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VA Smalltalk Update

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Agenda

- Company Update
- Current Release Content
- Next Release Candidates
- Q&A

Company Updates

VAST remains strong - new technology and users

- Intense new technology development
 - Upcoming product release
 - New 32/64-bit VM
- Community Outreach
 - Conference/workshop sponsors and participants
 - ESUG, FAST Smalltalks
- Sponsoring Marquette Camp Smalltalk
 - September 15 – 18, 2016
- Hosting North Carolina Camp Smalltalk
 - Spring 2017

2015-2016 Engineering Focus

- Enhanced Cryptography Support
- TCP IPv6 Support
- Fast Reliable Headless Installation
- Build System Re-engineering
- New 32/64-bit VM

New Release

V8.6.3 available Q4 2016!

V8.6.3 Content

Base Class Libraries

- Zip/Unzip support
 - Inflate/deflate convenience APIs added
- OSLong class added
 - Simplifies handing of 64-bit data and pointers
 - Transparent resizing on 32/64 bit systems
 - Transparent platform adaptation

V8.6.3 Contents

Communications Enhancements

- IPv6 support
 - All layers enabled
 - SocketCommunicationsInterface
 - Server Smalltalk (SST)
 - Parts
 - UI handles IPv4 and IPv6 addressing syntax
 - .INI file preference controls addressing behavior
 - IPv4 is default

V8.6.3 Contents

Seaside and Grease

- Small currency updates
- Adapted to IPv6

V8.6.3 Contents

Cryptography

- OpenSSL 1.1 Compatibility
 - *Lots of new algorithms available*
- Continue to support/enhance 1.0.x
- Compatibility layer to handle API breakage
 - OpenSSL 1.1 is a significant overhaul
 - Good amount of API breakage from 1.0.x
 - We have handled that internally
 - No code changes required for the user to move up

V8.6.3 Contents

Cryptography Cont...

- Secure Memory Support
 - Windows
 - User can request bytes that are encrypted in-memory
 - Auto-decrypt-encrypt during OpenSSL native calls
 - Uses Microsoft Crypto API
 - UNIX/Linux
 - Secure Arena
 - Page-guarded on either side
 - Pinned to RAM (won't swap to disk)
 - Won't show up in a core-dump

V8.6.3 Contents

SQLite

- Update SQLite to 3.14.0
 - Transparent performance improvements

V8.6.3 Contents

Environments Management Tool

- New popup menu on Environments list pane provides new actions:
 - Open a file explorer on the VA Smalltalk installation folder associated with the selected Environment
 - Open a command (terminal) window on the selected Environment's folder
 - Open a command (terminal) window on the VA Smalltalk installation folder associated with the selected Environment
 - Duplicate the selected Environment
 - Setup and use standardized images
 - Take checkpoint of development activity

V8.6.3 Contents

Installers

- All UNIX installers are headless
 - .RPM (Fedora RedHat derivatives)
 - .DEB (Debian derivatives)
 - .PKG (Solaris)
- Windows installer can be scripted
 - Supports standard installation across multiple machines

V8.6.3 Content

New Supported Platforms

- Ubuntu 16.04
- Fedora 24
- RedHat Enterprise Linux 6

Reengineered Build System

- Old Image Build and Installation Build
 - All custom Smalltalk code
 - Dates to mid-90's with relatively small changes since
 - Not the best code quality
 - Builds were slow with significant manual intervention
 - Windows and UNIX builds were sequential
 - Difficult to restart if problem occurred
 - Installation artifacts were unmanaged

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 - Builds were slow with significant manual intervention
 - Windows and UNIX builds were sequential
 - Difficult to restart if problem occurred
 - Installation artifacts were unmanaged
- New Image Build and Installation Build
 - Cmake-based system used to script build
 - Can restart at any job step
 - Duplicate and redundant processing removed
 - Still uses Smalltalk function where appropriate
 - Driven using abt.cnf scripting
 - Fully-automated nightly builds (if changes occurred)
 - Installable artifacts *will be* managed in Git repository

Reengineered Build System (cont)

- Old Installation
 - Smalltalk packaged image
 - Difficult to maintain
 - Slow install
 - File-by-file copying
 - File attributes in separate shadow file
- New Installation
 - 'Standard' installers
 - Windows MSI
 - UNIX RPM/DEB/PKG
 - Documentation in separate packages
 - Smaller download packages
 - FAST install

Reengineered Build System (cont)

- Old Build Testing
 - Only VM Build testing was automated
- New Build Testing
 - Automated build testing using CMake/CTest
 - Install Verification Tests
 - VM Tests
 - Image Tests
 - All platforms can be tested in parallel
 - Currently over 10,000 mainline testcases (and growing)
 - Additional non-automated testcases for features

Looking to the Future

Future Releases

- Release schedule is about once a year
 - Depends on volume of content
 - Current content information in Product Roadmap
 - <http://www.instantiations.com/products/roadmap.html>
- Content based on requirements from:
 - Surveys
 - Direct customer interactions
 - Forums
 - Support cases
 - Internals

Next Release

Candidate Items

- Web interface
 - Seaside 3.x
 - Continuation support
- Middleware
 - Postgres
 - NOSql (Voyage/MongoDB or ???)

Next Release

Candidate Items

- GUI Look-and-Feel
 - Common Widgets Application Window framework
 - Useful for SUnit, Seaside, etc.
 - Windows Common Controls
 - TreeView improvements
 - GTK to replace Motif on UNIX platforms
- Communications
 - HTTP/2
 - OMQ
- Server
 - Easy to use server farm support

Next Release

Candidate Items

- Development Tools
 - Improved code library access over WAN
 - Revamped Changes Browser
 - New Code Merge Engine
- Performance and Scalability
 - Incremental garbage collection
 - 64-bit Smalltalk

Dino2 32/64 Bit VM Project

Overview

- Project Goals
 - 64-bit VMs for x86, PowerPC and SPARC
 - 32-bit VMs with performance **at least** as good as production
 - Improve build systems and testing infrastructure
- Production VM Review
 - Proprietary Smalltalk Model (generates assembly)
 - VM Interpreter/JIT/Primitives is generated assembly
 - Supporting Modules written in C
 - **@135,000** lines of ASM
 - **@50,000** lines of C

Dino2 32/64 Bit VM Project

Current Status

- Build/Compiler Infrastructure
 - CMake-Based Build System
 - GCC, MinGW and MSVC compilers
- 32/64-bit Virtual Machine
 - Running on Windows and Linux
 - Current Focus: Interpreter Performance
- 32/64-bit Smalltalk Image
 - 32-bit -> 64-bit Image Translation Complete
 - Core Smalltalk Image and many libraries are 64-bit prepped
 - Current Focus: Continued 64-bit library prep

Dino2 32/64 Bit VM Project

The Journey Forward

- Raptor
 - 1st Generation C-Interpreter
 - Slow but 64-bit Clean
 - 80% bytecode speed (32-bit)
 - 50% message send speed (32-bit)
 - Primitive call machinery slow
 - Smalltalk process switching slow
 - Primitive implementation often faster than production
 - Allowed us to move forward with Image work
 - @90,000 lines of C code

Dino2 32/64 Bit VM Project

The Journey Forward

- Indominus-Rex
 - 2nd Generation C-Interpreter
 - Faster C-Implementation
 - 85% bytecode speed (32-bit)
 - 75% message send speed (32-bit)
 - Primitive implementation often faster than production
 - Stable - good reference implementation for new platforms
 - Small changes to large interpreter loop resulted in unpredictable behavior
 - Register allocator having a difficult time
 - Constant fight with the compiler
 - @85,000 lines of C Code

Dino2 32/64 Bit VM Project

The Journey Forward

- Coelo
 - LLVM Code-Generated Interpreter
 - Compiler toolkit
 - SSA Abstract Assembly Representation
 - Still down one register on X86 compared to production VM
 - Can't use hardware-stack register (ESP)
 - Superior Code-Gen makes up for it
 - 100% bytecode speed (32-bit)
 - 110% message send speed (32-bit)
 - At least 20% performance jump in primitives
 - For many prims (Floats) the production VM used call-outs to C
 - These are described directly in LLVM
 - Speedups are more like 4-6x
 - @19,000 of C++ Code (Interpreter Code-Gen)
 - @75,000 of C Code

Dino2 32/64 Bit VM Project

Customer Involvement

- Early Customer Access Program (ECAP)
 - Kicked off our ECAP program in July, 2016
 - Select customer involvement
 - Opportunity for feedback and collaboration

How Do You Get VA Smalltalk?

- Download evaluation copy
 - <http://www.instantiations.com/products/vasmalltalk/download.html>
- Buy development licenses
 - <http://www.instantiations.com/products/purchase.html>
- Download development build
 - Announced in VA Smalltalk Google Group
- Be a committer on an Open Source project
 - <http://www.instantiations.com/company/open-source.html>
- Work for an educational institution
 - <http://www.instantiations.com/products/academic-license-program.html>

Contact us

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Thank you for your attention

Questions?