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VA Smalltalk Update

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Agenda

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

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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
- Sponsored Marquette Camp Smalltalk
  - September 15 – 18, 2016
- Hosting North Carolina Camp Smalltalk
  - Spring 2017

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2015-2016 Engineering Focus

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

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New Release

V8.6.3 available Q4 2016!

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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

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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

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V8.6.3 Contents
Seaside and Grease

- Small currency updates
- Adapted to IPv6

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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

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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

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V8.6.3 Contents
SQLite

- Update SQLite to 3.15.0
  - Transparent performance improvements
  - Bug fixes

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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

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V8.6.3 Contents
Installers

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

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V8.6.3 Content
New Supported Platforms

- Ubuntu 16.10
- Fedora 24
- RedHat Enterprise Linux 7

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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

- ## 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

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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

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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 loadable features

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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

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Next Release
Candidate Items

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

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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
    - 0MQ
- Server
    - Easy to use server farm support

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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

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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 current production VMs
  - Improve build systems and testing infrastructure

- Production VM Review
  - Proprietary Smalltalk Model (generates assembly)
  - VM Interpreter/JIT/Primitives are generated assembly
  - Supporting Modules written in C
  - @135,000 lines of ASM
  - @50,000 lines of C

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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

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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

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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 - 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

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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

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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

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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

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Contact us

- General information
  - info@instantiations.com
- Sales
  - sales@instantiations.com
- Support
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Thank you for your attention

Questions?

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Backup

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Future Releases
Candidate Items

- ## Web interface
  - Web services debugging support/doc
  - Web services tooling improvements
  - Validating XML parser

- ## GUI Look-and-Feel
  - GTK+ 3.x on Linux
  - Windows Common Controls additions
  - Back-port widgets from add-ons (ex: UML Designer)

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Future Releases
Candidate Items

- Infrastructure
  - Consolidate product settings using Settings Framework
  - Settings Dialogs to complement Settings Framework
  - Consolidate product logging using Logging Framework
- Middleware
  - GLORP Programmer's Reference
  - MQ currency
  - TCP/IP V6
  - 0MQ

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Future Releases
Candidate Items

- Development Tools
  - Redesigned Change Browser & Merge Tool
  - C API wrapper generation tool
- Security
  - 'Full' security framework -- OpenSSL 1.0.2 or later wrappers
- Performance and Scalability
  - Parallel garbage collection
  - Class library performance hotspots
  - Integrate KES/Stats goodie for object monitoring
- Platform
  - Windows Services control moved from C to Smalltalk

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Future Releases
Candidate Items

- ## External Interfaces
  - JNIport (currently available on VAStGoodies.com)
  - .NET/C#
  - Other
- ## Class Libraries
  - Collection hashing policies
  - Sorted collection sorting policies
- ## Other
  - *We're always looking for suggestions*

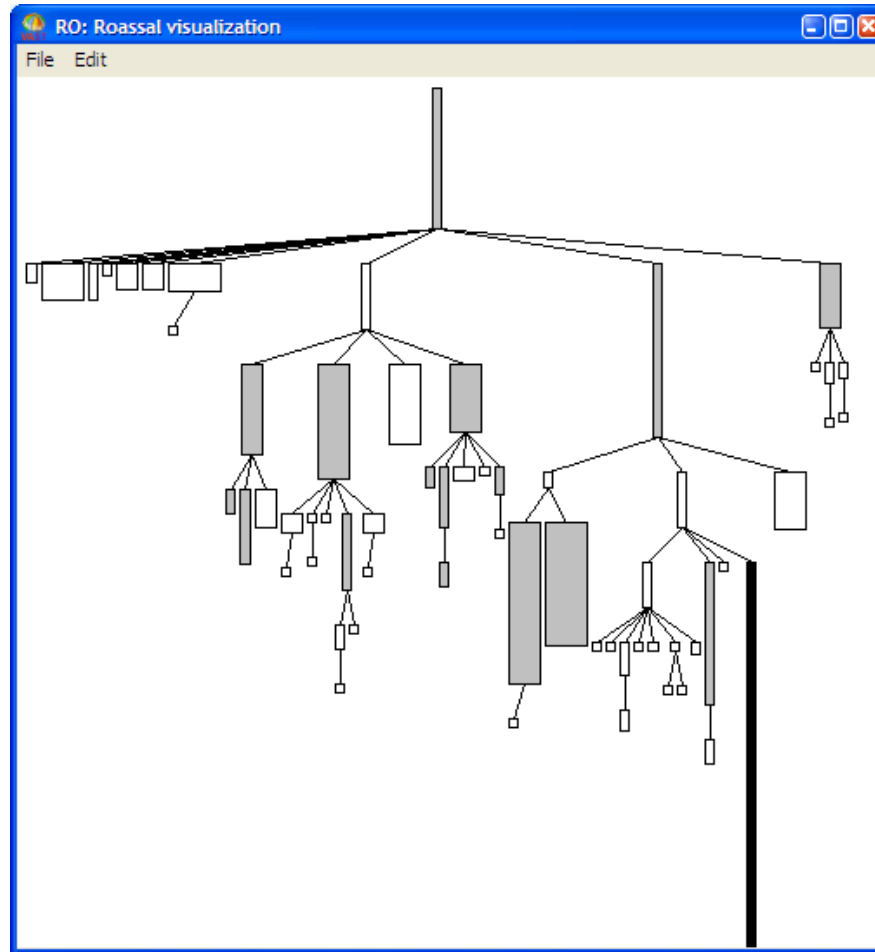instantiations
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Announcements

- A framework for event notification
  - Based on Observer pattern
  - Replaces traditional event symbols (`#changed`) with event objects (`ChangedEvent`)
  - Event objects can carry context-oriented information
  - Clients can subscribe, unsubscribe, and handle event
    - Event handling uses `#on:do:` like exception handling

- Supplied because Roassal uses it, but you can use it too

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Roassal Visualization Framework

- Roassal is an open-source project of ObjectProfile
- Roassal graphically renders objects using short expressive Smalltalk expressions
- A large set of interaction are offered for a better user experience
  - Painting
  - Brushing
  - Interconnecting
  - Zooming
  - Dragging and dropping
- Using Roassal can enhance your understanding of any arbitrary object model

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Roassal Visualization Framework
continued

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Open Source Project Committer

- Instantiations will donate a perpetual VA Smalltalk license
  - to committers
  - working on non-commercial open source project
  - Hint: release something to VAStGoodies.com
- **No charge**
- Details
  - http://www.instantiations.com/company/open-source.html

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Academic Licenses

- Accredited educational institutions
  - Teaching staff
  - Students
- **No charge**
- Details
  - http://www.instantiations.com/products/academic-license-program.html

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