Arius®
2021b

Release Notes and
Installation Instructions

Milliman

IT TAKES VISION

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1. Release notes

RELEASE 2021b ADDS SEVERAL NEW CAPABILITIES

What's new in Arius Deterministic

1. **Share exhibit options and default settings among Arius projects**

    You can now export additional project settings from an Arius file and import those into a different file, making these settings in the second file consistent with the first.

    You will find **Save** (To File) and **Load** (From File) buttons on the tool bars for the following windows.

    -   EXHIBIT OPTIONS | STATISTICS – saves all settings from the Statistics and Interpolated Factors tabs to a filename (*.exhopt) and location of your choice.

    -   DEFAULTS | EXHIBIT DEFAULTS – saves all exhibit defaults to a filename (*.exhdef) and location of your choice.

    -   DEFAULTS | DATA DEFAULTS – saves all data defaults to a filename (*.datdef) and location of your choice.

2. **Column Number reference in user defined formulas**

    You can now retrieve a specified column from any triangle array when building the formula for a user defined data column, method or report. This will be helpful if you want to create a diagnostic report that focuses on just the first few columns across several diagnostic exhibits to quickly assess changes and trends.

    The new function is called **Column( )** and it is available in the Functions section of the user defined Formula Editor window. It takes two parameters: column # to pull from and the specific array to reference. For example, you can return the second column of the paid loss triangle using: Column2(Cumulate("Paid Loss")).

3. **Reorder segments within your Arius project file**

    Arius defaults to listing Segments in the order in which they were created, but there are times when you may want to reorder these segments for better organization and navigation.

    Under the PROJECT SETTINGS | SEGMENTS window, simply highlight a segment and use the new **Up** and **Down** buttons to rearrange your segments in the order that works best for your analysis.

4. **New copy and paste capabilities and short-cut keys**

    You can now copy and paste into multiple cells in an array and use short-cut keys for **Copy Down** (Ctrl+D) and **Copy Right** (Ctrl+R) to copy a value down or across a selected range. This is especially useful when copying values down a column array (e.g., weights) or across a row (e.g., interest rates).

5. **Identify all the tables that are dependent on a table or object**

    Did you ever want to edit or delete an array or a user defined table, but you weren't quite sure what other tables might be affected? We added a new **Trace Dependents** button on the toolbar of all tables that are dependent on other tables in the system to help with this. Trace

Dependents provides a list of every object in the Arius file that is in some way dependent upon the current active table.

A similar **Dependencies** capability is also available in the Object Library to help manage and review all your user-defined tables. Rather than displaying in a window, the Object Library Dependencies function will perform the trace dependents function across all user-defined tables in your Arius project file and output the results to a CSV file for a single consolidated view.

6.   **Easily edit a user defined table**

We added an **Edit UDO** button ⬚ on the tool bar of every user defined table to take you directly to the Edit dialog. This allows you to edit the formulas or layout of a user defined object (UDO) immediately as you are looking at it, rather than having to go back to the Object Library to locate and edit it.

7.   **Updated logic in the Comparison of Ultimates report weighted averages**

We made a minor edit to the way that the weighted average calculations on the Comparison of Ultimates report works, so you can enter weights with blanks instead of having to type in zeroes. This is more consistent with how weight arrays work throughout the rest of the system.

8.   **New Reporting capabilities - Interest Rate Net of Margin**

For companies having to perform discounted cash flow reports at different interest rates, we added new system tables and collections that leverage a new data array for Interest Rate Net of Margin. These new reports are in the REPORTS | SPECIAL REGULATORY | CANADIAN (PFAD) folder within the Object and Collection Libraries.

9.   **Control over the system status message box**

The System Messages window in the bottom right corner of the screen can now be toggled on and off as necessary using a new button on the system ribbon. This window displays important information about such activities as file saving, project status, and the status of stochastic simulation jobs. However, if you are working in a part of the system where the messages are of less importance to you, you can now use the **System Messages** button to hide this window until you need it again.
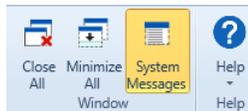
What's new in Arius Enterprise

1.   **New batch delete of upload files**

You can now delete any number of CSV upload files at one time, rather than selecting and deleting each one separately. Simply select the uploaded CSV files to delete using the check box next to each file name, and use the delete button at the top right.
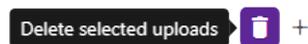
2.   **Automate the sharing of exhibit options and default settings among Arius projects with a script**

Similar to Save (To File) and Load (From File) capabilities for Exhibit Options, Data Defaults, and Exhibit Defaults settings in Arius Deterministic #1 above, Arius Enterprise users also have the

option to **Save (To Database)** and **Load (From Database)**. Settings that are saved back to an Arius Analysis database can be viewed from the left-hand navigation panel on the Analysis page within the Arius Enterprise web portal. In addition, new script commands are available to Load Exhibit Options, Load Exhibit Defaults, and Load Data Defaults, which allow you to use the system's automation capabilities to easily share these settings across multiple projects in a batch.

3. **Include dimensions from the right table into a reporting table**

When defining a reporting table, Arius Enterprise now allows you to include the dimensions from the right extract or supporting table into the final report table. This is useful if you need to report results using additional dimensions than those available in your Arius Analysis database. For example, you might need to roll up to different management lines or convert data to different currencies. To include dimensions from the right table in the output, select the **Include Dimensions in Output** checkbox found on the Reporting table definition page.

4. **Security/roles enhancements**

   ▪ **Delete Export to APJ** and **Delete Export to PDF** zip files activities are now controlled by the **Delete Project** permission.

   ▪ The ability to **Download APJ** and **Download PDF** zip files are now controlled by the **View Project** permission.

   ▪ The ability to **Download Extract/Reporting Tables** via the user interface and with the API is now controlled by a new **Download Extract Tables** permission. This new permission will automatically be added to the AA Database Owner system role, but separate consideration will need to be given to customized roles.

   ▪ The **Manage Performance** permission has been added to the Site Admin role, which means that any user assigned to this role can now scale performance levels up and down and turn Power BI on/off under the **Utilities** page.

5. **Addressed "stuck" processes**

We made internal system changes to reduce or eliminate certain processing functions from becoming "stuck" when running in Azure. These include the following areas: batch script, direct import updates, export to APJ, export to PDF, and Power BI data model update.

6. **New API to retrieve user accounts and roles from the database**

A new API call now allows authorized users to retrieve a list of all users and their respective assigned roles within the system.

What's new in Triangles on Demand

1. **New batch deletes of upload files**

You can now delete any number of CSV upload files at one time, rather than selecting and deleting each one separately. Simply select the uploaded CSV files to delete using the check box next to each file name, and use the **Delete** button at the top right.
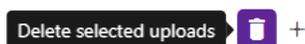
2. **New data load log file**

ToD retains a log of the actions that take place within the data load process showing which CSV files were successfully loaded, how many records were added to the database, etc. Previously

accessible only to users with certain privileges, this log is now available to all users from the **ToD Database Listing** page. Access it from the **Download** button at the top right.

Download data load log file 🔽 ⬇ +

This log file (DataLoadLogFile.txt) was enhanced to also contain important information about the status of the related updates to metadata that take place along with the uploading of the raw CSV records. This provides important information about the overall upload process, such as whether the entire upload process is complete (in addition to just adding the CSV records), and if there were issues during the upload.

FIXES AND USABILITY IMPROVEMENTS IN THIS RELEASE

Arius Deterministic

- When updating the Factor Library with the EXTERNAL FACTORS | REFRESH feature, the external factors now retain their original display order after the refresh.

- We fixed an issue with the Berquist/Sherman adjusted incurred method BSAdjInc function which could return incorrect results when the triangle was asymmetrical (e.g., Year x Quarter).

- We fixed an issue with the algorithm for Remove Oldest Exposure Period on files with a Prior row in situations where there are BLANK diagonals in the interior of the triangle.

- We addressed several issues related to the Arius API:

  - **PeriodType** now accurately reflects the selected exposure period type of the referenced Arius project (in some versions only Accident Period was returned)

  - **HasPrior** now accurately reflects whether or not the referenced Arius project uses the All Prior row feature (in some versions only FALSE might be returned)

  - We implemented the **LenLastCalPeriod** function, which returns the length of the last calendar period from the Data Structure tab of Project Settings)

  - We implemented the **ValDate** function, which returns the evaluation date of the referenced project file as a string

Arius Stochastic

- When exporting stochastic results to CSV, files will now be incremented with a parenthetical suffix, rather than overwritten, allowing successive runs without overwriting simulation output.

- We fixed an issue where Premium would be incorrectly adjusted within the Loss Ratio calculation in certain non-standard data structures.

- We corrected an issue in which weighted ODP Bootstrap results would not export to CSV when no weight was assigned to the Paid Chain Ladder method.

- We corrected an issue in which empty/incorrect weighted and/or shifted ODP Bootstrap results would be written to CSV when the GLM was utilized.

- We made two changes that may impact your model results, though neither change will result in material differences:

  - We re-structured the code for the GLM simulations to improve speed. While the underlying calculations did not change, the order of operations did. As such, different random numbers are being relied on at different stages in the process, which will result in differences in simulation results when compared to previous Arius versions. These differences should be insignificant when using a reasonable number of iterations.

  - We upgraded the MATLAB Runtime to version 2020b. In this version, MATLAB improved the speed and accuracy of several functions. Changes to the MATLAB "sum" function specifically impact Arius results. From Mathworks Run Time 2020b release notes: *"This performance improvement arises from code changes that also lead to a different set of round-off behaviors in sum. The new algorithm reduces the amount of round-off error in calculations, which leads to a more accurate result in general. Therefore, the output of sum might change slightly in R2020b compared to R2020a when operating on numeric inputs, even though the results between the two versions are numerically equivalent."*

Arius Enterprise

- Addressed issue caused by time changes (daylight saving time, etc.) so that the timestamp on the **Signoff Report** will now always match the timestamp on the Projects page under the Arius Analysis module of the web portal.

- Added new controls to prevent users from deleting extract or reporting tables or from updating extract or reporting table definitions while those tables are being updated by other users.

- If an error is encountered while exporting to APJ files across multiple projects via the Export to APJ file task, the system will now produce at least a partial zip file on the Downloads page with those APJ files that did complete.

Triangles on Demand

- Fixed issues in SQL that may have resulted in Metadata refresh timeouts during ToD data loads.

- Added new controls to prevent users from loading and deleting data at the same time and in the same database.

- Improved the error messaging on the Uploads page when a user tries to delete a CSV file that has already been deleted.

- Fixed an issue where the AEUploader load process could fail if a user refreshed the ToD Uploads page while the load process was in progress.

- Modified the Advanced Query logic to allow dimension values to contain an apostrophe.

- Changes made to reduce the time required to open the Create Segments window and the Set ToD Source window.

- Improved error messaging with the ToD drill-down, Set ToD Source, and Load Data from ToD to Arius functions in situations where the query previously used has been edited or deleted.

FILE COMPATIBILITY

The 2021b system opens and functions with files from any previous version of Arius.

Any files created or saved in Arius version 2021b *will not work with earlier versions of Arius*, and as such, they cannot be opened by others on your team who do not have version 2021b of Arius.

TELEMETRY DATA

For purposes of future enhancement, Arius has the means to gather data on the use and performance of specific features as well as general usage statistics of the software. It does not have the ability to relate any such usage to specific users.

KNOWN ISSUES IN THIS RELEASE

- Values used in the tail factor analysis (TFA) calculations may be incorrectly excluded if both of the following are true:
  (a) you manually edited the TFA, and
  (b) values were excluded, either by the system or manually, before the data changed.

  Workaround: Always review and confirm TFA values as part of your analysis process. The workaround to this issue is to manually uncheck values that are incorrectly marked for exclusion during this review, or you can simply rerun TFA.

- User-defined exhibits and methods with table IDs 801, 802, 803, and 804 are in conflict with hidden system tables and cause the following issues:
  (a) these methods can't be selected as methods within formula-driven assumption arrays, and
  (b) the exhibit type is not saved for these exhibits.
  Arius v2021b no longer allows you to create tables with these IDs, though tables with these IDs could already be present in existing projects.

  Workaround: If a user-defined exhibit or method exists with a table ID of 801, 802, 803 or 804, go to the Object Library, copy this table and enter a new table ID.

- When creating a new segment by copying a segment from another Arius project, external factors are not included in the data that is copied in.

  Workaround: When copying segments from one project to another and the incoming segment includes external factors, you will need to remap those external factors in the new segment.

- The batch processing feature for Export to PDF within Arius Enterprise currently only exports Deterministic tables. If a Stochastic table or graph is included in the print list, you will get the error message *Failed to Export to PDF: Object reference not set to an instance of an object* on the AUTOMATION | STATUS page. You will need to remove these objects from your print list in order for your job to successfully complete.

Other known issues are described on the Arius FAQs and Known Issues web page.
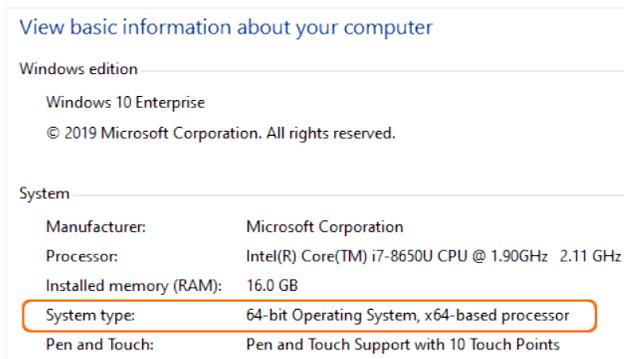
2. Installation requirements

System requirements for the basic Arius system are as follows:

- Minimum operating system: Microsoft Windows 10, 64-bit version

- Minimum hard disk space: 5 GB

- Minimum RAM: 8 GB, though more is recommended

- Related tools: Microsoft Office 2007 or newer (Arius does not support Microsoft Office XP). Arius and its API support both 32-bit and 64-bit versions of Microsoft Office. Arius requires the Microsoft .NET Framework 4.7.2 or newer and Microsoft Visual C++ 2017 Redistributable (x64). (Many Windows installations may already have this; you can confirm it at CONTROL PANEL | PROGRAMS AND FEATURES.)

- An Internet connection for license authentication at http://admin.actuarialsoftware.com

To assure that your Windows system is a 64-bit version:

Select **Start** and type **Control Panel**. Click on **Control Panel** and select **System**. You should see something similar to the window below.

View basic information about your computer

Windows edition

Windows 10 Enterprise

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System

Manufacturer:	Microsoft Corporation
Processor:	Intel(R) Core(TM) i7-8650U CPU @ 1.90GHz 2.11 GHz
Installed memory (RAM):	16.0 GB
System type:	64-bit Operating System, x64-based processor
Pen and Touch:	Pen and Touch Support with 10 Touch Points

3. Installation instructions for Arius Deterministic and Stochastic

Note: Administrator privileges are required to perform this installation.

In most cases, this is a multi-step installation process. You will:

1. **Run the install program** for the new Arius software.

   - If there is already a version of Arius installed, the installer uninstalls that copy. This DOES NOT affect any existing data files.

   - All new installations of Arius will also need to **download and install the MATLAB runtime**. Upgrades of existing Arius installations also require you to re-install the latest MATLAB runtime version 2020b.

2. Once the MATLAB install completes, **re-run the Arius installer**.

To install this software:

1. Close any existing version of Arius and all Excel workbooks before beginning the Arius installation.

2. Click the **Download** link and **Save** (do not Open) AriusSetup_v2021b.exe onto your computer.

3. Locate the downloaded file. Right-click on the EXE file and select **Run as Administrator**. Most users will first be instructed to download and install a new copy of the MATLAB runtime system.

   - When prompted to download the MATLAB installation, select Yes to download the runtime installer. (This file is large and will take several minutes to download.) The system downloads a ZIP file containing the MATLAB installer.

   - Once downloaded, locate the ZIP file, MATLAB_Runtime_R2020b_Update_6_win64.zip. Right-click on the ZIP file and select to Open with >> Windows Explorer. Note: *opening the ZIP file with Winzip or a similar upzip program could result in errors*.

   - Double-click SETUP.EXE in the ZIP file to run the install program.

   - Follow the instructions to install the MATLAB runtime. This is a fairly large install; it will take a couple of minutes to appear to start, and then a few minutes to run.

4. Re-run the AriusSetup_v2021b.exe install. **Right-click** on AriusSetup_v2021b.exe and select **Run as Administrator**.

   - You may also see the system installing the Microsoft Visual C++ 2017 Redistributable (x64) library. This is required for Arius 2021b, and if it is not present on your computer, the install routine installs it from the Microsoft downloads server.

   - Arius also requires that the Microsoft .NET Framework version 4.7.2 is installed with your operating system. This is likely already true for most users. However, if the installation routine detects that this is necessary, your IT team may need to download this from Microsoft and install it.

5. Once the installation is complete, you can delete the MATLAB installer ZIP file and the AriusSetup_v2021b.exe installer file.

   This release installs MATLAB Runtime 9.9. You can go to CONTROL PANEL | FEATURES AND PROGRAMS and uninstall versions of the MATLAB runtime earlier than 9.9 if they are not used by other applications on your computer.

4. Additional information

After installation, the application is listed as **Arius** in your START | ALL PROGRAMS listing.

The system installs with five sample project files. They can be found at:

C:\Users\<yourname>\Documents\Milliman\Arius\DemoFiles

or perhaps displayed as

Libraries\Documents\Milliman\Arius\DemoFiles

- **Arius_Sample.apj** – Sample data with 5 segments, a mix of short-, medium-, and longer-tailed lines of business. This file is intended to give you a sense of the system's capabilities and a sampling of how the models can be set up with different assumptions for different lines. Note not all segments work with all models (like in the real world).

- **Arius_Sample_Canadian.ap**j – Sample WC data for Gross, Net, and Ceded layers. This file includes sample user-defined tables for calculating the Reinsurance Provision for Adverse Deviation as described in the User Documentation Canadian Provision for Adverse Deviations and the section on Calculation Across Layers.

- **Arius_Stochastic_Sample.apj** – Sample data with 4 segments, showing a detailed implementation of all four families of stochastic models. This file is an updated version of the ODP_Mack_Hayne.apj file, revised as of Arius 2020b) to include the Generalized Linear Model.

- **Arius_GLM_Case_Studies.apj** – Includes 5 different data sets or case studies to help explain several ways models can be parameterized to fit the sample data. This file accompanies the case studies in the back of the User Documentation Getting Started with the Generalized Linear Model.

- **Hayne_Paper.apj** – Contains the data used in Dr. Roger Hayne's paper on Maximum Likelihood Estimator approaches, A Flexible Framework for Stochastic Reserving Models.