OHD-CORE-CHPS-3.2.a Release Notes

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Release Type: Scheduled
OHD-CORE Build: 3.2.a
OHD-CORE Build and Package Date: 11/7/2013
Tested against FEWS Binary: 2013.01 build 43108, patched from 42428

Introduction

This document contains release notes for OHD-CORE-CHPS-3.2.a and includes the code and documentation necessary to implement calibration in conjunction with FEWS 2013.01.

In addition to the normal differences between the fews.sh script provided by Deltares and the fews_ohdPlugins.sh script provided by OHD, the OHD version in this release has higher –xmx values. Some of the graphgen SA's were crashing in regression testing from not having enough memory available.

Note that OHD-CORE-CHPS-3.2.a has been compiled against Java 1.7. All RFCs should update to the latest version of Java to prevent potential version conflicts.

Fixes

FogBugz ID	Reported By	Title
984	NCRFC	TATUM incorrect if LAYER COEFFICIENTS of form #.00
1045	APRFC	GraphGen does not add a .xml extension
1061	WGRFC	Graphics Generator - Pi Service not finding Historical Ensemble HS
1078	OHD	Graphics Generator Tips and Troubleshooting" Document Update
1070	MARFC	In 3.1.a, FFH is failing at 18z. It runs successfully at 0z, 6z and 12z.

Enhancements

FogBugz ID	Requested By	Title
1117	OHD	Update Graphics Generator to use products/settings files on the filesystem
1142	OHD	Calibration, OHD-CORE part into CHPS
1144	Calibration users	Make Lower Zone Deficit Ratio (LZDEFR) SAC-SMA variable available as an output timeseries
1145	OHD	Program shef2pi originally developed by John Halquist of NCRFC/NOHRSC.

Beta

FogBugz ID	Reported By	Title
N/A	LMRFC	BASEFLOW mod not affecting UHG
N/A	MARFC	Threshold Information missing from Graphgen Plots
N/A	BPA	Shef2pi only available in 32-bit
N/A	BPA	nc2grib.LX Exiting Prematurely

Documentation

The following pieces of documentation have been added or modified since the last release and can be found in the 'documentation' directory at the root of the package. All the documentation for OHD-CORE-CHPS-3.2.a can be found online at http://www.nws.noaa.gov/oh/hrl/general/indexdoc.htm.

- *Added:* Calibration/Calibration_Configuration_Guide.docx
- *Added:* Calibration/Calibration_Reference_Manual.docx
- *Modified:* Models/Joint_Reservoir_Regulation.doc
- *Modified:* Models/Lag_and_K_Routing_New.doc
- *Modified:* Models/Continuous_Incremental_API.doc
- *Modified:* Models/Sacramento_Soil_Moisture_Accounting.doc
- *Modified:* Models/BASEFLOW_Simulation_Model.doc
- *Modified:* Models/Consumptive_Use.doc
- *Modified:* Models/SSAR_Channel_Routing.doc
- *Modified:* Models/Channel_Loss.doc
- *Modified:* Models/Single_Reservoir_Regulation.doc
- *Modified:* Models/SSARR_Reservoir_Regulation.doc
- *Modified:* Utilities/shef2pi.doc
- *Modified:* Utilities/Graphics_Generator_Tips_and_Troubleshooting.docx **(FBz 1078)**
- *Modified:* Utilities/Graphics_Generator_AHPS_Products_Installation_Guide.docx
- *Modified:* Utilities/Graphics_Generator_Installation_Guide.docx

Notes

Fix: Fogbugz case 984 – TATUM incorrect if LAYER COEFFICIENTS of form #.00

Description

A recently defined TATUM routing produced results which indicated coefficients were adding up to something less than 1, even though coefficients summed up to 1.0. After debug traces showed no problems, eventual trial-and-error configuration changes led to the "LAYER_COEFFICIENTS" section. The highest layer has 2 ordinates and the bottom layer has 3 ordinates. Changing the LAYER_COEFFICIENTS numbers from 2.00 and 3.00 to 2.01 and 3.01 resulted in correct TATUM routings. It appears *anything* in the hundredths digit, other than 0, was the key to having this 2-layer TATUM work correctly. 2.09 and 3.09 also worked during testing. It is unsure why the LAYER_COEFFICIENTS can't be whole integers instead of double precision floats. Ideally the decimal digits would not be flags to do different things.

Cause

The number of Tatum coefficients for each layer is defined as a double in the user manual documentation and the Java validation program ensures the xml parameter has valid double values. However, the Tatum Java driver only checks the double values, and can’t handle a situation where the value lacks the decimal values.

Fix

The code was changed to cast a double value into an integer value for the number of coefficients.

Fix: Fogbugz case 1045 – GraphGen does not add a .xml extension

Description:

This issue was found during the CHPS-3.0.1 Beta testing by Ben Balk (APRFC). When GraphGen exports an xml file, the file extension (.xml) is not appended to the end of the file name.

Cause:

GraphGen does not append the .xml file extension when the filename does not exist.

Fix

The GraphGen code was modified to automatically add a .xml extension when the export file is defined.

Fix: Fogbugz case 1061 – Graphics Generator - Pi Service not finding Historical Ensemble HS

Description

When trying to generate a product (e.g., the AHPSFlowProbPlot), GraphGen complains that it cannot find the historical ensembles and will print an error message, for example:

```
"In ProbabilityPlot calculator, the computation date Wed Jun 19 12:00:00 GMT 2013
yielded an empty distribution/exceedance function; it may be outside the
start/end time of the data."
```

Cause

Unlike the ESPADPInputGenerator that cuts one long time series into ensembles itself, GraphGen requires that historical simulation (HS) ensembles have already been created in order for them to be used in the AHPS probability plots AHPSFlowProbPlot, AHPSStageProbPlot, and AHPSVolumeProbPlot.

Fix

The HS ensembles can be created using the sample transformation from an existing long historical simulation within CHPS. The new sample transformation should be run once per day alongside the standard CS ESP runs to create the comparable HS ensembles. The new transformation module looks very similar to the standard MAP SampleESP module. Please see the Section 2.9 of the *Graphics Generator Tips and Troubleshooting* document for detail procedures of creating transformation module.

Notes

It has been reported (Fogbugz 1083 and 1061) that when running multiple workflows for different forecasting groups as configured in section 2.9.2 of the Graphics Generator Tips and Troubleshooting document, the HS ensembles created by the last workflow will overwrite the HS ensembles of previous forecasting group. Therefore, the previous HS ensembles are not available for Graphics Generator to display the probability plots for the previous forecasting group. One solution is to group the multiple workflows for different forecasting groups into one single workflow that will run all the forecasting group workflows.

Fix: Fogbugz case 1070 – In 3.1.a, FFH is failing at 18z. It run successfully at 0z, 6z and 12z.

Description

In the OHD-CORE-CHPS-3.1.a release, FFH runs at MARFC are failing when T0 is 18Z. However, the database viewer shows state data being created for up to 18Z.

Cause

The original code logic was inadvertently changed as part of cleaning up the code for 3.1.a.

Fix

A minor code change was made to the ApiContFFGRainfallRunoffModel to re-enable 18Z runs. The functionality matches as that of releases prior to OHD-CORE-CHPS-3.1.a.

Notes

The Update States portion of the FFH workflow assumes the APICont model state start time is for the previous 12Z state and is not more than 24 hours old. Cold States will be used if the start time is greater than 24 hours old. The Update States workflow should produce states for the FFH runs of API-CONT for the current synoptic time (i.e., 00, 06, 12, or 18Z). These states are then used to execute API-CONT for computing FFH.

This is a re-release of a fix delivered to MARFC as part of OHD-CORE-CHPS-3.1.b.

Enhancement: Fogbugz case 1117 – Update Graphics Generator to use products/settings files on the filesystem

Description

The CHPS database that manages the GraphGen products and settings through the FEWS PI-service has been replaced by two xml files on the file system. One is called the central area xml file and the other one is called the local area xml file. Both the xml files contain the GraphGen products and settings in the xml format. If the local area xml file is missing when a standalone is started, GraphGen will go to the central area to get the latest version of the products and place a copy within the region home directory under Models/graphgen that it will work with. Otherwise, the standalone will used the local area xml file in the region home Models/graphgen directory. A download button has also been added to the GraphGen Tree Plugin which allows the user to download the central area xml file to the local area manually. If both files are missing, GraphGen will create two empty files. The upload button can be used to promote the changes to the central area. If CHPS is closed without uploading the changed file to the central area, the changes are saved in the local area xml file and the central area xml file will be kept intact. The central area file and the local area file are only in sync after downloading or uploading.

Without this new enhancement, a SAX Parser Error sometimes occurs when importing the settings.xml files and when starting FEWS in an SA with the settings previously uploaded.

If there is a problem, the following SAX Parser Error occurs when importing the file:

```
05-03-2013 12:47:57 ERROR - Unable to build SAX parser: XML document structures
must start and end within the same entity.
```

However, all settings appear to be present and work properly.

If you upload these settings and exit FEWS and then re-start FEWS, the PI-service MOST OFTEN fails to connect and all of the previously uploaded settings are lost MOST of the time. Sometimes, a small number of settings for about 25 locations remain (23 in this case).

There is another problem associated with the PI-service regarding to products and settings. This error is documented in FogBugz case 1048. When deleting products on an OC, the deletion cannot be synchronized to the backend PI-service (the product is still on the backend server). However, the synchronization works between OC and OC. This issue also causes problems when synchronizing modified settings. If the settings are modified, although synchronizing the modification between OCs works (the OC to be updated has to be shut down and restarted), the modification still cannot be synchronized to the backend server.

Cause

The source of the problem for FogBugz 1117 is that GraphGen settings are saved via data set functions in the PI-service. For WGRFC, it constructs a 360,000 character xml string to save via the PI-service. Upon saving, it immediately retrieves what was saved, as a confirmation, but the returned xml string is cutoff at a little over 12,000 characters. Hence, the xml is partial and cannot be read leading to parsing errors. It seems to be an error in the FEWS PI-service java data set methods.

For FogBugz 1048, it seems there are issues with how the moduleDataSet are synchronized to the backend PI Service.

Fix

The new enhancement uses two disk files on the file system for GraphGen products and settings instead of PI Service. Any issues related to the PI Service will be fixed, including the cases reported in FogBugz 1117 and 1048.

Notes

1. **IMPORTANT!** See Section 4 of the *Graphics Generator Installation Guide* for detailed instructions for migrating from the FEWS PI-service to the xml files on the file system for GraphGen products and settings. **Graphics Generator will stop working if the steps are not followed prior to updating the bin directories with the latest code!**
2. If CHPS is closed without uploading, the changes would be saved in the local area xml file and the central area xml file will be kept intact. When CHPS starts next time, the products and settings in the local area file are used, although the local area products and settings were not uploaded to the central area. This behavior is different from the version that uses the PI-Service for products and settings. In that version, if the products and settings are not uploaded before closing CHPS, the changes will be lost.
3. This solution will work best if the RFCs tend to use only a single SA to create and modify products and settings. Conflicts may occur when uploading if multiple SAs are used.

4. The user should define a new property, `OHD_GRAPHGEN_CENTRAL_DIR`, in the global property file, such as `sa_global_property`. This is the directory where the central area xml file is stored. The local area xml file is hardcoded to the region home directory under the `Models/graphgen` directory. The file name for both of the xml files is hardcoded as `OHD_GRAPHEGN_PRODUCTS_AND_SETTINGS.xml`.
5. Because there is no way for the model adapter to obtain the CHPS global property directly, the user has to define one extra property (`OHD_GRAPHGEN_PRODUCTS_AND_SETTINGS.xml`) for the model adapter to find the products and settings file. `graphgenProductsAndSettingsDir` defines the directory path. The GraphGen model adapter will read the products and settings file in the directory path during execution to find the products and settings. The propery value should be set to the products and settings central area specified by the `OHD_GRAPHGEN_CENTRAL DIR` global property, or to a CHPS standalone local area. See section 15.2.1 of the Graphics Generator Reference Manual for more details.

Enhancement: Fogbugz case 1142 – Calibration, OHD-CORE part into CHPS

Description

OHD has used the FEWS Open API/custom transformation concept to code several calibration Stat-QME calculations which are not easily configurable. The equations coded are:

- Daily RMS Error (DRMSE)
- Daily average Absolute Error (DAE)
- Correlation Coefficient (CC)
- Line Of Best Fit (LOBF)
- Flow Interval Biases (simulated mean, observed mean, %bias, bias, maximum error, % average absolute error, and %RMS error)
- Accumulated Flows (accumulated simulated, accumulated observed, accumulated error, and accumulated error period)

Additionally the ICP statistical summary, a text based report in tabular format used to review all statistical information in a single window, is reproduced in CHPS as a FEWS report generated using an HTML template; this is referred to as the **HTML report**.

Notes

- RFCs that were part of the Calibration team should start from a brand new SA and follow the instructions from scratch.
- We recommend users start by reviewing the *Calibration Reference Manual* document before trying to implement calibration features using the *Calibration Configuration Guide*.
- CHPS calibrations are done in a Stand Alone (SA) and configuration should NOT be uploaded to the live system (OC).

Enhancement: Fogbugz case 1144 – Make Lower Zone Deficit Ratio (LZDEFR) SAC-SMA variable available as an output timeseries

Description

The lower zone deficiency ratio (LZDEFR) time series is needed by the Percolation Analysis for Calibration. The LZDEFR will be an additional output time series for the SAC-SMA model.

Cause

The CHPS Percolation Analysis Function is limited compared to the original ICP.

Notes

See the sections 1.4 and 4.2 of *Calibrations Reference Manual* document for more details.

This xml snippet imports the LZDEFR time series that is needed by the Percolation Analysis.

```
<!-- Add Import time series LZDEFR to SACSMA UpdateStates module in
ModuleConfigFiles/xxxxx/SACSMA_XXXXX_XXXXX_UpdateStates.xml -->
<timeSeriesSet>
    <moduleInstanceId>SACSMA_XXXXX_XXXXX_UpdateStates</moduleInstanceId>
    <valueType>scalar</valueType>
    <parameterId>LZDEFR</parameterId>
    <locationId>XXXXX</locationId>
    <timeSeriesType>simulated historical</timeSeriesType>
    <timeStep unit="hour" multiplier="6"/>
    <readWriteMode>add originals</readWriteMode>
</timeSeriesSet>
```

Enhancement: Fogbugz case 1145 – Program shef2pi originally developed by John Halquist of NCRFC/NOHRSC.

Description

The shef2pi program converts SHEF "shefout" formatted files to the FEWS pi-xml format. Shef2pi was originally developed by John Halquist of NCRFC/NOHRSC. John delivered the source code and test data to OHD prior to his departure from NWS. OHD created the executable and tested the program in the CHPS environment.

Cause

John retired and the source code was transferred to OHD.

Fix

There were 23 different SHEF products generated by John and delivered to OHD. The data sets were used to verify the shef2pi Program created by OHD. This verification is done through OHD regression tests in all releases.

Notes

Executable shef2pi_m32t, and shef2pi_m64t were replaced with executable shef2pi.

Beta: BASEFLOW mod not affecting UHG

Description

LMRFC reported that the BASEFLOW mod was not affecting UnitHG.

Cause

It was discovered that the NWSRFS mods to the BASEFLOW module were not ported to CHPS (i.e., there is no way to modify the BASEFLOW module using a mod). Instead, the CONSTANT_BASEFLOW parameter mod for the UnitHG module was provided as a way to modify baseflow. The current description of the CONSTANT_BASEFLOW parameter mod in ModifierTypes.xml is incorrect.

Fix

The current definition in the ModifierTypes.xml file needs to be modified to allow the definition of the CONSTANT_BASEFLOW mod through the parameter mod GUI. The new syntax below will overwrite the old value of the parameter.

This is a snippet from the ModifierTypes.xml file.

```
<moduleParameterModifier id="baseflow" name="Constant Baseflow">
    <filter>
          <moduleParameterId>CONSTANT_BASE_FLOW</moduleParameterId>
    </filter>
    <defaultValidTime/>
</moduleParameterModifier>
```

Add the following **bolded** line to the ModifierTypes.xml file.

```
<moduleParameterModifier id="baseflow" name="Constant Baseflow">
    <filter>
          <moduleParameterId>CONSTANT_BASE_FLOW</moduleParameterId>
    </filter>
    <defaultValidTime/>
    <overwriteParameterValues>true</overwriteParameterValues>
</moduleParameterModifier>
```

Beta: Threshold Information missing from Graphgen Plots

Description

In CHPS 4.0.1, FEWS includes changes requiring the timeSeriesSets defined for thresholds within the ThresholdValueSets.xml configuration file to be more precise. Specifically, in the previous release, if an ensemble included time series that matched any timeSeriesSet defined for a threshold ignoring the ensembleId, FEWS would assign it that threshold. For CHPS 4.0.1, FEWS will now require the ensembleId to match, as well. Since Graphics Generator acquires thresholds through input time series, this impacts the Graphics Generator delivered AHPS products. In particular, RFCs will be required to add timeSeriesSet definitions to ThresholdValueSets.xml that include the ensembleId in order for the AHPS products to display those thresholds.

Note that this behavior was present in older versions of CHPS and FEWS, so that the Graphics Generator documentation already includes instructions explaining this required change to ThresholdValueSets.xml.

Cause

Deltares made a fix to the Java PI-service interface class, FewsPiService, and it no longer returns thresholds in the time series xml string. Deltares was reluctant to rollback this fix.

Fix

The change to ThresholdValueSets.xml may include adding hundreds of new timeSeriesSets XML elements. To avoid making so many changes, a work-around is available that only requires modifying the Graphics Generator AHPS products. In general, the steps to modify an AHPS product are as follows:

1. Open the product in the GraphGen Editor.
2. Add an input time series provider via the Input Series Panel that results in adding a single-valued (non-ensemble) time series that already has the thresholds included via ThresholdValueSets.xml. For example, this may be a QIN, QINE, STG, or SSTG time series already associated with the needed thresholds. This step may require updating the PiServiceConfigFiles/GraphGen.xml configuration file to include the needed time series in one of the existing queries (for example, the query with id "QIN" or "QINE" for the AHPS flow products).
3. Modify the displayed chart series to not include the just added single-valued time series in chart series computations. This is done in the Chart Series Panel by changing the selected time series to incorporate the ensembleId in making the selection instead of using all time series.
4. Save the product under the same name and upload the changes to the central area.

With these changes, the thresholds should be visible to GraphGen. Follow the other instructions associated with the AHPS product in order to create settings for the segments so that the appropriate thresholds are displayed.

Beta: Shef2pi only available in 32-bit

Description

BPA discovered that the Shef2pi program currently delivered in the OHD-CORE-CHPS-3.2.a package is only 32-bit. They currently run a 64-bit version.

Notes

Prior to John Halquist's retirement, CHPS users were provided with 32-bit and 64-bit versions of Shef2pi. In assuming ownership of this program, OHD only builds and supports the 32-bit version and are not currently set up to build and deliver 64-bit executables yet. There is no update of when 64-bit programs will be supported by OHD.

Beta: nc2grib.LX Exiting Prematurely

Description

nc2grib.LX is not available in the OHD-CORE-CHPS-3.2.a package. We recommend you continue to use your current version. If you are looking for a version of nc2grib.LX to use for the first time, please enter a FogBugz request for it.

Notes

In this release, our goal was to provide a complete fix for FogBugz 446 (i.e. handling >10 dyas of data). In the process of working on this issue we discovered other issues that need to be resolved. We hope to have a version of nc2grib.LX that fixes FogBugz 446 in our next release of OHD-CORE-CHPS.