Arius

2023b

March 2024 update

Release Notes and
Installation Instructions

IT TAKES VISION

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1. Release notes

RELEASE 2023b ADDS SEVERAL NEW CAPABILITIES

What's new in Arius Deterministic

1. **Ability to Import Historical Factors into the Historical Factor Library**

    We have added a new icon to the EXHIBIT OPTIONS | HISTORICAL FACTORS tab for "Import Historical SDFs." This feature allows you to select a CSV file containing selected development factors associated with a particular segment and exhibit and import those factors into the Historical Factor Library in your current Arius file. The format of this file is similar to the file returned when you select "Export Historical SDFs" on this same dialog. For example, the columns represent your Library Name ("Selections at mm/dd/yyyy"), Segment ("PP AutoLiab"), Exhibit Name ("Paid Loss Development"), Valuation Date ("mm/dd/yyyy"), SDF Type ("Selected" or "Interpolated"), Number Periods ("40"), Period Length ("Quarter"), and First Period ("3").

2. **Ability to create user-defined Historical Arrays**

    Like the five system Historical Ultimate arrays (e.g., #35 Historical Ultimate Loss, etc.), you can now create user-defined historical arrays to store and retrieve other historical data and assumptions. These arrays are special in that the last diagonal is linked to any column array in Arius (or any formula that results in a column array). Each time a new evaluation period is appended, the columnar data is stored in previous diagonals in the historical array, allowing for the tracking of assumptions over time.

    To extend this functionality to an existing user-defined input triangle or to create a new user-defined input triangle, check the box for "Has Formula" and then check the box for "Historical Array" when editing or creating the user defined triangle. You can then enter any valid function below that returns a column array, such as "Loss Ratio – BF Method."

3. **New GetWeights() function to help access prior weights for Drivers of Change analysis**

    The GetWeights() function returns a column array with the weights corresponding to an input (or method) that is used in either a formula driven assumption array or a "Comparison of Ultimate" report.

    For example, to access a column of prior method weights for use in a Drivers of Change report, you would first create an historical input triangle array, e.g., **#501 Historical Weights – Paid Loss Development**, which has the formula GetWeights("Ultimate Loss", "Paid Loss Development (ULT)"). This would result in a triangle where the last column is linked to the weight associated with the Paid Loss Development method included in **#35 Comparison of Ultimate Loss Estimates.** You can then reference Diagonal2(Cumulate("Historical Weights – Paid Loss Development")) to return the prior method weights associated with this method.

4. **New Arius Sample File with modified Actual vs Expected and Drivers of Change analyses**

    We have included a new Arius_Sample.apj file found in ….\Documents\Milliman\Arius\DemoFiles. It includes new user-defined tables and collections showing examples of modified Actual vs Expected methods and Drivers of Change analysis.

    METHODS | USER DEFINED | **#603 Actual vs Expected Using Prior Quarter Paid Loss Development and Prior Indicated Reserves** and METHODS | USER DEFINED | **#604 Actual vs Expected Using Prior**

Quarter Incurred Loss Development and Prior Indicated Reserves provide examples for performing an Actual vs Expected analysis against the prior interim quarter's analysis on a Year x Year file.

REPORTS | USER DEFINED | **#602 Drivers of Change in Ultimate Loss** shows how you can split the change in ultimates into the change in data and the change in assumptions, to evaluate more effectively what is causing the change in reprojected ultimates. This information not only gives valuable information to the management team that books reserves, but also helps to monitor the reserving analyst's reaction to changes in the data and enables a more careful examination of the reliability of the method assumptions.

PP AutoLiab > Reports > 602 - Drivers of Change in Ultimate Loss

602 - Drivers of Change in Ultimate Loss

Accident Year	Prior Ultimate Loss	Ultimate Loss Based on Prior SDFs, ELRs and Weights	Ultimate Loss Based on Prior ELRs and Weights	Ultimate Loss Based on Prior Weights	Selected Ultimate Loss	Change due to Data (2) - (1)	Change due to SDFs (3) - (2)	Change due to ELRs (4) - (3)	Change due to Weights and Other (5) - (4)	Total Change in Ultimate Loss (5) - (1)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
12-2011	$ 21,326	$ 21,299	$ 21,492	$ 21,492	$ 21,492	($ 27)	$ 194	$ 0	$ 0	$ 167
12-2012	14,383	14,385	14,541	14,541	14,541	2	156	0	0	158
12-2013	13,250	13,272	13,430	13,430	13,430	22	157	0	0	180
12-2014	8,775	8,752	8,902	8,902	8,902	(22)	150	0	0	128
12-2015	8,297	8,295	8,418	8,418	8,418	(2)	123	0	0	121
12-2016	7,054	7,076	7,157	7,157	7,157	21	82	0	0	103
12-2017	7,730	7,851	7,842	7,842	7,842	121	(8)	0	0	112
12-2018	11,221	11,387	11,348	11,182	11,386	166	(39)	(166)	204	165
12-2019	15,951	15,934	16,001	15,155	15,155	(17)	67	(845)	0	(796)
12-2020										
Total	$ 107,986	$ 108,250	$ 109,132	$ 108,121	$ 108,324	$ 264	$ 882	($ 1,012)	$ 204	$ 338

100%

For more information on this report and the supporting tables, refer to the document *Drivers of Change Analysis* found in Arius under HELP | USER DOCUMENTATION.

What's new in Triangles on Demand

1. **Modified triangle aggregation logic for cumulative measures to treat missing records as zero.**

    If a record is "missing" for a particular valuation date corresponding to a cell within a triangle, ToD will no longer reach back to the latest cumulative value and will instead treat the "missing" record as a zero. This enhancement applies to SQLServer databases and helps correct those situations where claims closed without payments were "dropped" but the last record still showed non-zero case reserves.

2. **Enhanced security permissions to further restrict who can view data within a ToD database**

    A new Triangles on Demand permission was added for "Manage ToD Totals." Also, the "Load Data from ToD" permission now includes the action for "Create Segments" within Arius.

FIXES AND USABILITY IMPROVEMENTS IN THIS RELEASE

Arius Deterministic

- Fixed an issue where a user-defined method name within a formula-driven assumption array didn't properly update when that method was renamed.

- Fixed an issue where a particular user-defined "Total" formula on a report wasn't calculating properly for expressions where there was a constant value in the denominator (e.g., "Ultimate Claims"/("Ultimate Premiums"/1000)).

- Fixed an API issue for situations where stochastic tables weren't being retrieved properly when user's regional settings were such that the decimal separator was not ".".

- March 2024 update: The original 2023b build #17713 was updated to build #17718

  - Fixed an issue related to use of the "Interpolate" functions in User-Defined tables. Discrepancies were observed between the interpolated results that appear on the exhibit versus the interpolated results appearing in a user-defined method due to how the (x,y) pairs were sorted. To fix this, the Interpolate function was modified to now sort the known (x,y) pairs in increasing order and to use the known_x points that bound the new_x point when a new_x value falls between a pair of consecutive known_x's.

Arius Enterprise

- Under the Utilities module for Performance Levels, DTU settings have been limited to the settings that work most effectively with Arius. Contact the Milliman Client Service team if you believe you need a higher or lower setting.

- Fixed a data format issue with extract tables where the AM/PM has been dropped.

- March 2024 update: Updated from Web API version 2024.1.10.1 to 2024.2.22.1

  - Resolved an issue introduced in the original 2023b release preventing the renaming of projects in the Arius Enterprise portal. This capability is now available again.

Triangles on Demand

- Implemented validation checks when loading data into ToD to check for non-ASCII characters in column types for Dimension, Other, and ClaimID.

- Implemented validation checks to prevent duplicate column names in situations where blanks are converted to underscores (e.g., Test_123 and Test 123).

- When using YYYY date format within a ToD mapper, ToD will default the development date to 12/31/YYYY instead of 1/31/YYYY when loading data into the ToD database.

FILE COMPATIBILITY

The 2023b system opens and functions with files from any previous version of Arius.

Any files created or saved in Arius version 2023b – March 2024 Update *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 2023b.17718 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.

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++ 2015-2022 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

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.

   ▪ If this is a new installation of Arius, or an upgrade from a version prior to Arius 2021b, it will likely also require an install of the MATLAB runtime.

2. If you are directed to install the MATLAB runtime, once it 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_v2023b.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.

   ▪ If 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_v2023b.exe install. **Right-click** on AriusSetup_v2023b.exe and select **Run as Administrator.**

   ▪ You may also see the system installing the Microsoft Visual C++ 2015-2022 Redistributable (x64) library. This is required for Arius 2023b, 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_v2023b.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 Sᴛᴀʀᴛ|Aʟʟ Pʀᴏɢʀᴀᴍs 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.