PERFORMANCE SETTINGS WITHIN ARIUS ENTERPRISE & TRIANGLES ON DEMAND

Arius Enterprise and Triangles on Demand (ToD) leverage several services within Microsoft Azure that work together to host elements of our reserving platform. The initial performance level of these services is set at a benchmark level based on discussions between the implementation team, your IT department, and the personnel responsible for data. As your databases grow, it may become necessary to change the settings to improve performance as site use and needs increase. Also, you may wish to leverage a higher performance setting when performing resource-intensive actions such as data loads and batch processes.

There are five main performance-related components within an Arius Azure environment:

1. **Main App Plan** – This plan hosts the user interface, various Web APIs, and functions. This setting covers the majority of the Azure portal, outside of batch processing. These functions include, but are not limited to, opening and saving Arius projects, loading data from ToD to Arius projects, and updates to Extract tables.
2. **App Service Plan** – This plan is utilized for other functions within the Arius Analysis database, including running batch scripts and direct imports.
3. **SQL Server Elastic Pool** – A pool refers to shared server resources across all SQL databases (ToD and AA), and is the default provision of resources for most Arius Enterprise and ToD implementations.
4. **SQL Server Individually Managed Databases** – Large databases may suffer performance issues if they remain in the elastic pool utilizing shared resources. These databases may be removed from the elastic pool and assigned unique resources.
5. **Power BI Dashboard Settings** – For clients leveraging the Power BI data model and corresponding dashboards, performance for these are set independently.

The Milliman team manages performance settings for the Main App Plan and the App Service Plan on behalf of our clients. Clients manage performance settings for the elastic pool, individually managed databases (*if applicable), and the Power BI dashboard). *Please contact the Milliman team if you are interested in having a database moved out of the elastic pool (from component 3 to component 4).

MANAGING PERFORMANCE SETTINGS

Arius Enterprise and Triangles on Demand sites include a user interface for you to manage performance levels for components 3 and 4 from the above list. A user must be assigned the **Manage Performance** permission. Once you have permission to access this feature, select **Utilities** from the main Arius Enterprise screen, then select **Performance Levels**.

This screen splits performance settings into three categories:

- **Elastic Pools:** This section lists any applicable pools that share resources across multiple databases (generally Arius Analysis (AA) and ToD). A process requiring more resources can pull more from the elastic pool than a less intensive process. Resources are not dedicated or reserved for a particular database.
- **Databases:** This section lists any databases that are managed individually (generally large ToD databases), with resources dedicated specifically to each database.

- **Power BI:** These settings relate directly to the Power BI data model and dashboards and are only enabled when a client leverages these features.

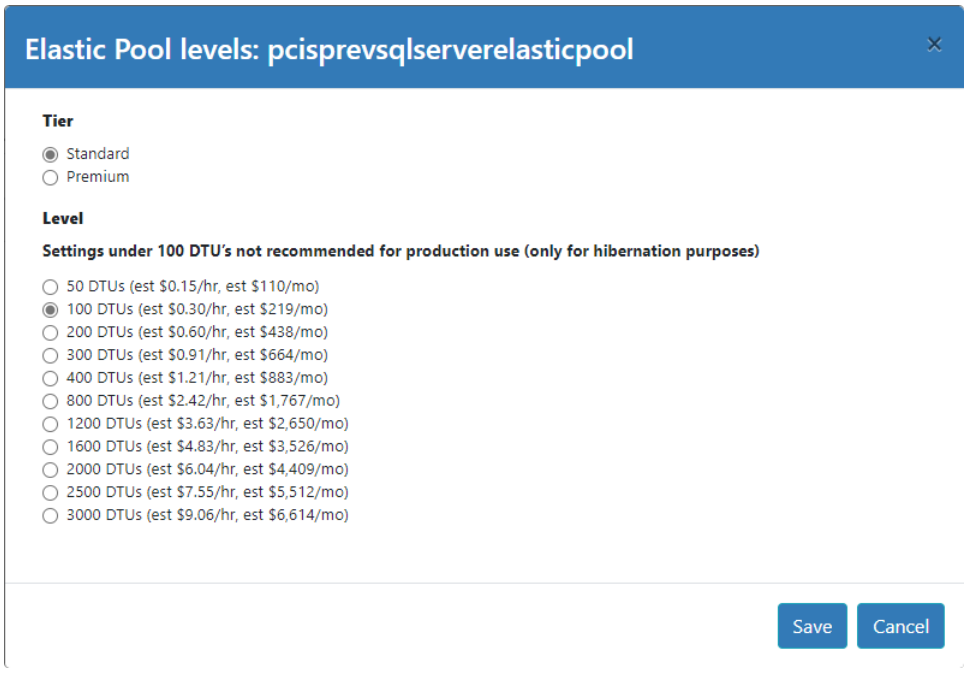
When to Change Performance Levels

You do not need to adjust performance levels unless you start experiencing slow or timeout issues with large data loads or batch processes, or if you wish to better manage expenses by lowering performance during periods of low activity. If you notice error messages or slower response rates when loading data into your database or running batch processes, you can test increasing the **Database Throughput Units (DTU)** setting to something higher, then lower the setting again when your databases are inactive if you want to manage costs.

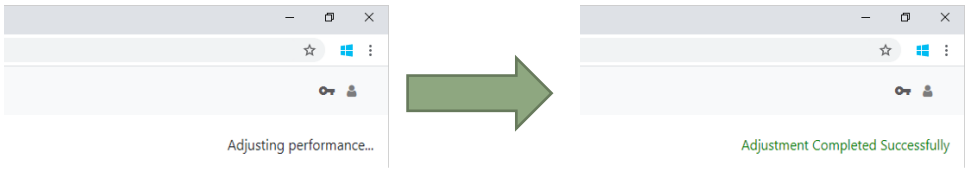
SQL Server Settings

Elastic pool and database performance is measured in terms of DTUs. DTUs provide a way to describe the relative capacity of a performance level of Basic, Standard, and Premium databases. DTUs are based on a blended measure of CPU, memory, reads, and writes. As DTUs increase, the power offered by the performance level increases, as does the cost. For example, a performance level with 5 DTUs has five times more power than a performance level with one DTU.

To adjust settings for an elastic pool (or database), navigate to the corresponding node using the left-hand navigation panel, and you see the list of each elastic pool (or database) used on your portal. The user interface identifies the current edition (standard or premium) and the current DTU settings. The icon under **Actions** launches a window allowing for the selection of a new service level, and an estimate of the associated costs.



Selecting a performance level and clicking **Save** starts the performance level update. Note that when you adjust performance levels on your site, it may take several minutes for the site settings to change. The time required depends on the difference between current and new DTUs. The more substantial increase (or decrease) in DTUs, the more time the setting adjustment takes. The user interface provides a visual indication of when the settings are updating, and when the update is complete.



Note: While ANY performance settings are being adjusted, it is essential that no one is using the Arius portal. Users can continue working in checked out projects but should not attempt to check projects into the portal, load data, or save the UDO library.

Power BI Settings

To help you manage costs associated with using Power BI Dashboards, you can start and stop the Power BI service, as well as control the performance level of the service. Clicking **Power BI** on the left navigation pane displays options for starting and stopping the service, as well as changing the tier.

Note that stopping the Power BI service prevents any reports from rendering and should be used for maximum cost savings when the Power BI dashboards are not in use.

The performance tiers for the Power BI Service are similar to those for databases within the elastic pool. Additional Virtual Cores can be selected for faster render times, though these come with additional Azure costs.

Performance Setting Interactions

Note that some of these performance settings may interact with one another. For example, users that scale their elastic pool (or database) performance levels very high may continue to run into issues if their Main App Plan requires scaling up. Please contact Milliman Support if scaling up your elastic pool or database performance does not resolve any performance issues you may be having.

Recommended Performance Settings

The following are recommended performance settings for particular actions within the Arius Enterprise system. They should not be interpreted as minimum standards; in fact, many situations may require database scaling beyond the levels listed here.

In general, larger ToD databases benefit from premium service levels due to the higher memory and IO needs of the ToD architecture. There is less benefit from using premium service levels within the Arius Analysis databases, so standard service tiers with higher DTU levels may be better suited.

AEUploader

When using the AEUploader utility, we recommend the associated Triangles on Demand database be set at 400 DTUs or higher. The expectation is that this utility is used for loading large data files. If you continue to have issues after increasing the performance level of your database, please contact Milliman; you may need the App Service Plan upgraded.

Claim Level Detail

When using claim level detail in your Triangles on Demand database 400 DTUs are the recommended minimum setting. Databases with greater than 10 million records may benefit from premium tiers, and databases with greater than 100 million require the premium tiers. In this situation, the ToD database itself may also benefit from being pulled out of the elastic pool. Please contact Milliman if you'd like to allocate resources to a specific database.

Batch Processing

Batch processing can function with AA database settings as low as 100 DTUs, but heavy processing (including having users working within the portal while the batch process is running) would benefit from higher levels.