CADSWES Maintenance Accomplishment Report Compilation -- March 2015
Edit: 4-14-2015 (Phil)

March 2015 Maintenance Highlights:

1. One RiverWare patch release: 6.6.4, and two 6.7 development snapshots.
2. Eight (8) RiverWare bug fixes.
3. Analysis of RiverWare Unit Conversion utilities; preparation for maintenance cleanup and resolution of bug 5614.
4. Ongoing: Monitoring and maintaining daily RiverWare regression tests.
5. Installation support for display of RPL Predefined Function help content in RiverWare.

Report contributors:

- Substantive content from: Jessica, David, Phil
- Bug fix items from: David, Patrick, Phil
- Indicated that they had no *maintenance* accomplishments to report this month: Neil, Mitch, 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:

- Patch Release 6.6.4 / 3-24-2015, *see details below.*
- Development Snapshots: 3-11-2015 and 3-19-2015.

SUMMARY OF CHANGES IN RIVERWARE PATCH RELEASE 6.6.4

Inline Power Plant - Flow Tables Modifications

On the Inline Power Plant object, the Flow Tables method in the Inline Turbine Release and Bypass category was modified to better model power production for large flows. For documentation, see section 14.1.1.2 of the Objects chapter of the RiverWare Help.

Bugs

The following bugs were fixed:

- 5491, 5557, 5616: Interpolation on the Plant Power Table was unexpectedly failing. These bugs were fixed by the following:
  - Values used in the interpolation within the Plant Efficiency Curve method on the power reservoirs were corrected.
  - An unnecessary error condition was removed. A warning message is posted if the looked-up values are not on the table.

- 5623: An abort error in MRM resulted in many internal errors.

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

The following bugs were fixed:

- Bug 4951 - Optimization table interpolation error message

- Bugs 5491, 5557, 5616 – These interpolation errors were affecting the operators at TVA. It turned out that there was an issue in the Plant Efficiency Curve method when the method was called a second time and computed a new (lower) max Turbine Release, but because Turbine Release was within convergence of the value already on the slot, it did not reset. Later in the method, it used the larger slot value in the table interpolation and aborted with a message that it was too large. To fix the problem, temporary variables were used within the power method so the comparison to max was valid. In addition, the table interpolation error condition was relaxed. This fix was provide to all users in patch 6.6.4.

- Bug 5607: RPL predefined function toCelsius is spelled incorrectly
- Bug 5609: Open Account dialog not updated when creating supplies on the workspace.
- Bug 5611: Tool tip on Input accounting slots is incorrect.
- Bug 5623: Running CRSS and hitting an error gives many new assertion messages.

Bug 5614 -- Annual Aggregation time series slots are not correctly summing monthly flows in units of AF/month -- is in the process of being addressed.

Most of the aspects of this bug are related to the special Time Aggregation Series Slot which users can create on Data Objects.

One high-level problem is that rate unit types (notably, FLOW) were being summed in the "normal" way, which is not correct for rate (e.g. flow) values for different timesteps within a single time series. Two options which were considered for the SUM function of Time Aggregation Series Slots were: (1) "Integrating" such values with respect to time (e.g. showing the sum of those flows as a volume), or (2) Showing the sum as the average value, but with a

rate unit having a "per time" factor matching the time aggregation size (e.g. showing an annual aggregation of "per month" values with the analogous "per year" unit). We have implemented the latter approach.

Another high-level problem is that rate values needed to be summed (for both the *sum* and *average* functions) using a "weighted" algorithm. This is relevant specifically for summing rate series having an irregular timestep (i.e. per month or per year).

Ancillary to these Time Aggregation Series Slot issues, we have also implemented these related enhancements:

- Support for aggregating to Days (e.g. of hourly data). Previously, only aggregating to Months and Years was supported.

- The SCT's time aggregation capacity was expanded to support annual aggregation of daily series. That scale of aggregation (365 or 366 detail rows for each time aggregation) presented both extreme graphical and program performance problems for the SCT's time aggregation "summary" row cells. Those are normally "painted" in separate vertical slices -- one slice for each timestep -- primarily to depict each timestep's flag state as a background color. This time aggregation summary cell feature is now turned off for time aggregations of 100 or more timesteps.

In the course of testing the Time Aggregation Series Slot fixes, a broader problem was discovered within our unit conversion algorithms. **Rate values within an annual series are not correctly converted to per-month units.** The result was effectively assuming an average month-length of 31 days -- i.e. the length of the month (December) preceding the Date_Time designating the end of an annual timestep. We've determined that our variant of the "convertWithinType" C++ method which is given a Date_Time to resolve irregular time units also needs an explicit DeltaTime (symbolic time interval) to correctly compute the required value. We are addressing this problem before completing the testing of the "5614" issues specifically involving the Time Aggregation Series Slot.

To address this latter problem, an analysis of the *internal structure* and *use* of our unit conversion utility methods was done. This analysis included observations about how to improve the unit conversion API and implementation for both better run-time performance and application-code readability. A formal document for this analysis will be provided in April.

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

None reported for March 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.

(II.E) Download, Install and Release Processes

- Set up the snapshot, prerel, and release's release folders to include the newly added additional platform-independent ISV license server file cadswes.set.
- Set up the snapshot release folder to include the new release files from the new project RwDoc. This is for displaying RPL Predefined Function help content within RiverWare.
- InstallShield project files:
- Set up the snapshot, prerel, and release project files to include the newly added additional ISV license server file cadswes.set in the install subdirectory "reprise". This is the platform-independent ISV license server file.
- Set up the snapshot project files to include the release files from the new project RwDoc.

(II.F) Updates to license software/procedures

- Maintaining RiverWare licenses for internal development systems. This is an ongoing task.
- Work on the BPA license questions/issues: VM license, single licenses.
- Reprise:
    - Worked on setting up Reprise Activation Pro License Center and database.
        - Set up the product definition and the activation key for the RiverWare Viewer license and the Node-locked license.
        - Testing the license activation procedure.
    - Set up the RLM License Generation (rlmgen) tool for generating basic RiverWare Viewer Node-locked, RiverWar Node-locked, and RiverWare Floating license key. Creating the instruction file. This tool is for internal use only. The purpose is to provide an automated tool to generate simple license keys for users. It only generates license key, it does not generate the standard license information normally included in a license file.

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

- Updating the online document License Server Configuration Guide to include the information that is related to the additional ISV license server file cadswes.set.

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

None reported for March 2015.

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