VA Smalltalk Update

**including**

Exploring the Dark Underside of 64-bit Support

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Agenda

• 2017 Release Content
• 64-bit Support
• Next Release
• Q&A
2017 Release

V9.0 available soon for Windows
V9.0 Content

- Windows only
  - New 32/64-bit VMs
    - Fully backward compatible
  - Image adaptation for 64-bits
  - Dual, but shared, Environments
  - Dual Installers
V9.0 Contents
Minor Enhancements

• Grease and Seaside
  • Currency

• Cryptography
  • Elliptic Curve support added

• SUnit Browser
  • Performance improvement for large test sets

• Scintilla
  • Full Code Assist support in Workspaces for 25+ languages

• HTTP multipart forms
  • Optimized memory usage and speed
What Made 64-bit Difficult?
Beyond writing new VMs

• Bootstrap
• Serialize for everyone
• Expose the magic
• Say what you mean
• Managing elastic OSSStructures
• I don’t have my source
What Made 64-bit Difficult?

Bootstrap

- **Problem:** All I have is a 32-bit image
- **Solution:**
  - Mark image file as 32- or 64-bit
  - Provide multiple image file loaders
    - 32-bit image loader for 32-bit VM
    - 32-bit image loader for 64-bit VM (dynamic conversion)
    - 64-bit image loader for 64-bit VM
  - Depend on #preStartUp/#startUp for fixup of converted image
  - Offline 32-to-64 bit conversion tool available
What Made 64-bit Difficult?
Serialization for everyone

- **Problem**: Serialized data (files and library objects) must be sharable between 32- and 64-bit images

- **Solution**:
  - All serialization is 32-bit by default (compatibility mode)
  - If 64-bit serialized object is required; temporarily turn off compatible mode
    - 64-bit serialized object cannot be read by 32-bit image
What Made 64-bit Difficult?
Expose the magic

- **Problem**: Images are littered with magic numbers conforming to 32-bit representations

- **Example**:
  - 4 (size of pointer) ➔ System vmPointerSize
  - 12 (size of object header) ➔ Object objectHeaderSize
  - 20 (size of Association) ➔ self associationSize
  - Etc.

- **Solution**:
  - Find and fix (parameterize)
What Made 64-bit Difficult?

Say what you mean

- **Problem**: PlatformFunction parameter and returnValue definition semantics are too loose
- **Example**: #uint8, #uint16 and #uint32 widened to 32-bits
- **Solution**: Examine ALL PlatformFunction definitions and make parameter and returnParameter types explicitly correct
What Made 64-bit Difficult?
Managing elastic OSStructures

- **Problem**: Static OSStructure definitions (mapping C structs) need to be dynamic
  - Field sizes may change for 64-bit
  - Field order may change for 64-bit
  - Number of fields may change for 64-bit
  - Field alignment may change for 64-bit

- **Solution**:
  - Explicitly identify field sizes, order, and occurrence
  - Change field references from offset based to field name based
  - Compute offsets for field names when starting image
  - Completely backward compatible
What Made 64-bit Difficult?

I don’t have my source

- **Problem**: Method source code is hidden (3rd party add-ons) or lost
- **Solution**:
  - Obtain source code from 3rd party providers
  - Dynamic 32-to-64 bit conversion may work at runtime
    - Immediate access to additional memory
    - Doesn’t handle access to 64-bit DLLs
  - Run only 32-bit images
What Helped with 64-bit?

• Early Customer Access Program
  • Invitation only to limit overhead
  • Small number of high-impact customers

• Beta Releases
  • 3 public betas with significant number of participants
  • Exposed problems that in-house testing couldn’t find
Looking to the Future
Next Release

- UNIX 32/64 bit VMs
  - Short development cycle
  - Beta program expected to start soon
- Unicode
How Do You Get VA Smalltalk?

- Download evaluation copy

- Buy development licenses

- Download development build/beta
  - Announced in VA Smalltalk Google Group or by email

- Be a committer on an Open Source project
  - [http://www.instantiations.com/company/open-source.html](http://www.instantiations.com/company/open-source.html)

- Work for an educational institution
  - [http://www.instantiations.com/products/academic-license-program.html](http://www.instantiations.com/products/academic-license-program.html)
Contact us

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

Questions?
Backup
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)
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
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
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
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
Academic Licenses

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