CADSWES Maintenance Accomplishment Report Compilation -- December 2015 Phil, edit 1-19-2016

December 2015 Maintenance Highlights:

- 1. RiverWare 6.8 Pre-Release and two development snapshots
- 2. Five (5) bug fixes.
- 3. Plotting and Output Architectural Proposal
- 4. Plot Appearance Improvements
- 5. TCL Upgrade to solve Model Loading Problem, Revisited.
- 6. Reprise Library / RiverWare Linking Method Change
- 7. Ongoing: Monitoring and maintaining daily RiverWare regression tests.
- 8. Ongoing: Installation Process and Licensing development and administration.

Report contributors:

- Substantive content from: Jessica, David, Neil, Phil.
- Bug fix items from: Neil (2), Phil (2), David (1)
- Indicated that they had no *maintenance* accomplishments to report this month: Mitch, Patrick, Bill, Tim.

(II) RiverWare Software Maintenance

- A. Releases, Patches and Snapshots
- B. Software Updates, Bug fixes (not associated with new development)
- C. Development tool improvements; issue tracking software; modelcomp
- D. Enhancements or changes to regression tests (not part of development tasks)
- E. Download, Install and Release Processes
- F. Updates to license software/procedures
- G. Updates to download/install/configure user documentation
- H. Modification to Web pages for downloads and installs

(II.A) Releases, Patches and Snapshots

The following releases were generated this month:

- RiverWare 6.8 Pre-release -- see below.
- RiverWare 6.8 Snapshot -- 12-09-2015 for USACE, 12-16-2015 for BPA.

The RiverWare 6.8 Pre-release was sent to all users on 12-22-2015 for testing and acceptance. This involved writing release notes, regenerating the help PDFs, updating the builds areas, creating the release executable, updating the website, and sending out the release notification. Release notes can be found on the RiverWare.org website.

(II.B) Software Updates, Bug fixes (not associated with new development)

The following bugs were fixed:

- Bug 5656: Output data in table series slots is not cleared when saving a model with no output. On the reach there are 14 table series slots that are used for the distributed routing methods (Kinematic, Mackormic, Muskingum Cunge...). These slots have a column for each segment or section of the reach, so there can be many columns in each slot. Since these are Table Series Slots, they are saved in the model file like Table slots, that is, they are saved regardless of the user's "Save Output" preference. This leads to very large model files. In one example, these slots accounted for 198MB of a 200MB model file. These slots are intermediate computed values; any values are cleared at beginning of run. They do not need to be saved in the model file. Therefore, these slots were converted into temporary slots. The slots are still available and are viewable to the user after a run, but they are not saved in the model file.
- Bug 5690: Unable to add columns to table slot with numeric headers
- Bug 5692: Last accessed package directory not remembered
- Bug 5694: Open Object Dialog: sort by Slot Type no longer works
- Bug 5695: RPL debug slow on subsequent runs

Plotting and Output Architectural Proposal

Users have expressed the desire to have more user-friendly and better looking plotting in RiverWare. Sponsors have allocated funds for improvements, but before these are implemented, it seemed prudent to revisit the way that users create, save, and edit plots and other output devices. For example, there are multiple dialogs where the user can select slots to plot and configure the layout (E.g. 2X1 curves) of the plot. In both places, the user can edit the plot and the interaction between them is not very intuitive. In addition, the plots use a "Save" paradigm which has never been easy to explain or use. In December, two documents were produced:

- A conceptual document describing a proposal for a new configuration of the user interface dialogs. /projects/riverware/doc/plotting/PlottingArchitecture.fm
- A document describing deficiencies and issues with the current plotting package. The document can be found
 - in: /projects/riverware/doc/plotting/PlottingInterfaceDeficiencies.fm

Plotting Appearance Improvements

The border and spacing around and inside RiverWare plot panels, and in between the plot panel and the axes, have been removed. This simplifies the appearance of plots. This is a followup from updating our Qwt plotting library from Qwt 5.2.3 to Qwt 6.1.2, also being done for RiverWare 6.8.

TCL Upgrade

TCL is a third-party software utilized in loading and interpreting RiverWare model files. The version of TCL used by RiverWare was previously updated within the 8.5 series from 8.5.1 to 8.5.18 to address a crash that occurred when loading a user's model. The change, however, resulted in a slowdown of up to 10% in the overnight running of some regression tests. A potential fix for this was tried to eliminate the writing of continued separate lines for the data in long time series so that these lines do not need to be rejoined during loading. This did not improve the slowdown in regression tests.

A second attempt at a fix was successful, accomplished by upgrading TCL to the most recent 8.6 version (8.6.4). This fix required minor changes to some TCL method calls made from the RiverWare code, but resulted in restoring regression test run times to prior levels. The new version of TCL was incorporated into the RiverWare build process. This involved:

- Downloading and building 32 and 64 bit versions of TCL 8.6.4
- Creating tarred package files of the new versions for 32 and 64 bit.
- Modifying the window configuration process for development machines to download the correct package file for the new version.
- Committing the required RiverWare source code changes to the RW 6.8 prerelease and RW 6.9 master development branches of the code repository.
- Updating all development machines to use the new version.

(II.C) Development tool improvements; issue tracking software; modelcomp

None reported for December 2015.

(II.D) Enhancements or changes to regression tests (not part of development tasks)

The regression tests continue to be maintained on a daily basis. This involves updating the regression tests to exercise new developments in the code. Also, as new code is added to the development area, the model comparisons performed in the nightly regression tests usually show differences (for example, because a new method category may have been added). When this occurs, the regression tests need to be updated to reflect the current state of the development area so model comparisons do not fail. In addition, every week, the daily history of each regression test is analyzed to determine if the run time or model size has significantly changed because of new development.

In December, the slowdown of certain tests that occurred in previous months was further monitored and found to be improved after the TCL version was updated to the current version. In addition, the tests were updated and or restarted after the version number was increased for the pre-release.

(II.E) Download, Install and Release Processes

- InstallShield project files:
 - Updated three IS 64-bit version project files (for snapshot, pre-release, and release). Removed the RLM DLL files from the component list so they are not included in the release install file. This is due to the RLM library file linking option changed from dynamic linking to static linking.
 - Created two new IS project files for generating the 6.8 pre-release 32-bit and 64-bit version install files.
 - Updated the development environment to include the RPL Predefined Function help content from Phil.
 - Updated the pre-release release file holding folders to contain the version 6.8 release files. These are the files linked in the IS project files for generating the install files.
- Updated the version number and the File Description in the RiverWare resource file in VS. The version number is updated to 6.8 and the text "Development" is added to the File Description field in the master branch. Now the Properties window for RiverWare snapshot executable displays "RiverWare Development Executable," while the official release display remains "RiverWare Executable." Also, updated the internal document Build Generation Guide: include this procedure in the to-do list when the development master branch in GIT is updated to a new version number, and make sure to verify that the official releases do not have the text "Development" in the File Description field.

(II.F) Updates to license software/procedures

- Maintaining RiverWare licenses for internal development systems. This is an ongoing task.
- Reprise:
 - Re-opened the bug report ticket number 2802 reported to Reprise on 11-14-2014. RiverWare program can find a floating license running on the network without having a physical local copy of the license file. And, a RiverWare started on another machine on the network that has its own node-locked CPLEX license file would still take out a CPLEX license from the floating license pool. Working with Reprise Support on this issue.
 - Addressed license security issues by statically linking for 64-bit Riverware build and controlling download access for 32-bit RiverWare build. See the next section.

Reprise: Statically Linking Library for 64-bit Builds

Reprise is the licensing software that is used by RiverWare. The RiverWare executable developed to use static linking to Reprise was tested and found to work correctly. However, when a statically linked 32 bit executable was attempted, there were errors due to multiply defined symbols in the dongle libraries of Reprise and FlexLM (FlexLM is the prior license software used by RiverWare, which is still used for various reasons by some customers on 32 bit). In consultation with Reprise customer support, several approaches were tried to fix these conflicts, but none were successful. It was decided that the 32 bit build of RiverWare would continue to use dynamic linking to Reprise, but the resulting 32 bit executable would be placed on a password protected area of the RiverWare web pages and be available to customers by

request only. This is due to security concerns from hacking of the Reprise dynamically linked library (DLL) file.

RiverWare configuration files were modified to link statically on 64 bit and dynamically on 32 bit. These changes were incorporated into the RiverWare build process by creating 32 and 64 bit package files, modifying the window configuration process for development machines, committing the necessary RiverWare source code changes, and updating all development machines with the Reprise changes.

Subtasks for these changes include:

- 1. Tested the RiverWare executable which has RLM library statically linked.
- 2. Created a testing InstallShield project file for generating the install file that does not include the RLM DLL file in the release.
- 3. Revised the internal document Build Generation Guide.

(II.G) Updates to download/install/configure user documentation

• Working on the online document "Which RiverWare license type to choose". This document describes the differences in details among the various types of RiverWare licenses available to users, so users can decide which type of license to choose from when purchasing a license.

(II.H) Modification to Web pages for downloads and installs

None reported for December 2015.

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