about the version.
- packages
 - A list of Monticello package versions (or project references via required projects) that make up the project.
- repositories
 - A list of Monticello repositories from which the packages can be loaded.

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VersionSpec - 3

- groups
 - An alias for a collection of packages.
- doits
 - A collection of blocks associated with a Monticello package that are evaluated before and/or after a package is loaded.
- project package
 - A definition of the Monticello package name and Monticello repository from which the latest project metadata is loaded.

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VersionSpec - 4

- required projects
 - A list of projects that the Metacello project depends upon.
 - A required project spec includes
 - the version of the project
 - the name of the Metacello project class
 - the package and repository from which the project metadata is loaded (note the similarity to the project package specification).

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VersionSpec - 5

- Any one of the versionSpec attributes may be conditionally modified.
- Here's an example package specification that adds a new Monticello package version for the package 'Example-Core' when the #testPlatform attribute is present:

```
packages10TestPlatform
<packages: '1.0' attribute: #testPlatform >

^self packagesSpec
  add: 'Example-Core' file: 'Example-Core.testPlatform-anon.15';
  yourself
```

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Integrated Tools - 1

- Save Packages
 - Finds the dirty Monticello packages that are members of the selected version of the Metacello project and saves them, prompting you for version name and commit comment.
 - After the packages are saved you are prompted to Update Package Methods.

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Integrated Tools - 2

- Update Package Methods
 - Automatically updates the package spec metadata for the selected version.
 - Modifies and compiles the methods with the #packages:attribute: pragma for the appropriate version to match the currently loaded Monticello package versions.
 - After the methods are update you are prompted to Save Project.

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Integrated Tools - 3

- Update Package Repositories
 - Updates the repository group for each Monticello package associated with the selected version of the Metacello project to include the repository for that package as specified in the version spec.
 - Scans every package and adds the project repository to the repositoryGroup for each package, so that one doesn't have to manually do so.

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Integrated Tools - 4

- Current Project Version
 - Displays the current version of the selected Metacello project.
 - The version is calculated by comparing the currently loaded Monticello packages to those specified in the version spec.
 - A leading '~' means that the version is partially loaded (i.e., not all of the packages associated with the project have been loaded into the image).

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Integrated Tools - 5

- Load Project Version
 - Prompts for the version of the selected Metacello project to be loaded.
 - If there are groups associated with the selected version, you are prompted for the group that you would like loaded.
 - When in doubt choose 'ALL'.

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Integrated Tools - 6

- Save Project
 - Saves the selected Metacello project to the repository specified by the project package of the selected version.
 - You are prompted for version name and commit comment.

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Integrated Tools - 7

- Update Project
 - Loads the latest Monticello package version from the repository specified in the project package of the selected version of the Metacello project.
 - Remember that you are simply loading the Metacello project metadata, so it doesn't hurt to have the latest metadata loaded.
 - Once the latest version is loaded, you are prompted to Load Project Version.

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Metacello Example: Pier - 1

- Best of all, it becomes possible to load a project like Pier into a minimal base image (with only Monticello, Metacello and OB loaded) using something like the following expression:

```
(GsPierMetacelloProject version: '1.2')
load: { 'Pier Core'. 'Pier AddOns'. }
```

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Metacello Example: Pier - 2

- Not only does Pier get loaded, but all of the projects that Pier depends upon (i.e., Magritte, Seaside, Scriptaculous, etc.) get loaded along with the projects that they depend upon.

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Metacello Example: Pier - 3

- Definitions of 'Pier Core' and 'Pier AddOns'
- GsPierMetacelloProject>>#groups0233'

```
groups0233
<groups: '0.233' attribute: #gemstone' >
~self groupsSpec
add:
  (self groupsSpec
   names: 'Pier Core';
   add: { 'Pier-Model'. 'Pier-Tests'. 'Pier-Security'. 'Pier-Setup'. 'Pier-Seaside'. });
  yourself );
add:
  (self groupsSpec
   name: 'Pier AddOns';
   add: { 'Pier Core'. 'Pier-Blog'. 'Pier-Design'. 'Pier-DesignChooser'. 'Pier-Documents'.
         'Pier-EditorEnh'. 'Pier-Google'. 'Pier-Links'. 'Pier-Randomizer'. 'Pier-TagCloud'. 'Pier-Slideshow'.
         'Pier-Twitter'. });
  yourself );
  yourself
```

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Conclusion

- Resources
 - <http://seaside.gemstone.com/>
- Questions?
 - James.Foster@GemStone.com
 - <http://programminggems.wordpress.com>

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