CADSWES - Releases, Software Maintenance, and Development Environment Work Summary – Fiscal Year 2014

This document summarizes the maintenance work completed by CADSWES in these categories from October 1, 2013 through September 30, 2014.

- 1. Releases, Patches and Snapshots
- 2. Development Environment
- 3. Software Maintenance
- 4. Download, Installation, and Release Processes
- 5. Licensing
- 6. Regression Tests
- 7. Bug Fixes

(1) Releases, Patches and Snapshots

Two major releases (6.4 and 6.5) and eleven (11) patch releases (6.4.1 -- 6.4.10 and 6.5.1) of RiverWare were generated this year. The work involved in generating a patch release is very similar to a major release, except that a major release typically has an extended period dedicated to bug fixing prior to the release, and a more extensive set of release notes. Release notes may be found in the RiverWare online help.

Release Type	Release	Release Date
Release	6.4	Nov 15, 2013
Patch	6.4.1	Dec 3, 2013
Patch	6.4.2	Dec 19, 2013
Patch	6.4.3	Jan 6, 2014
Patch	6.4.4	Jan 17, 2014
Patch	6.4.5	Jan 31, 2014
Patch	6.4.6	Feb 25, 2014
Patch	6.4.7	Mar 19, 2014
Patch	6.4.8	May 2, 2014
Patch	6.4.9	May 14, 2014
Patch	6.4.10	Jun 3, 2014
Release	6.5	Aug 7, 2014
Patch	6.5.1	Sep 22, 2014

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Ten (10) snapshots of the build development area were made over the course of the fiscal year to allow users to test newly implemented features before they become part of an official RiverWare release.

RiverWare 6.4 was prereleased on October 24, 2013 and released on November 15, 2013.

RiverWare 6.5 had a sequence of prereleases in 2014 on 6-24, 7-9, 7-10, 7-29, 7-30 and was released on August 7, 2014.

The tasks involved in generating releases include:

- Organizing and writing the release notes
- Testing the release executable
- Generating an updated set of online help files in PDF format
- Managing the transition of code from the development area to the prerelease area
- Administering and updating the configuration files for building the software
- Compiling and verifying the builds
- Setting up a regression test area for release test runs
- Creating the release package
- Testing the installation
- Distributing the executable on the CADSWES web site, and announcing the release.

(2) Development Environment

The Development Environment category includes all of the associated software and tools used for developing RiverWare as well as their setup and interaction. Work completed this year in this category is presented below by major topic.

- Oracle Server
- Oracle Client 12c
- CADSWES HDB Test Database
- GIT source-code repository maintenance
- Visual Studio 2010 performance analysis tool
- GPAT / Excel Add-Ins
- Decommissioning Maelstrom (Sun Solaris machine)
- Windows Development Tools
- Windows 8.1 Development Environment

Oracle Server

The Linux machine named allegheny was virtualized to the CU cloud by Managed Services. Allegheny supported Oracle and the HDB database that CADSWES developers use to test HDB connectivity from RiverWare. Oracle was installed on the virtualized server and the HDB database was moved from the old machine. Several rounds of testing were performed before correct connectivity was established from developer's machines to the new database configuration. Connectivity from SQL Plus, Oracle SQL Developer, and RiverWare are now working correctly with the new database.

Oracle Client 12c

To function with the Visual Studio 2010 compiler, the Oracle client used in building the HDB Server needed to be updated to Oracle Client 12c. The new Oracle Client was installed on a test machine and the correct Oracle OCI and OCCI libraries and DLLs for Visual Studio 2010 were integrated into the local RiverWare development environment. The libraries and DLLs from the development machine used for the ensemble work were tarred and zipped to create both 32-bit and 64-bit packages for the win-config process that allows these to be downloaded to other machines. New Oracle DLLs were made available for incorporation into the RiverWare snapshot generation process. The HDB Server that functions to connect RiverWare to an HDB Database was rebuilt with the new environment, and once a problem with the server code was addressed, the new server was tested and functioned correctly in transferring data between RiverWare and HDB.

CADSWES HDB Test Database

Connectivity to the HDB Oracle database was not working when tested in January 2014. Debugging led to the discovery that a restart of the listener on January 5, 2014 caused a change to the service name of the database (the name had been changed months earlier, but did not take effect until the restart). Connect strings for clients connecting to the database had to be updated with the new service name.

GIT source-code repository maintenance

A file permissions problem arose with the GIT repository which contains the RiverWare source code. This problem prevented software developers from committing changes to the repository. The problem was initially resolved by reconfiguring the repository to ensure appropriate permissions for CADSWES staff. Subsequently, the problem returned. The problem was reproduced in a new test repository, and analysis determined that an improperly cloned repository on another machine and operating system was corrupting the permissions. The configuration of the cloned repository was corrected. This resolved the problem.

Visual Studio 2010 performance analysis tool

The Visual Studio 2010 performance analysis tool required an updated driver, but when the new driver was installed, the tool would abort analysis with an unhelpful error message. The problem was eventually resolved by uninstalling Symantec Endpoint Protection and replacing it with an alternative application to provide a firewall and other security measures.

GPAT / Excel Add-Ins: Tab Not Visible

In setting up tests for the GPAT plugin in RiverSMART, it was discovered that the Add-Ins tab in Excel from which GPAT is initiated was hidden on a developer's machine. There was no way

to execute GPAT from the Excel interface. After research it was discovered that Visual Studio Tools for Excel, which is a COM Excel add-in, apparently keeps the Add-In tab from being visible when it is installed. When this Visual Studio Tools add-in was removed from Excel under the administrator account, this fixed the problem.

Support Activity Tracking Tool

The support tool is a Java application used by CADSWES staff to keep track of the time spent providing user support to RiverWare users. For years it's been run on Solaris machines, the last of which will soon be decommissioned. To prepare for this, the support tool was moved to a Linux machine. A search for the Java source was unsuccessful; instead a Java decompiler was used to extract the Java source from the Java archive.

Decommissioning Maelstrom (Sun Solaris machine)

Over the years RiverWare development has migrated from Solaris to Windows and Linux, to the extent that a single Solaris machine (maelstrom) remained. Maelstrom was used for a small number of tasks. It was decided to decommission maelstrom and complete the migration from Solaris. Tasks included:

- 1. Deploying our Support Tool (for logging user support time) on Alamosa (linux). The support tool is written in Java and was a fairly straightforward port from Solaris to Linux.
- Deploying "modelcomp" with xmgr -- for comparing model files and plotting differences

 -- on Alamosa. Attempts to find a Linux xmgr binary which could be installed were
 unsuccessful. Subsequent attempts to find source code which could be compiled were
 successful.
- 3. Confirming usability of Flex/Bison (parsing library) tools on Alamosa. These are used within RiverWare for processing files having particular grammars, e.g. RPL ruleset and SCT files.

Windows Development Tools

RiverWare development requires a sophisticated development environment with several third party tools and libraries. Over the years an infrastructure has been developed for configuring Windows machines for RiverWare development. The infrastructure used both CVS (a source control system) and tar files for deploying the development environment. There were two problems with the infrastructure. First, using CVS was a "chicken and the egg" situation - CVS was necessary to install CVS on a Windows machine. Second, portions of the development environment had become fragmented across three directories (bin, bin.reorg and perllib). We decided to ditch CVS, to combine the three directories into a single directory, and to jettison tools which are no longer being used. This was accomplished and greatly simplified configuring Windows machine for RiverWare development.

Related: From the beginning RiverWare Windows development has been on the C: partition, in C:\RiverWare. This seems to be counter to "best practices" which separate data from the operating system to facilitate backing up data independently from the operating system. Some

RiverWare tools relied on RiverWare development being in C:\RiverWare; the tools were modified to be accepting of other partitions. (They use heuristics to locate directories which are known to be part of the RiverWare development environment).

Windows 8.1 Development Environment

We configured a Windows 8.1 machine to support RiverWare development and created a document describing the procedures for doing this on other machines. To illustrate, the following are some of the steps involved in configuring a machine for RiverWare development:

- Install the compiler (Visual Studio 2010)
- Install third party software libraries (e.g., Qt and GDAL)
- Install configuration management tools (e.g., the source code versioning application, GIT, and a custom script for conducting regression tests)
- Configure permissions for access to remote source code repositories
- Create a local copy of the source code repository

As part of this work, problems were identified with the existing script for installing RiverWare libraries and that script was significantly redesigned.

(3) Software Maintenance

The Software Maintenance category includes work required to maintain the RiverWare code that is apart from work funded to implement specific new features and new functionality. This can include, for example, removing obsolete code, porting code to use newer versions of libraries (like Qt) or to use alternate libraries, addressing compiler warnings and memory leaks, non-project improvement to online help, or changing existing code to improve maintainability and efficiency.

- RiverWare name changes
- Power Reservoir method change
- Fixes to the Qt4 port of the SCT's series data table
- Qt4 Port of Client/Server
- HDB Server Removed / OracleConnect and HdbConnect Integrated into RiverWare

RiverWare name changes

We analyzed two bugs reports suggesting changes to RiverWare names, user-selectable category and method names in the case of bug 809, slot names in the case of bug 2971. Initially, approximately 200 categories and methods were identified as candidates for renaming, and a design was developed to allow these changes to be made without affecting existing models. The software infrastructure portion of this design was implemented and tested. The new software infrastructure was utilized to update category and method names on the Aggregate Diversion Site object to a standard format. Ultimately, approximately 300 category and method names were modified across all engineering object types to adhere to a standard format. This included formatting all names in title case, including spaces between all words, removing terms such as category, calculation or calc from the names and in some cases making the name more descriptive of what the method does. These changes were made available in RiverWare 6.5.

Changing the name of slots is more difficult for several reasons, principle among them is that external entities with which RiverWare interacts often rely heavily on the specific slot names. For example, database schemas have been developed which incorporate current slot names, and changing those names would disrupt use of those databases. CADSWES staff concluded that while it would be useful to change the names of some slots, this would not be undertaken immediately.

... additional name change work:

• Updated reach routing category and method names: The "routingMethodCategory" has been changed to "Routing," and all method names in the category have been revised to a consistent, updated format for RiverWare 6.4. For example, the method previously called "timeLagRouting" is now "Time Lag." All existing models will update automatically upon load.

Power Reservoir method change

Functionality to allow a Plant Power Cap Fraction greater than 1 was restored. This returns functionality from RiverWare 6.3.3 before the initial fix to bug 5433.

Fixes to the Qt4 port of the SCT's series data table

A broad set of SCT bugs -- mostly resulting from the Qt3-to-Qt4 port of the SCT's series data table developed in March and April, 2013 for RiverWare 6.4 -- were fixed for RiverWare 6.4.2 and 6.5. These included:

- 1. The 'Double Click Data Cell Toggles Detail Rows' general configuration option wasn't functioning. Double-clicking in a detail row cell (in the aggregated SCT views) was instead starting an edit of the "clicked" detail cell.
- 2. In the Horizontal Timestep Aggregated View, the triangle-arrow treeview control *column* (for showing and hiding detail rows within a timestep aggregation block) was overly wide. This occurred only in the release (non-debug) build.
- 3. Unintentionally starting an incell edit, and then clicking away, caused the cell's flag to be changed to "Input" (as a result of the cell editor's text being applied to the slot value). Now, when an edit completes with the edited value matching the original value (with display precision), the edit is not applied. (Note that it would be useful for users to know that any edit can be aborted by hitting the ESC key).
- 4. A change to a series slot's time range as a result of running an Input DMI caused the SCT to be scrolled to the beginning of the time range. This no longer occurs.

- 5. Red crosshatching on slot column headers -- to indicate slots on objects for which dispatching is disabled -- was not showing up in certain Windows desktop themes. This was addressed by crosshatching *all cells* for such slots (in the vertical time axis views).
- 6. The "Go To" (-slot item) operation wasn't scrolling the SCT to that item in a sufficiently precise way -- it was only insuring that the picked slot item was visible. Now the picked slot item is scrolled to the top (or left side) of the SCT's window (depending on the SCT's current axis orientation).
- 7. During an incell edit, the left and right arrow keys were moving the edit cursor one character to the left or right within the text being edited. A sponsor preferred that those keys terminate the edit and move "focus" to the adjacent data cell (i.e. to the left or right).
- 8. In the horizontal time axis views, when an incell edit was active, the Tab key was navigating to the wrong cell: one *below* the cell to the right.
- 9. Changes to the configuration of column header content (e.g. optional display of units or the aggregation summary function) did not always cause updates to the column header display.
- 10. The SCT Configuration dialog's "Summary" tab gives four choices for the conditions under which timestep flag colors are shown in representative vertical "slices" of aggregation summary cells (as cell background colors). Not all choices had been implemented.
- 11. Notes on series slot values were not correctly being displayed as tooltips.
- 12. A mistake was made in the implementation of the SCT configuration lock status. It had been preventing incell edits.

Qt4 Port of Client/Server

The code for the Client/Server library was ported to Qt4 in previous work, but had not been tested with a rebuilt server until the HDB server update to use Oracle Client 12c. This testing uncovered a server crash when transferring data between RiverWare and HDB. The crash was traced to code where the socket used to transfer data was being deleted. The error had to do with attempting to send an event across threads. Based on some notes in the QT code for the socket class, the C++ delete call was changed to a deleteLater call on the base socket class. This allowed socket deletion to complete successfully when it could, and fixed the crash problem with the server.

During testing of the MRM ensemble work, it was noticed that the HDB server is getting spurious commands across the socket from the RiverWare client even though RiverWare is not sending any commands. The commands appear to be the last command that the server sent being reflected back periodically across the socket to the server. This behavior looks to have started with the port of the client/server code to Qt4, which involved significant changes to the socket implementation. Preliminary debugging and testing did not uncover any fixes to the problem, so the issue was ultimately filed and fixed as bug 5448 ("Phantom commands to HDB Server"). The solution was to move the OCCI code to communicate with HDB directly into RiverWare and eliminate the HDB server -- *see the next section*.

HDB Server Removed / OracleConnect and HdbConnect Integrated into RiverWare

With the port to Qt4, RiverWare and server code had to be rewritten to use Qt4 socket classes. When the HDB server was modified and rebuilt to include HDB ensemble functionality, it was noted that "phantom" commands seemed to be intermittently reflected from the RiverWare client back to the server over the socket. With testing by Reclamation that involved moving a lot of data via the ensemble functionality, the server commands would get out of sync with the RiverWare client and the server would hang. It was strongly suspected that these phantom commands were causing the out of sync problem. To address this problem, the client/server mechanism was taken out of the communication process, and the code to connect to the HDB Oracle database was incorporated directly into RiverWare as described below.

The OracleConnect Visual Studio project that was in the HDB server was moved to the RiverWare Visual Studio Solution (this contains the Oracle C++ Call Interface code that connects to HDB for the OracleConnect and HdbConnect classes, as well as the OracleError class). The RwOracle and RwHdb classes in RiverWare were modified to contain a static instance of OracleConnect and HdbConnect, respectively, Functions in RwOracle and RwHdb were modified to call the connect code directly through these static instances. Code was added to RwOracle and RwHdb classes to process Oracle error and warning messages returned from the connection code and add these messages to the DMI handler as well as posting them as RiverWare warnings. Diagnostic messages for illuminating the interactions with HDB were in the HdbClient and OracleClient classes under the diagnostic category of ClientServer. These were moved to the RwOracle and RwHdb classes under the category of Dmi Dataset.

Compilation of the new RiverWare code with Oracle libraries produced errors with type definitions of the word "boolean". Investigation found that Oracle include files will typedef "boolean" as an int if it is not already defined. A windows library was later declaring it as a typedef of unsigned char creating the multiple definition error. The solution was to ensure that the Windows file wtypes.h is included before the Oracle file occi.h so that the Windows definition happens first and then Oracle does not attempt to define it.

A server timeout value could be set and saved with each HDB dataset that defined the amount of time before an error was declared if the RiverWare client did not hear back from the HDB server. This was needed for the situation where the communication link between client and server became inoperable. The HDB dataset dialog was modified to remove the widgets and handler code for setting the timeout values, as these are no longer needed with the new code arrangement. The RiverWare help was modified to delete description of the server timeout functionality.

A release build of the new code was tested to ensure that the HDB functionality works correctly. Input and output DMIs as well as input and output ensembles were run to exercise all of the methods that connect to HDB. The posting of diagnostics and error messaging were also tested to verify proper operation.

32 and 64 bit snapshots of RiverWare packaged for users were tested to verify the correct operation of HDB connectivity since removal of the HDB Server. This testing was necessary to

ensure that correct DLLs were assigned into the correct directories in the modified snapshot creation process.

(4) Download, Installation, and Release Processes

Flexera InstallShield is the software used to create RiverWare installation files. The work over the past fiscal year related to InstallShield was as follows:

- Created new IS project files for 6.4, 6.5 and 6.6 releases (several release types, throughout the year).
- Re-structured the release file holding folders for IS project files in all three release areas (builds, prerel, and release). Removed the "src" directories (originally holds 5 common RiverWare source files). Moved release files to "win" folder for common files, to "win32" folder for 32-bit files, and to "win64" folder for 64-bit files. Updated all IS project files to link from the new locations.
- Finished the installation and the configuration of the new InstallShield version "InstallShield 2013" on machine torrent. Worked with Flexera customer support to resolve a few installation issues.
- Converted the current four main IS project files from IS 2012 version to IS 2013 version. Cleaned up and removed the old release build configurations from the new project files. Working on testing the installation of each converted project file.
- Updated the release files (units and RplUnits) to the newer version in all three release file folders for the InstallShield projects files.
- Updated the InstallShield snapshot project files with the new setup for the HDB server files. The executable file rwhdbsev.exe will no longer be built, all the related Qt and Oracle DLL files are now moved up to the main install folder. The "servers" sub-folder now only holds the DSS server executable file and its Qt DLL file.
- Completed the configuration of the four newly converted InstallShield 2013 project files (for releasing 6.5 snapshots and 6.4.x patch releases). Verified the changes and tested the installation of the setup files built. Modified the bill board splash screen, added the colorful picture (the one on the RiverWare About Overview page) to the install progress window. Fixed compiler warning 3028- cannot find the string ID "CheckBox1" from the string table. Now the builds are completed without any warnings.
- Moved our InstallShield node-locked license from torrent to danshuei; resolved some issues regarding installing as a user without administrative privileges. Tested and verified the setup on the new machine. Tested the four newly converted InstallShield 2013 project files for 6.5 snapshots and 6.4.x releases on the new build machine. The new patch releases and snapshot releases are now built with the new IS version on the new build machine.
- Solved a problem of InstallShield application crashing upon launch. This had been caused by Microsoft security update KB2962872 (MS14-037). This was addressed by installing the latest IS patch release.
- Updated the Colorado River image file new version. This is displayed displayed in dialogs at the beginning and at the end of the installation.
- Upgrading InstallShield to release IS2014:

- Downloaded and installed the latest InstallShield 2014 version to machine danshuei.
- Cleaned up and verified all the IS2013 project files to get them ready for converting to IS2014.
- Set up a new directory structure for holding the new IS project files with IS2014 release. The current six main project files located in the \projects\riverware\IS\is2013-project folder (64-bit version and 32-bit version for snapshot, pre-release, and official release releases) have been copied over to the new IS2014 project folder \projects\riverware\IS\is2014-project and converted to use the new IS2014 release.
- Configured and set up the six new project files (for creating snapshot 6.6, prerelease 6.5, and release 6.5 install files), which were converted from IS2013 to IS2014.
- Created a testing snapshot project file for generating a testing install file with the RLM 11.1 version incorporated.
- We have started looking into an issue involving RiverWare model file associations with a RiverWare executable on machines where multiple versions of RiverWare are installed. The .mdl file type is set in the IS project file and it is set in the registry during the installation.

Other work related to download, installation, and release processes included the following:

- Completed the update of the online Install User Guide.
 - Added more details to the license file install location section based on the errors reported by users in the past.
 - Added table of contents.
 - Removed all the references and instructions that are FLEXIm license related.
 - Added Viewer license executing instructions.
 - General minor changes.
- Updated the internal instruction document for generating RiverWare releases.
 - Added more GIT related details and reorganizing the directory structure for holding the release files that are used by InstallShield project files.
- Archived the old CVS folders to free up disk space.
- Cleaned up and reorganized the three build and release areas for better management and to free up disk space. Updated all the release manifest files.
- Updated the Copyright year in RiverWare source code and in InstallShield.
- Cleaning up the unused or the duplicated environmental variables in all project files.
- Composed a special email file describing why RiverWare default installation is designed to have each release installed into different install directory.
- Added download information to all of the license email template files so users know that they need to obtain RiverWare and related programs from our website instead of expecting physical software delivery. Also, the license re-hosting email template now includes a reminder that only three re-hosts are allowed per license contract year.
- Set up and maintained a GIT repository for all three build areas, builds for snapshot release, prerel for pre-release release, and release for official release. These three GIT repositories contain the entire checked out source files based on their specific release

version. Before creating each release, a procedure is added to update the GIT repository area so all source files are updated to the most current versions. All three IS project files have been modified to retrieve these five release text files from its GIT source area.

(5) Licensing

Ongoing licensing work:

- Generation and delivery of license files to RiverWare users. Tasks include tracking of expiring licenses, contacting users to get information; generating license files; updating the license data records; providing instructions for RiverWare download, install, and floating license server manager configuration setup; and problem solving for users.
- Maintenance of licenses for internal development environment.
- Periodic reporting of sponsor and other user licenses, including temporary licenses for users attending in-house and on-site classes.

Reprise License Manager (RLM) and related licensing work:

- Tested the licenses -- both floating and node-locked licenses -- having different expiration date between RiverWare and CPLEX license keys.
- Updated the Floating License Renewal Quick Start and User Guides.
- Added section "Updating to the Latest License Server Programs" to recommend that user upgrade to the latest license server programs when restarting the license server with their new annual license file.
- Tested RiverWare version-5.X-locked license for issuing PacifiCorp's version-locked license. Created the special user instructions for running the version-locked license.
- Modified all the email template files with updated and simplified instructions for obtaining the host IDs.
- Tested running more than two license servers on one single license server system simultaneously with two different floating license files. The result is multiple generic license server processes (rlm.exe) running on one system, but only one ISV server (cadswes.exe) is allowed on one license server system.
- Updated the License Record Excel file.
- Created a new license email template file for Viewer user. This includes information about how to avoid having the "FLEXnet License Finder" window coming up every time RiverWare is started.
- Created a new email template file describing the RiverWare application version and model file version compatibility issue.
- Updated document RiverWare License File Creation Guide. This document is for internal use only.
- Updated two special email files for providing support to users with license server problems. These email files will help speed up the process of helping users resolving their license errors. The two updated are generate-diag-debug-log-file.txt and common-error.txt, which contain the instructions for users to generate a diagnostic log file for us to debug the problem.

- Upgrading RLM to version 11.1. (As of the end of FY 2014, testing with RiverWare is underway).
 - Downloaded and installed all 3 versions (Windows 64-bit, Windows 32-bit, and Solaris) of the RLM Developer Kit.
 - Configured and built version 11.1 Reprise Developer Kit, for both 32-bit and 64bit. Provided the required configuration files to the RiverWare tools directory for incorporated into RiverWare.
 - Updated internal document "RLM for RiverWare-Configuration and Build Guide." This document contains the instructions for downloading, installing, configuring, and building the RLM Developer Kit for RiverWare.
 - RiverWare test executables were created for 32 and 64 bit Windows with Reprise 11 libraries and DLLs. This supports testing of the new Reprise license software version for incorporation into RiverWare.
 - (As of 10-2014), We are currently testing the new version with all different license files created by the new license generating program rlmsign.exe. After the new version is confirmed working without any issue, RLM release 11.1 will be checked into the version 6.6 development build.
- After full integration with RLM version 11.1, we'll start configuring and setting up the Reprise Activation Pro. This is a license activation tool which allows us to automatically deliver licenses to our users. This will initially be used for RiverWare *Viewer* licenses.

Dongle (USB device) License support:

- Updated online document: Dongle License User Guide for the new dongle key available from Reprise. This included updating the instructions for license file install location and adding more SafeNet help file references.
- Updated and tested the latest version of Sentinel HASP/LDK device driver files for RiverWare dongle. The new version of the zip files is now available from the RiverWare download webpage.

(6) Regression Tests

Regression tests are a suite of RiverWare models that were automatically run every night to look for changes in results or performance from new code that was checked in to the development area. Results of the tests were evaluated on a daily basis to identify unexpected changes in model results. The model comparisons performed in the nightly regression tests can show expected differences (for example, because a new method category may have been added). When this occurred, the regression tests had to be updated to reflect the current state of the development area so model comparisons did not fail going forward. In addition, every week, the daily history of each regression test was analyzed to determine if the run time or model size had significantly changed because of new development.

In addition to the regular regression test work, the following regression test items were addressed over the course of the year:

- Oct 2013: The tests were updated a number of times as slot names, method names, and slot unit types were changed. In addition, a number of bug fixes led to diagnostic differences in some tests requiring updating.
- Nov 2013: The tests were updated when routing method names were modified and RPL print and warning diagnostics were changed.
- Dec 2013: The tests were modified when code was changed for salinity improvements.
- Jan 2014: The tests were updated when routing and power methods were modified. Also the tests were modified to exercise new optimization evaporation methods and new diagnostic messages.
- Feb 2014: The tests were restarted when they failed to work after a power outage.
- Mar 2014: The tests failed when the new HDB/oracle client work was implemented. The tests were analyzed and the testing machines were updated so the tests ran again.
- Jun 2014: The regression tests were updated due to the new 6.5 pre-release and move to the 6.6 development area.
- Jul 2014: The regression tests stopped working on two days on one particular machine. The machine was restarted and the tests were re-run.

(7) Bug Fixes

This table enumerates the 222 RiverWare bugs closed in FY 2014 (Oct 2013 through Sep 2014).

Bug	Description
1704	Add a mode to the dispatch dialog: omit fully dispatched objects.
1762	Model Run Diagnostics Do Not Indicate Which Controller!
1834	Rio Grande Ratio could have an iteration problem with Heron Inflow
1841	Depth to Flow Manning Trapezoid uses poor iteration setup
2011	Add thermal object information to the dispatch dialog.
2248	We should allow standard scale prefixes for units (Mega, etc)
2322	Units of TIME will not be correct on Series Slots when the units are months
2548	Sim Controller redispatching incorrectly with water quality on
2574	Predefined getSlotVals() doesn't deal well monthly units
2592	conflict lists could be unnecessary
2653	Post-Simulation Accounting Controller
2699	impulse response routing method does not balance mass if an Inflow value changes
2820	Models with cyclic flows cause core dump
2822	mis-handling of signals, out-of-memory
2826	Dispatch solved diagnostics should be available when selecting Dispatch Management- >Controller
2898	memory leak (MLK)
2903	Input Outflow Adjustment methods are no longer needed now that we have physical constraint flags
2945	Pass through account solve unnecessarily and far too often.
2991	All information not purged to reduce model file size before saving
3015	Can get AggDiversionSites into inconsistent state with respect to accounts
3062	Table Series Slots are being used for input values, this is not good.
3106	The SCT does not expand the time series range of a slot when the user sets a flag on an unavailable date
3133	problem with pausing and stopping model runs (PC version)
3204	URGWOM model gives out of memory error and then core dumps when changing the start date
3274	Resume Run still not working with Rio Grande Model

3300	Simulation problems when the Diversion slot on a Water User is set with a rule
3316	The Resume Run feature does not work for the URGWOM model.
3511	SCT issues and new GUI development plea
3542	GUI, plotting wish list item
3612	RPL Analysis Dialog does not update properly when a new rule assignment is added
3693	SeriesSlot::setValue(double, Date_Time *=NULL,) should not have null default argument
3718	Crash changing the timestep in the Run Control
3734	Run Control Irregularities
3771	Copy/Paste Object and Account Information (not data)
3864	RiverWare workspace environment not constant
3960	GUI Dialogs have user input issues
3975	[Enh] Open Object dialog should allow exporting of this object
3977	Output Manager slot lists need to be export/importable
4178	Model corruption issues related to SubBasins
4184	Open Acct Dialog, Methods Tab: order of method categories is confusing
4247	Closing the console window on Windows OS crashes RiverWare
4252	purify errors, lotsa memory leaks
4413	account system configuration cannot configure dependent slots
4425	Exporting an account sometimes loses input values
4433	Series resizing with copy operator as an option
4462	Database DMI: slot selections sort by slot name, not selection name or anything else
4513	Physical constraint flag persist when it should not
4599	DB DMI editor won't recognize or incorrectly displays mapped DSS b-parts for object names with certain slot combinations
4607	Certain Name Maps still not resolving correctly in DB DMI editor
4694	excelwriter return unhelpful error
4719	In the middle of running a MRM, a window error message stating "riverware.exe has encountered a problem and needs to be closed." And RiverWare closes.
4792	HDB/DMI Entries Change Upon Import of Revised Data Object
4856	RPL set analysis tool "Evaluations" is misleading
4875	Weird message when trying to close model
4915	Error solving back in time before model start date

4976	DSS DMI error on output DMI - goes away when DMI diagnostics are enabled
4977	Initialization rules and expression slots don't deal well with HasRuleFiredSuccessfully
4992	DMI Confirm hangs from batch run
5005	issue with excel DMI
5014	Assertion Failure in MRM Run when required data is missing
5033	Initial value of zero breaks kinematic routing method
5067	Mass Balance bust in storage routing method
5071	Mass Balance Bust in Kinematic Routing Method
5106	User Defined Accounting Methods not solving for future timesteps.
5119	Invoking a DMI results in a message that control file isn't a text file and stops execution
5122	Newly created rules show up as ASSIGN TO ? [] in RPL Analysis Dialog
5142	Multiple run progress bar isn't shown if concurrent MRM follows iterative MRM
5154	Distributed MRM is creating temporary folders at C:\
5163	Extra "Freeze" statement causes CPLEX exception
5179	RPL predefined OptValue() returns values for some approximated slots
5187	Lots of crashes when deleting supplies
5207	Support for Weekly Timesteps needs to be Hidden or Fixed
5212	Batch mode ConfigureMRM command sets number of traces incorrectly
5213	RPL debugger breakpoints in expression slots don't work
5216	SeriesSlot Import RESIZE does grow the series, but doesn't shrink the series
5220	Slot plot legend font reverts to standard font when slot value changes.
5267	Print Statements for Initialization Rules do not work when using Rulebased Simulation Controller
5284	Workspace File->Reopen Model menu selection ignored
5295	With single trace distributed MRM controller crashes
5302	Diagnostics in opt are not displaying the name of the object that is causing a run abort
5311	Aggregate Diversion Slot solving every other day
5321	Stopping an accounting run leads to an unexpected red abort error
5332	Crashes on exit
5338	Control file DMI with wildcard exports non-visible slots
5346	Several warning messages in TVA Hourly model
5353	DMI performance problem

5367	Missing context for invalid slot value message
5376	Diagnostic that is sometimes misleading about missing minimum values
5377	Opt diagnostic about hydro blocks is unclear
5381	Need improved warning msg for particular infeasible case
5383	Error importing an exported MRM Slot List
5386	Wide slots are not placed in a fully visible location and resizing width is forgotten.
5387	SCT - Allow multiple tabs for series slots
5388	SCT - Allow statistics columns/rows in series slot tab of SCT
5389	no documentation for Ramping Modeling and Regulation Category
5390	Crash during MRM
5391	Bad advice: Save with Extended Precision (not generally necessary)
5392	Slot Visibility: Slots not in use are showing up in the slot selector and other slot lists.
5393	Setting Initial Timestep Values with Batch script
5394	Accounting slots and slots on data objects do not save and reload rule priorities
5395	Printing line width factor is incorrectly applied for Model Reports
5397	Multiple Object Method Selector shows methods from two categories.
5398	Find Input Slots is finding too many accounting slots
5399	Cannot move rule to first position in policy group
5400	The new trace-based DMI doesn't work in a multiple run
5401	Slot order in Open Object dialogs is inconsistent
5402	Expression Slot Function Set import and overwrite fails
5403	Initialization rules do not allow @"t" or @"t-1" references
5405	Diagnostics sometimes cause the RiverWare interface to freeze
5406	GetDayOfMonth Predefined Function not evaluating to correct day of month
5407	Exiting RiverWare aborts a distributed multiple run
5408	Index Sequential "Intervals" do not work with distributed MRM
5409	Visual Studio/Debug-only CRASH: QGraphicsScene/Item paint event, operating horizontal scrollbar.
5410	SCT Export Copy is not exporting row headers
5411	Inserting slot in SCT hides existing slots
5412	DMI file chooser does not let you select a control file or executable if the directory is write protected
5414	Tabular Series Slot Report: Time Range and Description are not retained.



5415	Study Manager: error if no executable is specified in control file/executable style DMI event
5417	Diagnostic about hydro blocks does not clearly explain the problem
5418	Objects jump off workspace if moved slightly when opening
5419	Model Reports: Potential Crash with Slot Table: Uninitialized account pointer
5420	Tabular Series Slot Report: 'Show 0.0 as blank' option is causing values with commas to be blank.
5421	Can edit only one curve in the Curve Configuration editor for Plot Pages
5422	SCT behavior change in version 6.4
5423	Can't close optimization goals (and perhaps other dialogs)
5424	'File >> Save Model' problem in new RiverWare session when no model file path is defined.
5425	Assertion error plotting Integer Indexed SeriesSlots
5426	Slot Column Label filter does not work when selecting slots
5428	No Diagnostics Context for constraint error message
5429	CMD screen error message when running model
5430	Periodic slot lookup is inconsistent based on order of configuration
5431	MRM configuration is not showing excel options
5432	A reach with near zero flow can calculate a non-zero Salt Available for Removal
5433	Arkansas model has differences in power method in 6.4
5435	Storage account is not solving for timesteps in future when there are lags
5436	In Sim, expression slots now say End of Block, not End of Timestep for evaluation time
5437	Crash operating the Plot Dialog's 'Scale to Specified Time Range'
5438	Adding a RPL breakpoint to an OLAM causes crash on next model load
5439	Workspace: Right clicking on object (to show context menu) no longer selects the object
5440	Plot page generation does not re-use existing dialog
5441	Crash on reload with plot open
5442	SCT crash: right-clicking in empty area of series table with no cell selection.
5443	Renaming a copied slot with name ending in a number causes a crash
5444	SCT: unintentional data changes due to numeric entry edit field 'focus' behavior
5445	A crash can occur if errors are reported in a popup window while loading an SCT file.
5446	Error message should say "Release" instead of "Turbine Release"

5448	Phantom commands to HDB Server
5449	Geospatial view background image refresh problem with MrSID format
5450	Slot order is not maintained on open object dialog
5451	DMI input of AggSeries requires NONE type for all columns after first column
5452	Series Slot with Periodic Input having NONE unit type: Auto-width of series column not always sufficient.
5453	Slot Type Filter in Slot Selector: TableSeries filter value is including 1x1 Table Slots
5454	Missing Diversion Shortage Calculation
5455	Tolerance check between Diversion Requested and Diversion is needed when solving water user given diversion
5456	Plot Page Output Device Configuration Dialog: Cannot paste Periodic Slots into Slot List
5458	Thermal economic values are incorrect for large hydro generation values
5459	Series Slot with Periodic Input does not copy and paste
5460	Unable to Insert a Column in an AggSeries Slot
5461	Pause Before Timestep Range doesn't update after a Script a "Set Run Range" is used
5462	All Columns of an AggSeries Slot do not DMI In from excel with the same units
5463	Importing a table column doesn't allow NaN
5464	Initial zero step response coefficients results in warning for backcasting or setting pre- run values
5465	RiverWare crashes when changing series slot timestep in large model
5466	RPL set analysis tool doesn't remember column order
5468	If RIVERWARE_HOME isn't set distributed MRM generates bad XML
5469	Distributed MRM generates bad XML if global function set is saved in model file
5470	DMI "start timestep" for annual slot is a monthly date
5471	Diagnostic settings for predefined functions is not working
5472	MRM distributed run working directory specification cannot use environment variable
5473	parser stack error loading a ruleset
5474	Model report for three column table slot gives incorrect labels
5475	Run Analysis - Window maximize issues
5477	Assertion failure, Edit Account Dialog when run range is changed
5479	Coping logic into rule causes if/with/for statements to show up in expansion tree of ruleset
5480	Crash when closing a Name Map if Name Map Manager is not open

5482	Top of Cons Pool is no longer required to be the same across a flood control subbasin
5483	Crash deleting (Pie-) Chart Device when its Configuration Dialog is open.
5484	Model run aborts the first time model is run after setting up an account application (Inline Simulation and Accounting) to run as a Water Operations application (Inline Rulebased Simulation and Accounting) run
5485	Incorrect error that turbine release is greater than capacity
5486	assertion error after changing dates and running the model
5487	Plot Dialog: Assertion failure adding slot after having tried plotting a single-column table slot
5489	Crash loading model when using an SCT with Object Grid
5490	Canceling a move (drag) of the first Rule of a Policy Group puts it at the end of its original group
5492	Results not displaying in Agg series slot columns (newly appended columns)
5493	Accounting not clearing values between runs
5494	Rows in SCT are out of synch when SCT loads
5495	Periodic slots are not repeated in graphs.
5496	GetSeriesSlots returns slots from object for methods that aren't on
5497	When moving the first rule in a group, if the move is cancelled, the rule goes to the bottom.
5498	DMI input for Aggregate Series slots only imports on column when initiated through a script
5499	DMI input for Aggregate Series slots only imports on column when initiated through a script
5500	Switching to a parametric plot in Plot Dialog ignores bottom axis' configured precision.
5501	issue with inline power plant
5502	FilterByObjType: (1) only first type used (2) 'DataObj' problem
5503	RPL: core dump when writing to agg series slot
5504	RPL IF statement copy/paste can lead to a crash
5505	Diagnostics window closes when invalid RPL set is loaded (sometimes)
5506	Redundant DMI execution (GUI only)
5507	Creating a Subbasin from AggObjs selected on the workspace no longer includes Element Objects.
5508	problem with having multiple flood control basins in one model
5509	issue with new Inline Power Plant method
5510	Crash modifying a plot page configuration via the output manager



5512	Cannot synch slots different than run timestep
5513	Interpolate Between Inputs feature in SCT does not work for slots/SCTs that are different timestep than the model
5517	Exporting then importing a table slot doesn't work
5518	Importing evaporation coefficients through DMI does not re-size units
5519	Open TableSeries Slot Dialog: Selection Statistics panel doesn't work
5521	SCT: Entered timestep cell value doesn't get Input flag if new value matches old value
5522	An empty subbasin does not save with the model
5524	core dump when trying to run model with phase flood control
5526	core dump with phase balancing flood control
5527	Periodic slot not properly saved into model file
5528	RPL displays incorrectly under Windows 8.1
5530	Scripts Open Global Functions Set action does not work
5531	Distributed MRM looks for first trace of data, even when initial offset is non-zero.
5536	RW crashes when change Flow type to af/mo in Unit Scheme Manager
5538	Script not accepting changing of day and month in table slot
5539	Seepage values not showing when switching from Single Seepage Value to Linear Seepage
5540	Object Acct Sum Dialog: wrong number of time columns when switching column mode
5542	R flag is not showing up on Model Run Analysis cells
5543	Name Changes on Reach Objects not working as advertised
5544	In Script Manager, setting the Initialization Rules execution flag to Yes only works for the Simulation and Rulebased Simulation controllers

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