**CADSWES Maintenance Accomplishment Report Compilation -- December 2017**
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**December 2017 Maintenance Highlights:**

1. Unfunded Software Development
2. One Patch Release: 7.1.6 (12-05-2017)
3. One Prerelease: 7.2 (12-15-2017)
4. Twenty four (24) completed bug fixes.
5. Building RdfToExcel 32-bit, 64-bit executables
6. Progress on replacing Gnats bug tracking system.
7. Ongoing: Monitoring and maintaining daily RiverWare regression tests.
8. Ongoing: Installation Process and Licensing development and administration.

Report contributors:

* Substantial content from: Jessica, Bill, Phil, Mitch, David, Robynn
* Bug fix items from: Patrick (8), Phil (11), Bill (3), Robynn(2).
* Indicated that they had no *maintenance* accomplishments to report this month: Tim

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| (I) New/Enhanced Software* (B) Unfunded Software Development
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**(I.B) Unfunded Software Development**

**RiverWare Documentation Reformatting**

An inventory was made of all of the table formats currently used in the RiverWare Help documentation. A document describing each of the formats with examples was provided to Spectrum Writing for the purposes of developing Adobe Frame Maker templates for RiverWare documentation.

**RiverWare Help Updates**

RiverWare Help documentation was updated in the following areas:

* The description of how the RPL Numeric Comparison Tolerance is applied was made more precise, and a table of examples was added to illustrate how the tolerance is applied with each of the RPL comparison operators.
* The descriptions of slot dialogs were updated to reflect changes to which slot types are shown in the Slot Viewer and how numeric precision is displayed in slot dialogs.
* The description of how to save a model file was updated to include the recent enhancement that allows users to specify the precision with which outputs are saved.
* The description of the Priority-oriented Optimization Solution Analysis Tool was updated to reflect revisions to the layout of the dialog. Panels with information about frozen constraints and variables are now shown on separate tabs.
* In the equations for the Impulse Response Routing (Reach) and Impulse Response Return Flow Routing (Water User) methods, corrections were made to the subscripts used to reference the timesteps for flow values and the routing coefficients.

**New NaN Option for Time Aggregation Functions for RiverWare 7.2**

A new option for the treatment of NaNs (or NaNs and Output values) in the course of time-aggregation of values on a series slot has been added for RiverWare 7.2. The new option is now available for these three RiverWare features:

1. The "Set Run Timestep" script action's "Aggregate Input Data to New Timestep" function.
2. The Run Control dialog's "Synchronize Slots with Run Parameters" function.
3. The Time Aggregation Series Slot\*

Those features now provide these three options for handling NaNs (or NaNs and Output values). The 2nd option is new, added to address a new requirement identified in Gnats 6036.

* a. Ignore NaN/Output values
* b. Do not aggregate intervals having NaN/Output values
* c. Error on NaN (excluding pre-simulation timesteps)

\*Note: This special undefined-value handling for the Time Aggregation Series Slot applies only to NaNs, and not to Output-flagged values.

See this feature document:

* Set Timestep Size, Synchronize Slots, New NaN Option for RiverWare 7.2 / Dec 2017

R:\doc\runControl\InputAggregation\SetTstepSize-SyncSlotsNanOptions-RW72-Enh.docx

Also a change to the third option was made for RiverWare 7.2, documented as the following bug specific to the "First timestep" and "Last timestep" time-aggregation functions:

* Bug 6053: Series Aggregation "Error on NaN" option shouldn't consider unused timesteps.

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| (II) RiverWare Software Maintenance1. Releases, Patches and Snapshots
2. Software Updates, Bug fixes (not associated with new development)
3. Development tool improvements; issue tracking software; modelcomp
4. Enhancements or changes to regression tests (not part of development tasks)
5. Download, Install and Release Processes
6. Updates to license software/procedures
7. Updates to download/install/configure user documentation
8. Modification to Web pages for downloads and installs
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**(II.A) Releases, Patches and Snapshots**

The following releases were generated this month:

* RiverWare 7.1.6 Patch Release (December 5, 2017)
* RiverWare 7.2 Prerelease (December 15, 2017)

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| Summary of Changes in RiverWare Patch Release 7.1.6Bugs:The following issues were addressed:* 5806: For accounting controllers, Water Quality methods were not hidden when Water Quality was disabled
* 6038: The CompletePartialDate RPL Predefined Function could return an incorrect value when the reference date had an offset. This issued has been corrected, but the change could lead to differences in results. This only affects the CompletePartialDate function when there are offsets. Examples of offsets include the plus 1 year in the following:

- CompletePartialDate(@"December 31", @"January 1, Current Year + 1 Year") - CompletePartialDate(@"December 31", @"24:00 January 1, 2017" + 1 "Year") |

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

**The following twenty four bugs were fixed:**

1. Bug 5196: Missing diagnostic when constraint is skipped because it modifies a frozen constraint
2. Bug 5419: Interpolation tolerance for 3-D interpolation too tight
3. Bug 5781: (revisited): RPL set editor 'saved with model' icon visible state
4. Bug 5806: With accounting enabled WQ methods not hidden when WQ is disabled
5. Bug 5898: + buffer error eliminates much of screen shot
6. Bug 5918: POSAT incorrectly reporting the number of frozen constraints
7. Bug 5928: Generating CPLEX Error 1222 and inconsistent/missing coefficients
8. Bug 5929: Model dialogs don't always stay on top
9. Bug 5999: Object Viewer: Switching obj tabs: Loss of vertical scroll position
10. Bug 6018: Excel and table series slot row labels (merge, test and commit)
11. Bug 6022: Editing a script while paused does not reset Script Dashboard
12. Bug 6023: Crash with large memory usage from numerous diagnostic messages
13. Bug 6036: Treatment of NaN values in time aggregation function/script action\*
14. Bug 6038: Bug with Pre-defined function CompletePartialDate
15. Bug 6039/5937: Plotting: Error reported on time axis, esp. zooming out
16. Bug 6047: Aborted MRM continues after abort dialog closed
17. Bug 6048: Incorrect Rule Opened when two Rules Named the Same
18. Bug 6049: Fully-specified unit scheme exceptions do not persist when a slot's name is changed
19. Bug 6052: RplViewer occasional crash on exit
20. Bug 6053: Series Agg 'Error on NaN' shouldn't consider unused timesteps
21. Bug 6057: No way to add custom slots to elements of an aggregate object
22. Bug 6059: Slot Viewer Import Paste does not expand the time range
23. Bug 6062: Can't delete custom slots from elements of an aggregate object
24. Bug 6063: Global Time Scroll ignored opening slots in the Slot Viewer

**The following two items were analyzed and closed with no change:**

1. Bug 4233: CPLEX error of Duplicate Entry stops the run
2. Bug 6061: Account method not working

**Additionally, analysis was done on the following bug:**

1. Bug 6041: Configure Existing Slots dialog doesn't allow Apply operation.

**Model dialogs don't always stay on top (5929)**

Through perhaps unusual operations in the Windows task bar, it was possible to obscure RiverWare's modal dialog with other RiverWare windows. It was also found to be problematic that a modal RiverWare dialog could be obscured by windows of other applications. Both of these problems were solved by explicitly re-raising RiverWare's modal dialog (when one is active) based on application-state change and focus change notifications from the Qt Application instance AND based on a repeating one-second timer made to run while a RiverWare modal dialog is active.

**Crash with large memory usage from numerous diagnostic messages (6023)**

This work was completed in December, 2017. In order to prevent program termination, a recommended maximum number of diagnostic messages was set at 5 million. When diagnostic messages reach 5 million in the diagnostics window, a dialog appears asking the user whether to continue writing diagnostic messages and risk instability or to disable diagnostics. When disabled, a notice is written in the diagnostics window that the maximum has been reached. File output is not affected.

**Treatment of NaN values in time aggregation function/script action (6036)**

This is described in section I.B above.

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

**Building RdfToExcel 32-bit, 64-bit executables**

In November the distributed MRM controller was modified to look for the program which converts RDF files to Excel workbooks – RdfToExcelExecutable.exe – in the RdfToExcel sub-directory of the RiverWare installation directory. (The executable is in a sub-directory so it can have its own DLLs, for times when it requires different versions of the DLLs than RiverWare.) In December an attempt was made to build the 32-bit and 64-bit executables to bring them up to date with the DLLs, but the attempt was unsuccessful. Given that building the executables wasn’t necessary from a behavioral standpoint, the effort was abandoned after a modest amount of effort. This points out the complexity of RiverWare’s (and associated tools’) build environment, and perhaps the need to not let software become “stale” by not building it for years. Should it become necessary to build the executables the issues which blocked the current effort will of course be resolved.

**Issue tracking software (Progress on replacing Gnats bug tracking system)**

In December 2017, CADSWES staff conducted an in-depth technical analysis of installation and configuration options for the Atlassian product suite to begin the migration from Gnats bug tracking software to JIRA Service Desk. CADSWES made the decision to install and host a distinct installation of three Atlassian products: JIRA Service Desk, JIRA Software, and Bitbucket on a CADSWES-dedicated server. A fourth product, Atlassian’s Confluence knowledge base, may also be included. An evaluation copy of these products was installed and used to simulate installation, configuration, and import scenarios in order to plan the Gnats data export and import. Strategies for user management were studied in detail. CADSWES staff worked with Atlassian support to clarify data import concepts, server setup, product integration features, and firewall strategies. CADSWES staff exported user data, RiverWare version data, and category data from Gnats, formatted it for JIRA import, tested the import, and preserved the import files to import into the production system after it is installed. CADSWES staff exported Gnats issue data into a FileMaker Pro database, created a field-map spreadsheet and sample input format to prepare for the more complex task of parsing and formatting Gnats bug data.

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

Testing new Diversion Power

A reservoir object was added to the bhops regression test model that exercises three new methods on reservoir objects: Diversion Power Efficiency Curve in the Diversion Power category, Diversion Base Value Plus Lookup in the Diversion Tailwater category, and Bypass Capacity Table in the Diversion Power Bypass category.

Daily Maintenance

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 regression tests were monitored and updated during the transition to the 7.2 prerelease.

**(II.E) Download, Install and Release Processes**

* Converted the riverWISE.png image file (from Patrick) to an icon file for RiverWISE and added to the 7.2 snapshot IS project file. This icon file is not used later because a new one was created by Phil.
* Created and tested two new IS2016 project files for generating the 7.2 prerelease 64-bit and 32-bit install files.
* Set up the directory hierarchy for holding all the release deliverable files to be included in the 7.2 prerelease install files. The directory structure is used by IS project files for linking-in the deliverable files to generate the install files.
* Updated the version number to 7.3 in the development sources and the regression tests.
* Updated the version number to 7.2 in the prerel regression tests on aspen and Kickapoo.
* Added RdfToExcel as a new component to all 7.2 and 7.3 IS project files.
* Attended the meeting to discuss how to release riverWISE.
* Bug #5893: Uninstall leaves folder “servers” behind. Worked on the bug from the new IS2016 7.2 snapshot project file. No new progress.
* Created a brand new IS project file for generating the 64-bit RiverWISE install file. Working on the initial version.

**(II.F) Updates to license software/procedures**

* Maintained RiverWare licenses for internal development systems. Issued licenses for internal or external training classes. This is an ongoing task.
* Set up Reprise Activation Pro (ActPro) License Center and database for Viewer license.
	+ Worked with Edie on her testing. Generated new activation keys for her testing.

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

None reported for December 2017.

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

None reported for December 2017.

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