Software Development, Maintenance, Releases and Tech Transfer

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2015 RiverWare User Group Meeting

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Software Development Team

- Professional software engineers
  - Continuity and institutional knowledge
  - Variety of complementary backgrounds
- Professional water resource engineers
  - Engineering methods
  - User support
- Professional support staff
  - Software configuration management (licensing, releases)
  - Hardware maintenance

Software Development Process

- Our goal is to deliver professional quality software applications which meet our users' needs:
  - Requirements analysis
  - Requirements document
  - High level design document
  - Estimates
  - Other documents as appropriate
  - Document reviews

Software Development Process

- Implementation
  - Write code
  - Unit test (may include writing test code)
  - Peer code review (correctness, efficiency, coding standard conformance, readability, maintainability),
  - Integration testing (including regression tests, memory analysis)

Software Maintenance

- Bug fixing
  - Critical bugs fixed for next patch release
  - Non-critical bugs deferred to next major release
  - Before major release thorough review of bug list to identify bugs to fix for release
- RiverWare development requires many software packages:
  - Applications or libraries
  - Commercial
  - Open Source
  - Home Grown (Java, Perl, Python, Tcl/Tk)

Software Maintenance

- **Operating Systems:**
  - Windows: XP, Vista, 7, 8
- **RiverWare Functionality:** Qt (with WebKit), Qwt, CPLEX, Concert, GDAL/OGR, FlexLM, Reprise, Oracle, Tcl, netCDF, Google Protocol Buffers, QuaZIP, Java Runtime Environment
- Source Control, Regression Tests, Releases: Git and Git Extensions, rw-rt, modelcomp, InstallShield
- **Compilers, Debuggers, Performance Analysis:** Microsoft Visual Studio, Rational Purify and Quantify, DevPartner BoundsChecker
- **Bug Tracking, User Support:** Gnats (moving to Bugzilla), Perl CGI scripts, SupportTool
- **Web Pages, Online Payment System:** DreamWeaver, Photoshop, Perl and Python CGI scripts

Software Maintenance

- Many pieces to the puzzle and many dependencies between the pieces
- New versions of third-party software are continually released
  - Monitor and evaluate new versions
  - New versions may be compatible with RiverWare or they may require substantial RiverWare code changes
  - New versions may affect other third-party software
  - Estimate effort and schedule upgrade to new version, keeping in mind release schedule
- Keeping current requires significant effort

Recent Software Maintenance Activity

- Upgrade Reprise License Manager
- Upgrade InstallShield
- Virtualize Oracle server and move HDB test database
- Move remaining Solaris tools to Linux
- Reorganize Windows development infrastructure
- RiverWare development on Windows 8.1

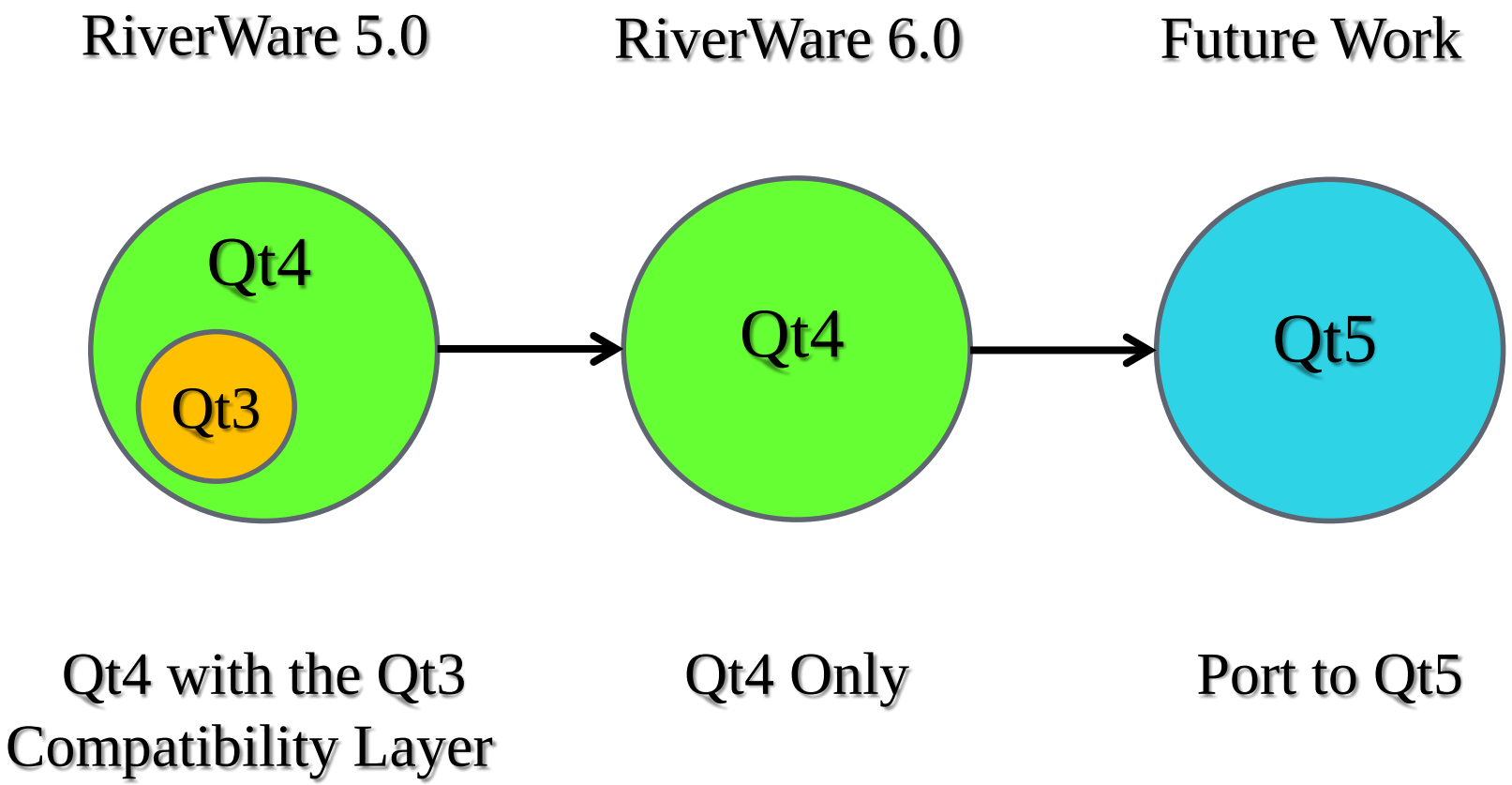
DMI Servers

- HDB Server
  - Separate HDB server removed
  - HDB connection code integrated into RiverWare (possible since Solaris platform dropped)
  - Required an upgrade to Oracle Client 12c for compatibility with Visual Studio 2010
  - More robust and efficient

DMI Servers

- DSS Server
  - Server from April, 2009 couldn't be rebuilt due to:
    - Incompatible HEC libraries
    - Unsupported HEC C++ DSS interface
  - Server ported from C++ to Java to use supported HEC Java interface
  - Requires "Install RiverWare AND DSS Connectivity" option in installer
    - Creates a Java Runtime Environment under RiverWare

Qt Porting Road Map



User Support Procedure

- All user support questions should be sent to:

  riverware-support@colorado.edu

- Multiple support staff receive email and most appropriate or available person can respond
- Must have purchased time!

Releases

- Typically two releases each year, with additional patch releases as necessary
- Numbering: RiverWare Major.Minor.Patch where
  - Major = major version number (currently 6)
  - Minor = minor version number (currently 6)
  - Patch = patch level number (currently 1)
- Download from the web site:
  - www.riverware.org

Releases

- Major releases: RiverWare 6.6
  - Fully tested and verified (usually including a pre-release)
  - Include updated online documentation and release notes
  - Users notified by e-mail and encouraged to upgrade
- Patch releases: RiverWare 6.6.1
  - Generated from last full release with minor enhancements
  - Tested and verified (usually without a prerelease)
  - May include updated online documentation
    - Usually minor enhancements/fixes mentioned in email (also under “notes” link on web site)
  - Users notified by e-mail but may choose not to upgrade

Snapshots

- Development snapshots:
  - RiverWare 6.7 Development
  - Generated from previous night's development area
  - Should only be used to test new development Should NEVER be used for operations or model building
  - Only tested by overnight regression tests
  - Does not include updated online documentation or notes
  - Concerned users are notified by email

Bugs

- Filing Should be done by users, even if CADSWES verifies
- Current licensees login to:

  http://cadswes2.colorado.edu/downloads/riverware/issuetracking/

  - Log in as: rwuser
  - For password contact RiverWare support:

    riverware-support@colorado.edu

Bugs

- Include information to reproduce the bug
  - Events leading to the bug
  - Exact text of any errors or messages
  - Model, ruleset, and/or dmi in which bug is manifested
  - Send model to:

    riverware-support@colorado.edu
  - Ftp models to: ftp://cadswesftp.colorado.edu/incoming/riverware

Bugs

- Bug follow-up
  - Filer is contacted by automated email
  - Bug tracking system notifies filer when status changes (closed, info added, reassigned)
  - Web lookup available
  - Closed bugs documented in release notes or patch email

New Bug Tracking Software

Current System: Gnats

- Not supported or maintained
- Homegrown Perl scripts for Gnats web interface are limited and difficult to maintain

- Leading Replacement: Bugzilla
  - Active open source software
  - Many additional capabilities such as filing a model file along with the bug

Training

- Intro to Simulation
- Rulebased Simulation
- Accounting
- Optimization
- Introduction to RiverWare: overview of both Simulation and Rules

Other Training Tools

- Video Demonstrations
  - Model Reports
  - RiverSMART
  - Notes on Series Slots
  - Database DMI Excel
  - Database DMI DSS
  - Smart Linker
  - Open Object Dialogs
  - Unit Schemes
- Informational Tutorials
  - Simulation
  - Rulebased Simulation
  - Multiple Run Management

http://www.riverware.org/PDF/RiverWare/documentation/