

Arius Enterprise

Reporting Capabilities



IT TAKES VISION

Information in this document is subject to change without notice. The software described in this manual is furnished under a license agreement. The software may be used or copied only in accordance with the terms of that agreement.

No portion of the contents of this publication may be reproduced or transmitted in any form or by any means without the express written permission of Milliman.

Milliman, Inc.
3424 Peachtree Road, NE Suite 1900
Atlanta GA 30326 USA

Tel +1 800 404 2276
Fax +1 404 237 6984

ActuarialSoftware.com

© Copyright 2006-2022 Milliman, Inc. All Rights Reserved.
This document is the proprietary and confidential property of Milliman, Inc.
Arius®, Arius Enterprise®, and Triangles on Demand® are registered trademarks of Milliman, Inc.
All other trademarks are property of their respective owners.

Table of Contents

1. INTRODUCTION	1
2. ACCESSING THE REPORTING FUNCTIONALITY	1
3. EXTRACT TABLES.....	2
Create Extract Table List	2
Define Extract Table.....	3
Update Extract Table	3
Download Extract Table.....	4
4. SUPPORT TABLES	6
Upload CSV Files	6
Define Support Table	6
Load Data	7
5. REPORTING TABLES	8
Define Reporting Table	8
Update Reporting Table.....	8
Download Reporting table	9
6. REPORTING TABLE USE CASES.....	10
IBNR Allocation	10
Currency Conversion.....	10
Triangle Reconciliation.....	10
7. SECURITY	11
Portal management	11
API Key.....	11
8. WORKING WITH THE EXTRACT & REPORTING TABLES OUTSIDE THE ARIUS ENTERPRISE PORTAL	12
Refresh Extract Table	12
Get Extract Table Status.....	13
Download Extract Table.....	13
Refresh Reporting Table	14
Download Reporting Table	14

1. Introduction

The **Reporting** tab within the Arius Enterprise Analysis module is where you can extract data from across projects and valuation dates to produce management reports, dashboards, and other downstream reporting. All data is saved back to the Arius Analysis (AA) database, which is a proprietary SQL Azure database designed to efficiently handle aspects of the Arius Enterprise system. In order for data to be consumable, the following data elements can be extracted into an **Extract Table** that resides within the AA database and is in a format that is easily downloadable (e.g., to a CSV file) and/or accessible via other third-party tools.

- All inputs, assumptions, and results arrays
- All selected development factors and selected interpolated factors
- All columns specified as “ultimate” in Arius methods
- Incremental values from all cash flow reports

In addition, Arius Enterprise can merge the data in an Extract Table with other user-provided data to support additional manipulations and reporting. For example, you may want to allocate reserves to a more granular level, roll them up into other business unit dimensions, or convert them to multiple currencies. These topics will be covered in the sections under **Support Tables** and **Reporting Tables**.

2. Accessing the reporting functionality

The reporting functionality is available from the ARIUS ANALYSIS TOOL | REPORTING screen in the Arius Enterprise portal.

Name	Description	Last Modified	Last Modified By	Last Submitted	Last Submitte...	Record Count	Actions
Export All Results		09/24/2021 9:08 AM	Bethany Cass	09/24/2021 9:08 AM	Bethany Cass	6,246	...
Export Source Arrays_CurrentQtr	Used to reconcile triangles	10/11/2021 12:18 PM	Bethany Cass	10/11/2021 12:18 PM	Bethany Cass	30,400	...
Export Source Arrays_PreviousQtr	Used to reconcile triangles	10/11/2021 11:27 AM	Bethany Cass	10/11/2021 11:28 AM	Bethany Cass	21,600	...

3. Extract Tables

To extract a subset of data from your Arius Analysis Database for reporting purposes, you will need an Extract Table.



The Arius Enterprise extract process involves the following steps:

- Step 1: Create Extract Table List
- Step 2: Define Extract Table
- Step 3: Update Extract Table
- Step 4: Download Extract Table

CREATE EXTRACT TABLE LIST

The first step in creating an Extract Table is to create an **Extract Table List**. The Extract Table List includes all the data you want to extract from your Arius Analysis Database for a particular purpose. You can extract data arrays (triangles, columns, or rows), selected development factor patterns, method ultimates, and cash flow reports. For example, if you want to create an extract for data reconciliation, you can create a list that includes all your source input arrays. Or, if you need IBNR for financial reporting, you can create an extract of your indicated reserves and/or selected ultimates. Because these data tables are unique to your company's customized object library, you will create the list from the **Arius** desktop tool.

To create an Extract Table List:

1. From the Arius Enterprise home page, choose **Arius Analysis Tool**, and then **Analysis**.
2. Select the Arius Analysis database you are working with and any current project. Choose either  for **Open and Checkout** or  for **Open and Read Only**.
3. In the Arius desktop tool, go to the **Enterprise** tab and click the ribbon icon for **Extract Table List**.
 - Drag collections or tables that contain the data you want to extract from your collection pane to this dialog. You can also drag tables from the **Object Library**. Note that graphs and reports (other than cash flow reports) cannot be extracted and therefore do not appear in the list when dragged into the list.
 - You can remove any tables that you do not want in your list by highlighting the table and selecting the **X Clear Selected** option.
 - You can change the order of the tables with the up and down arrows.
4. Once your list is complete, select the option to **Save List to Database**. Provide a name for your Extract Table List and click **SAVE**.
5. Go back to the **Enterprise** tab and click the ribbon icon for **Undo Checkout**.
6. From the Arius Enterprise portal, go to the **Reporting** tab and select **Extract Table Lists** from the left-hand pane. The Extract Table List you saved in step #4 will appear in this list.

To edit an Extract Table List:

1. In the Arius desktop tool, go to the Enterprise tab and click the **Extract Table List** icon. Select the option to **Load List from Database**. Remove and/or add tables to your list.
2. Select the option to **Save List to Database**. Provide a name for your Extract Table List and click the **SAVE** button.
3. Go back to the Enterprise tab and click the **Undo Checkout** icon.

To delete an Extract Table List:

1. From the Arius Enterprise portal, go to the **Reporting** tab and select **Extract Table List** from the left-hand pane.
2. Select the Extract Table list you want to delete and choose the action to **Delete**.

DEFINE EXTRACT TABLE

The second step in creating an extract process is to define an **Extract Table**. The Extract Table definition includes options for filtering which projects to include, extracting all cells of a triangle or the last diagonal, and extracting incremental or cumulative values.

To define an Extract Table:

1. From the Arius Enterprise home page, choose **Arius Analysis Tool**, and then **Reporting**.
2. Select the Arius Analysis database you are working with and select **Extract Tables** from the left-hand pane.
3. Select the **+** icon in the upper-right portion of screen to create a **new Extract Table**.
4. Enter a name and description for the new Extract Table.
5. Select the Extract Table List that contains the data you would like to extract from the drop-down box.
 - Under Export Filtering you have the option to filter projects by **Valuation Date**, **Project Status**, **Last Updated By** and/or **Project Category**.
 - Under **Options**, you can select **Last Diagonal Only** vs. **Full Triangle** and **Cumulative** vs. **Incremental**.
6. Click the **SAVE** button, and you will see your new Extract Table displayed in the list.



Note


All projects included in an Extract Table need to be checked in prior to running an Update, otherwise you will receive a **Failed: Conflict** error message on the Automation Status page.

UPDATE EXTRACT TABLE

The third step in the extract process is to **Update** or refresh the Extract Table which populates the table with data. This process will run project-by-project and you can monitor the job progress from the **AUTOMATION | STATUS PAGE**.

To update an Extract Table:

1. From the Arius Enterprise home page, choose **Arius Analysis Tool**, and then **Reporting**.

2. Select the Arius Analysis database you are working with and select **Extract Tables** from the left-hand pane.
3. Select the Extract Table you created above and under **Actions**, choose  for **Update Extract Table**.
4. Select the **Automation** tab and **Status** from the left-hand pane.
5. You will see the Extract job listed and, when expanded, a list of all the projects and their status.
6. You will have to **REFRESH** the page to see updates and when the job is complete.
7. Go back to the Reporting tab and select **Extract Tables** from the left-hand pane.
8. Once the Extract Table update is complete, you will see **Last Submitted Date/Time** and **Last Submitted By** fields updated along with the **Record Count** field.

DOWNLOAD EXTRACT TABLE

Once an Extract Table has been updated and there is a positive Record Count displayed on the Extract Tables page, you can download this table to a CSV file or link another tool directly to the table.

The columns that get extracted from the Extract Table include the following descriptor fields:

FIELD	EXAMPLE
ID	{1,2,3 ...}
DatabaseName	Demo_Client1
ExtractTableName	Export All Results
ProjectID	{1,2,3 ...}
ProjectVersion	10
Project Name	Commercial Auto PD
ProjectLastModifiedByDate	9/23/2021 10:00:38 PM
ProjectLastModifiedBy	Bethany Cass
ProjectStatus	{Not Reviewed, Not Started, In Progress, Level X Review, Completed}
ValuationDate	12/31/2012
DataStructure	9 Y x 36 Q, 2004,12,3,3,Accident, Prior
Mode	{Incremental, Cumulative}
Exposure Date	12/31/2004
Calendar Date	12/31/2012
Development Age	{3,6,9}
ExtractedDate	9/24/2021 1:06:35 AM
ExtractedBy	Bethany Cass
Segment	Commercial_Bus Auto_PD_All
AA Database Dimensions	{Company, Division, LOB, ...}


For the wide format, all the data objects are listed to the right as separate columns.

FIELD	EXAMPLE
Paid Loss	Value
Incurred Loss	Value
etc.	Value


For the narrow format, all the data objects are listed in a column with a single value field and therefore have additional descriptor fields.

FIELD	EXAMPLE
Source	{Data, Exhibit, Method}
Shape	{Triangle, Column, Row}
ObjectName	Paid Loss
TableID	16
Value	Value

To download an Extract Table to a CSV file:

1. From the Arius Enterprise home page, choose **Arius Analysis Tool**, and then **Reporting**.
2. Select the Arius Analysis database you are working with and select **Extract Tables** from the left-hand pane.
3. Select the Extract Table you created above and under **Actions**, choose  for **Download Wide Format CSV** or **Download Narrow Format CSV**.
4. The CSV file will appear in your Downloads folder.

To link to an Extract Table:

1. From the Arius Enterprise home page, choose **Arius Analysis Tool**, and then **Reporting**.
2. Select the Arius Analysis database you are working with and select **Extract Tables** from the left-hand pane.
3. Select the Extract Table you created above and under **Actions**, choose  for **Copy Wide Format URL to clipboard** or **Copy Narrow Format URL to clipboard**.
4. The URL that is populated includes your API Server, API Key, Arius Analysis Database Name, Extract Table name, and the data format (wide, narrow).

4. Support tables

Once you have extracted data into the Extract Table, the data may not always be in the format you need for reporting purposes so additional data manipulation may be required. For example, you may want to allocate reserves to a more granular level, roll them up into other business unit dimensions, or convert them to multiple currencies. Arius Enterprise allows you to join data from the Extract Table with other support tables to create the Reporting Tables you need. Support Tables contain data that is external to the Arius Analysis database, such as allocation percentages or currency exchange rates.

Creating Support tables involve the following steps:

- Step 1: Upload CSV files
- Step 2: Define Support Table
- Step 3: Load Data

UPLOAD CSV FILES

The first step to create a Support Table is to upload a CSV file to the Arius Enterprise web portal.

To upload a CSV file to the Arius Enterprise web portal:

1. From the Arius Enterprise home page, choose **Arius Analysis Tool**.
2. Select **Databases** (or any other icon), then navigate to the **Uploads** page.
3. Select the + icon in the upper-right portion of the screen to upload a new CSV file.
4. Browse to your CSV file and select **OPEN**.
5. Arius Enterprise will perform a simple validation on the file and return error messages if appropriate (e.g., header row column names cannot be empty). If there are no errors, a progress bar will appear. Once loaded, click **REFRESH**, and you will see your CSV file loaded in the list below. If a CSV file of the same name already exists in the list, a suffix (e.g., _v1, _v2, etc.) will be appended to the file name.



Note

CSV files must be less than 1GB in size.

DEFINE SUPPORT TABLE

The second step is to define the Support Table column headers of your CSV file as either dimensions, dates, or measures.

- A **dimension** represents a descriptive field (e.g., Company, Line of Business, Coverage, State).
- A **date** represents any column that needs to be mapped to another date field (e.g., exposure date, valuation date). You will need to specify the date format (e.g., yyyy, mmyyyy, ddmmyyyy, etc.) and delimiter (e.g., .(period), /(slash) or -(dash)).
- A **measure** represents a numeric field within the database (e.g., Paid Loss, Incurred Loss).


To create a Support Table definition:

1. From the Arius Enterprise home page, choose **Arius Analysis Tool**, and then **Reporting**.

2. Select the Arius Analysis database you are working with and select **Support Tables** from the left-hand pane.
3. Select the + icon in the upper-right portion of the screen to create a new Support Table.
4. Enter a name and description for the new Support Table.
5. Select the CSV file you uploaded above from the drop-down box. This selection will populate the column headers from your CSV file below.
6. For each column, specify the column type as a dimension, date, or measure.
7. Click **SAVE** and you will see your new Support Table displayed in the list.

LOAD DATA

The last step in creating a Support Table is to **load the data** from your CSV file into the table.

1. From the Arius Enterprise home page, choose **Arius Analysis Tool** and then **Reporting**.
2. Select the Arius Analysis database you are working with and select **Support Tables** from the left-hand pane.
3. Select the Support Table you created above and under Actions, choose  for **Load CSV File**.
4. The drop-down box will list all available CSV files. Select the CSV file to load.
5. Click the button for **Load Data**.
6. Arius Enterprise will perform an initial validation on the file and return error messages, if necessary (e.g., Date format mismatch, Value in measure is not numeric, etc.). Otherwise, the data load will proceed, and Arius Enterprise will notify you when it is complete.
7. Return to the Support Table page and expand the Support Table to view the CSV files loaded to this table.

5. Reporting tables

A Reporting Table is created by joining two tables, returning all records from the left table, and the matched records from the right table. You can then perform additional calculations on the measures from these two tables.

Creating Reporting Tables involves the following steps:

- Step 1: Define Reporting Table
- Step 2: Update Reporting Table
- Step 3: Download Reporting Table


DEFINE REPORTING TABLE

1. From the Arius Enterprise home page, choose **Arius Analysis Tool**, and then **Reporting**.
2. Select the Arius Analysis database you are working with and select **Reporting Tables** from the left-hand pane.
3. Select the + icon in the upper-right portion of the screen to create a new Reporting Table.
4. Enter a name and description for the new Reporting Table.
5. Select the Left and Right tables that you would like to join from the drop-down box which lists all Support and Extract Tables. Note that all the dimensions and measures from the left table will be returned along with any calculated measures using the matched records from the right table. If you also want to include the dimensions from the right table, for example when you want to apply currency exchange factors but not aggregate over the specified currency, select the checkbox for **Include Dimensions**.
6. Select the **Column Mappings** which are those fields that exist in both the Left and Right table upon which you need to find a match.
7. Under Formulas, select the + icon to create a new calculated measure.
8. Provide a name for the new column and define the mathematical relationship using measures from either the Left and/or Right table.
9. Click the **SAVE** button, and you will see your new Reporting Table displayed in the list.

UPDATE REPORTING TABLE

The second step in creating a Reporting Table is to Run the Reporting Table, a process that populates the table with data. This job's progress can be monitored from the Automation Status page.

To update a Reporting Table:


1. From the Arius Enterprise home page, choose **Arius Analysis Tool** and then **Reporting**.
2. Select the Arius Analysis database you are working with and select **Reporting Tables** from the left-hand pane.
3. Select the Reporting Table you created above and under **Actions**, choose  for **Run Report**.

4. Select the **Automation** tab and **Status** from the left-hand pane.
5. You will see the Reporting job listed and its status.
6. **REFRESH** the page to see when the job is complete.
7. Go back to the Reporting tab and select Reporting Tables from the left-hand pane.
8. Once the Reporting Table is completed, you will see **Last Submitted Date/Time** and **Last Submitted By** fields updated along with the Record Count.


DOWNLOAD REPORTING TABLE

Once a Reporting Table has been run, and there is a positive Record Count displayed on the Reporting Tables page, you can download this table to a CSV file or link another tool directly to the table.

To download a Reporting Table to a CSV file:

1. From the Arius Enterprise home page, choose **Arius Analysis Tool** and then **Reporting**.
2. Select the Arius Analysis database you are working with and select **Reporting Tables** from the left-hand pane.
3. Select the Reporting table you created above and under Actions, choose  for **Download CSV**.
4. The CSV file will appear in your Downloads folder; double click to open it.

To link to a Reporting table:

1. From the Arius Enterprise home page, choose **Arius Analysis Tool** and then **Reporting**.
2. Select the Arius Analysis database you are working with and select **Reporting Tables** from the left-hand pane.
3. Select the Reporting table you created above and under Actions, choose  for **Copy URL to clipboard**.
4. The URL that is populated includes your API Server, API Key, Arius Analysis Database Name, Reporting Table Name, and the data format (wide).

6. Reporting table use cases

You can use reporting tables in a variety of ways to join extract tables and support tables. Following are some examples.

IBNR ALLOCATION

Upload a support table of allocation percentages at a more granular level than that used for reserving as the left table and join with an extract table of IBNR reserves as the right table. You can then use calculated measures to calculate the allocated IBNR.

CURRENCY CONVERSION

Use an extract table of IBNR reserves as the left table, and join with a support table of currency exchange rates. You can then use calculated measures to calculate the IBNR at the various exchange rates.

TRIANGLE RECONCILIATION

Use an extract table containing the full triangle of all source arrays from the previous evaluation as the left table and join with an extract table containing the analogous full triangle of all source arrays from the current evaluation. You can then use calculated measures to calculate the difference between the current and previous evaluations.

7. Security

PORTAL MANAGEMENT

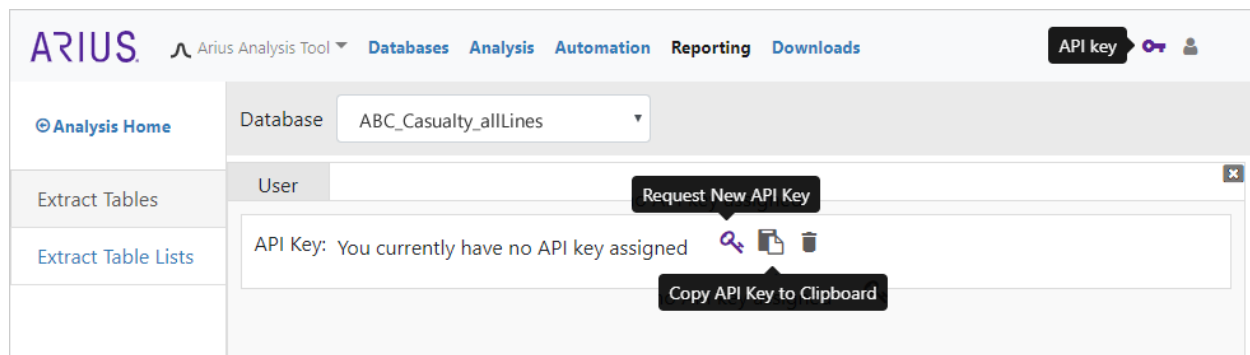
Several Arius Analysis Tool permissions related to reporting capabilities can provide additional control when you create or edit user roles under the Arius Enterprise **Portal Management** module.

- Create/Edit Extract tables
- Update Extract tables
- Delete Extract tables
- Download Extract tables

These permissions include the respective actions for Extract tables, Support tables, and Reporting tables. For further guidance on creating user roles, refer to the document *Arius Enterprise Portal Management Security* found in Arius under **HELP | USER DOCUMENTATION**.

API KEY

In addition, an Arius Enterprise API key is required to use the URL to access the extract. To create and access an API key, click on the **API Key** icon in the top right corner of the Arius Enterprise portal, select the first icon to **Request New API Key**, then select the second icon to **Copy API Key to Clipboard**.



8. Working with the Extract & Reporting tables outside the Arius Enterprise portal

A more automated approach for extracting data from the AA database is to use your API key and special URL Triggers to perform many of the actions described above. Arius Enterprise includes triggers for the following actions:

Refresh (Update) Extract Table

Get Extract Table Status

Download Extract Table

Refresh (Run) Reporting Table

Download Reporting Table

These URLs can be used directly in a browser or, more commonly, as a part of a scripted process outside of Arius Enterprise. The following sections provide the template for each URL trigger, a fictional example, and the responses that will be provided to the service in which the trigger is used.

REFRESH EXTRACT TABLE

URL template:

`https://{address}/extract/status/{databaseName}/{extractTableName}?apikey={guid}`

URL Example:

`https://companyname-api.actuarialsoftware.com/extract/status/atest1/extr2?apikey=10f9ddd1-88a0-449c-9e0a-78c115266ace`

CONDITION	CODE RETURNED	TEXT RETURNED
Extract was triggered	200 HTTP	SUCCESS: Extract tables refresh initiated
Database or extract definition name can't be recognized	400	ERROR: Unknown database: <i>{database name}</i> or Unknown definition: <i>{definition name}</i>
Extract is already running	409	ERROR: Extract already running
Refresh for reporting table which uses this extract is running	409	Reporting Table update in process
Any other error which happened during this call	500	(error message)
API key is not recognized	401	(Unauthorized)

GET EXTRACT TABLE STATUS

URL template

<https://{address}/extract/status/{databaseName}/{extractTableName}?apikey={guid}>

URL Example

<https://companyname-api.actuarialsoftware.com/extract/status/atest1/extr2?apikey=10f9ddd1-88a0-449c-9e0a-78c115266ace>

Response

CONDITION	CODE RETURNED	TEXT RETURNED
No problem found	200 and JSON	<pre>{"databaseName":"atest1","definitionName":"extr2","status":"Completed","lastUpdated":"2020-04-03T19:43:28.613"}</pre> <p>Details:</p> <ul style="list-style-type: none"> databaseName: database name from request definitionName: extract definition name from request status: current extract status. Possible values: Completed, Initiated, Cancelled, Cancelling, Executing, Failed, Never run lastUpdated: DateTime in UTC
Database or extract definition name can't be recognized	400	ERROR: Unknown database: <i>{database name}</i> or Unknown definition: <i>{definition name}</i>
Any other error that happened during this call	500	(error message)
API key is not recognized	401	(Unauthorized)

DOWNLOAD EXTRACT TABLE

URL Template

<https://{address}/extract/wide/{databaseName}/{ExtractTableName}?apikey={guid}>

URL Example

<https://{address}/extract/narrow/{databaseName}/{ExtractTableName}?apikey={guid}>

Response

CONDITION	CODE RETURNED	TEXT RETURNED
No problem found	N/A	(CSV file is returned)
Reporting table has no records	N/A	(CSV file will contain "No Records Found")
Database name missing	400	Database name not specified
Definition name missing	400	Definition name not specified
Extract is already running	400	Extract is running. Try again later

Database or extract definition name can't be recognized	400	Cannot find extract definition '{ <i>definitionName</i> }' for database { <i>databaseName</i> }
Any other error during this call	500	(error message)
API key is not recognized	401	(Unauthorized)

REFRESH REPORTING TABLE

URL Template

<https://{address}/reporting/refresh/{databaseName}/{ReportingTableName}?apikey={guid}>

URL Example

<https://companyname-api.actuarialsoftware.com/reporting/refresh/atest1/rt1?apikey=10f9ddd1-88a0-449c-9e0a-78c115266ace>

Response

CONDITION	CODE RETURNED	TEXT RETURNED
Extract was triggered	200 HTTP	SUCCESS: Reporting tables refresh initiated
Database or extract definition name can't be recognized	400	ERROR: Unknown database: { <i>database name</i> } or Unknown report definition: { <i>definition name</i> }
Reporting table is already running	409	Reporting Table update in process
Corresponding extract is running	409	Extract Currently Running
Validation check finds an error, for example extract table is empty	409	(error details)
Any other error which happened during this call	500	(error message)
API key is not recognized	401	(Unauthorized)

DOWNLOAD REPORTING TABLE

URL Template

<https://{address}/reporting/wide/{databaseName}/{reportingTableName}?apikey={guid}>

URL Example

<https://companyname-api.actuarialsoftware.com/reporting/wide/atest1/rt1?apikey=10f9ddd1-88a0-449c-9e0a-78c115266ace>

Response

CONDITION	CODE RETURNED	TEXT RETURNED
No problem found	N/A	(CSV file is returned)

Reporting table has no records	N/A	(CSV file will contain "No Records Found")
Database name missing	400	Database name not specified
Report definition missing	400	Report Definition name not specified
Invalid database name	400	Database is not valid
Report Definition not found	400	Report Definition not found
Reporting table is already running	400	Reporting table is running. Try again later
Any other error which happened during this call	500	(error message)
API key is not recognized	401	(Unauthorized)