# Software Development, Maintenance, Releases and Tech Transfer

RiverWare User Group Meeting
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# Software Development Team

➤ **Professional software engineers**
- Continuity and institutional knowledge
- Variety of complimentary 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?
  - Solaris: 2.9, 2.10 (dropped support for 2.6 – 2.8)
- ➤ **RiverWare Functionality:** Qt, Qwt, RogueWave, CPLEX, Concert, FlexLM, HecGen, heclib, Oracle, MODFLOW, Tcl, zlib
- ➤ **Source Control, Builds, Regression Tests, Releases:** CVS, TkCVS, rw-checkout, rw-config, rw-update, rw-build, rw-rt, modelcomp, cvs-copy.pl, InstallShield, rw-release, rw-install
- ➤ **Compilers, Debuggers, Performance Analysis:** Microsoft Visual Studio, Sun Studio, Intel Fortran, Rational Purify and Quantify
- ➤ **Bug Tracking, User Support:** Gnats, 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

➢ Recently Qt 4.4 required Sun Studio 12 which required Solaris 9

➢ Keeping current requires **significant** effort

# 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

# Releases

➢ Typically two releases each year, with additional patch releases as necessary

➢ Numbering: RiverWare Major.Minor.Patch
where Major = major version number (currently 5)
Minor = minor version number (currently 2)
Patch = patch level number (currently 2)

➢ Downloading
 • From the web site:
 http://cadswes.colorado.edu/users/
 • From the ftp site:
 ftp cadswes2.colorado.edu
 • For either site, log in as: rwuser
 • For passwords contact RiverWare tech support:
 riverware-support@colorado.edu

# Releases

➤ Major releases: RiverWare 5.2
- 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 5.2.2
- 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 5.3 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
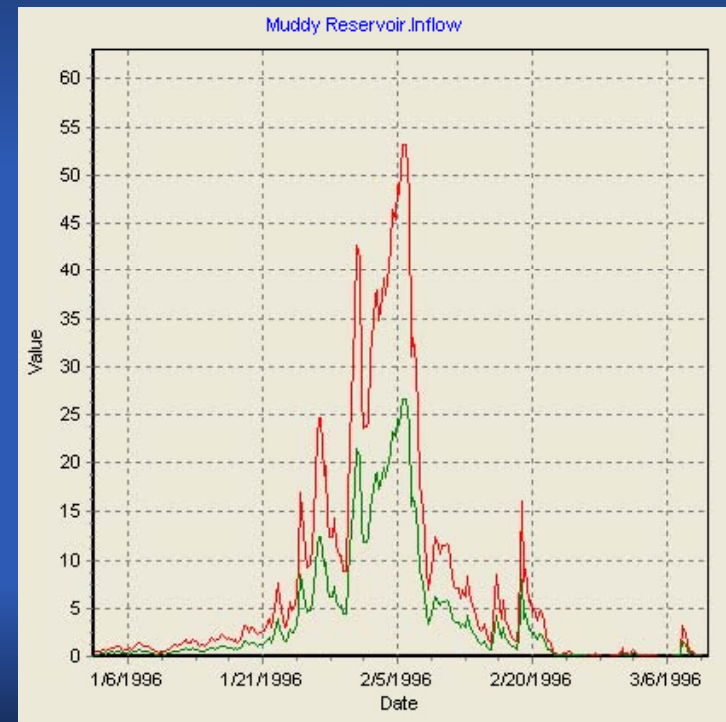- Concerned users are notified by phone or email

# Other Tools available

➢ Modelcomp – RiverWare model comparison tool

- Execute from command line

  ```
  modelcomp model1.mdl model2.mdl
  ```

  - Model files are compared line by line
  - Slot differences include convergence check
  - Graphing Options
    - Both sets of data (-g)
    - Differences only (-d)
    - Scaled Differences (-s)
  - Largest differences are shown first

# Other Tools available

➢ GPAT – Graphical Policy Analysis Tool

➢ Excel Writer – Writes Excel files from RDF

➢ YAPP – Yearly Aggregation Post Processor

➢ All are available on website

# Bugs

- ➢ Filing Should be done by users, even if CADSWES verifies
- ➢ 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://cadswes2.colorado.edu/

# Bugs

➤ 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

# Training

- ➢ **Intro to Simulation**
  - Classes held when there is enough interest / demand
  - Class dates chosen to accommodate participants' schedules
- ➢ **Rulebased Simulation**
  - Typically held a month or two after the Intro class
  - Need to have completed Intro to Simulation class
- ➢ **Accounting**
  - Typically held a month or two after the Rules class
  - Need to have completed both other classes
- ➢ **Optimization**
  - Under development
- ➢ **Web-based Special Topics?**