




T-SQL: Bulk Insert Azure CSV Blob into Azure SQL Database

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Introduction

We already knew that we can use [Bulk Insert](#)  from performing a bulk insert from a file into SQL Server table. See this [good article by pituach](#) for a good understanding of how to implementing the bulk inserts on a on-premises file i.e, you already have the file in your file system(local disk). But when coming to the cloud, **especially in Azure**, all the structure and unstructured data will be stored inside a blob container (In Azure Storage Account) as a **blob**. In this article, we are going to see how we are going to import (or) bulk insert a CSV file from a blob container into Azure SQL Database Table using a Stored Procedure.

Prerequisite

1. **Azure Subscription**- We need to have a valid Azure Subscription in order to create any Azure resources like Logic Apps, Azure SQL Database. You can create a [free Azure Account](#)  if you don't have any.
2. **Azure Storage Account** - Once we have a valid Azure Subscription, we need to create [an Azure storage account](#)  where we store all our blobs in a blob container
3. **Azure SQL Database** - We need to have an Azure SQL Database, where our Stored Procedure will reside.

Step-By-Step


Creating master key encryption by password

We need to create a database master key if one does not already exist, using your own password. This key is used to encrypt the credential secret in all the further step.

Example:

```
CREATE MASTER KEY ENCRYPTION BY PASSWORD = 'Some!nfo' ;
```

Creating database scoped credential

We need to [create database scoped credential](#)  first in order to record the authentication information that is required to connect to a resource outside SQL Server. It will create a database credential. A database credential is not mapped to a server login or database user. The credential is used by the database to access to the external location anytime the database is performing an operation that requires access.

Syntax:

```
CREATE DATABASE SCOPED CREDENTIAL credential_name WITH IDENTITY =  
'identity_name' [ , SECRET = 'secret' ]
```


Example:

For our case, we need to get access the storage blob using SAS token, so we are going to create a database scope credentials with the SAS token


```
CREATE DATABASE SCOPED CREDENTIAL MyCredentials WITH IDENTITY =  
'SHARED ACCESS SIGNATURE' , SECRET =  
'QLYMgmSXMklt%2FI1U6DcVrQixnlU5Sgbtk1qDRakUBGs%3D' ;
```

Note: The SAS key value might begin with a '?' (question mark). When you use the SAS key, you must remove the leading '?'. Otherwise, your efforts might be blocked.

Creating external data source

Creating [an external data source](#)  helps us to refer our Azure blob storage container, specify the Azure blob storage URI and a database scoped credential that contains your Azure storage account key.

Syntax:

```
CREATE EXTERNAL DATA SOURCE data_source_name  
  
WITH (  
  
TYPE = BLOB_STORAGE,  
  
LOCATION =  
'https://storage_account_name.blob.core.windows.net/container_name  _'  
[ , CREDENTIAL = credential_name ]  
  
)
```

Example:

```
CREATE EXTERNAL DATA SOURCE MyAzureStorage WITH (  
  
TYPE = BLOB_STORAGE,  
  
LOCATION =  
'https://myaccount.blob.core.windows.net/testingcontainer' ,  
CREDENTIAL = MyCredentials  
  
);
```

Bulk Insert from Azure Blob Container

This Bulk Insert command helps us to bulk insert our CSV file from Blob container to SQL Table

Syntax:

```
BULK INSERT

[ database_name . [ schema_name ] . | schema_name . ] [ table_name |
view_name ]

FROM 'data_file'

[ WITH

(

[ [ , ] BATCHSIZE = batch_size ]

[ [ , ] CHECK_CONSTRAINTS ]

[ [ , ] CODEPAGE = { 'ACP' | 'OEM' | 'RAW' | 'code_page' } ]

[ [ , ] DATAFILETYPE =

{ 'char' | 'native' | 'widechar' | 'widenative' } ]

[ [ , ] DATASOURCE = 'data_source_name' ]

[ [ , ] ERRORFILE = 'file_name' ]

[ [ , ] ERRORFILE_DATA_SOURCE = 'data_source_name' ]

[ [ , ] FIRSTROW = first_row ]

[ [ , ] FIRE_TRIGGERS ]

[ [ , ] FORMATFILE_DATASOURCE = 'data_source_name' ]

[ [ , ] KEEPIDENTITY ]

[ [ , ] KEEPNULLS ]

[ [ , ] KILOBYTES_PER_BATCH = kilobytes_per_batch ]

[ [ , ] LASTROW = last_row ]

[ [ , ] MAXERRORS = max_errors ]

[ [ , ] ORDER ( { column [ ASC | DESC ] } [ ,...n ] ) ]

[ [ , ] ROWS_PER_BATCH = rows_per_batch ]

[ [ , ] ROWTERMINATOR = 'row_terminator' ]
```

```
[ [ , ] TABLOCK ]
```

```
-- input file format options
```

```
[ [ , ] FORMAT = 'CSV' ]
```

```
[ [ , ] FIELDQUOTE = 'quote_characters' ]
```

```
[ [ , ] FORMATFILE = 'format_file_path' ]
```

```
[ [ , ] FIELDTERMINATOR = 'field_terminator' ]
```

```
[ [ , ] ROWTERMINATOR = 'row_terminator' ]
```

```
)]
```

Example:

```
BULK INSERT Sales.Invoices
```

```
FROM 'inv-2017-12-08.csv'
```

```
WITH (DATA_SOURCE = 'MyAzureStorage' );
```

CSV File

For the demo purpose, we will use a simple CSV file named inputblob.csv, which has 3 columns.

```
1,JAYENDRAN,24
```

```
2,Testing,25
```

Stored Procedure

Now we are going to implement all the above-mentioned step in a single **Store Procedure**.

First, we will create a table corresponding to the CSV File Schema

```
CREATE table userdetails (id int , name varchar ( max ),age  
int )
```

Now we will see the Stored Procedure code,

```
CREATE PROCEDURE dbo.BulkInsertBlob
```

```
(
```

```
@Delimited_FilePath VARCHAR (300),
```

```

@SAS_Token    VARCHAR ( MAX ),

@Location    VARCHAR ( MAX )

)

AS

BEGIN

    BEGIN TRY

        --Create new External Data Source & Credential for the Blob, custom for
        the current upload

        DECLARE @CrtDSSQL NVARCHAR( MAX ), @DrpDSSQL NVARCHAR( MAX ), @ExtIDS
        SYSNAME, @DBCred SYSNAME, @BulkInsSQL NVARCHAR( MAX ) ;

        SELECT @ExtIDS = 'MyAzureBlobStorage'

        SELECT @DBCred = 'MyAzureBlobStorageCredential'

        SET @DrpDSSQL = N '

        IF EXISTS ( SELECT 1 FROM sys.external_data_sources WHERE Name = ' '' +
        @ExtIDS + ' ' ' )

        BEGIN

            DROP EXTERNAL DATA SOURCE ' + @ExtIDS + ' ;

        END;

        IF EXISTS ( SELECT 1 FROM sys.database_scoped_credentials WHERE Name =
        ' '' + @DBCred + ' ' ' )

        BEGIN

            DROP DATABASE SCOPED CREDENTIAL ' + @DBCred + ' ;

        END;

        ' ;

```

```

SET @CrtdSSQL = @DrpDSSQL + N '

CREATE DATABASE SCOPED CREDENTIAL ' + @DBCred + '

WITH IDENTITY = ' 'SHARED ACCESS SIGNATURE' ',

SECRET = ' '' + @SAS_Token + '' ';

```

```

CREATE EXTERNAL DATA SOURCE ' + @ExtlDS + '

WITH (

TYPE = BLOB_STORAGE,

LOCATION = ' '' + @Location + '' ',

CREDENTIAL = ' + @DBCred + '

);

' ;

```

```

--PRINT @CrtdSSQL

EXEC (@CrtdSSQL);

```

```

--Bulk Insert the data from CSV file into interim table

SET @BulkInsSQL = N '

BULK INSERT userdetails

FROM ' '' + @Delimited_FilePath + '' '

WITH ( DATA_SOURCE = ' '' + @ExtlDS + '' ',

Format=' 'CSV' ',

FIELDTERMINATOR = ' ', ' ',

--ROWTERMINATOR = ' '\n' '

ROWTERMINATOR = ' '0x0a' '

```

```
);
```

```
' ;
```

```
--PRINT @BulkInsSQL
```

```
EXEC (@BulkInsSQL);
```

```
END TRY
```

```
BEGIN CATCH
```

```
PRINT @@ERROR
```

```
END CATCH
```

```
END ;
```

Here the Stored procedure have 3 parameters

1. **Delimited_FilePath** - The name of the CSV File that already in the blob container
2. **SAS_Token** - For accessing any blob within the container (Private container) we need a SAS token. ([You can refer here on how to generate the SAS token](#))
3. **Location** - The URL of the Azure Storage Account along with the container

Executing the Stored Procedure

Now we will see how we are going to execute our Stored procedure

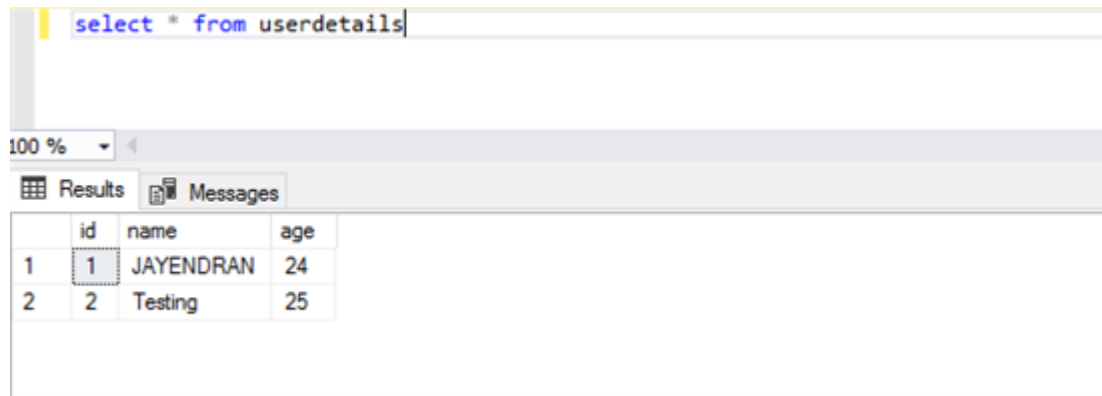
```
exec BulkInsertBlob 'inputblob.csv' , 'st=2018-10-21T14%3A32%3A16Z&se=2018-10-22T14%3A32%3A16Z&sp=rl&sv=2018-03-28&sr=b&sig=5YCuPCTVTt826ilyVsLBrKarPNg5sWUyrN7bMQ5fIhc%3D' , 'https://testingstorageaccount.blob.core.windows.net/testing_ -'
```

The parameters we are using are:

- Storage Account Name: <https://testingstorageaccount.blob.core.windows.net/>
- Container Name: testing
- SAS Token: st=2018-10-21T14%3A32%3A16Z&se=2018-10-22T14%3A32%3A16Z&sp=rl&sv=2018-03-28&sr=b&sig=5YCuPCTVTt826ilyVsLBrKarPNg5sWUyrN7bMQ5fIhc%3D
- FileName: inputblob.csv

After successful executing we will get the the message: (2 rows affected)

Let's check the userdetails table



The screenshot shows a SQL query editor with a query bar containing the text `select * from userdetails`. Below the query bar, there is a toolbar with a zoom dropdown set to 100% and two tabs: 'Results' and 'Messages'. The 'Results' tab is active, displaying a table with the following data:

	id	name	age
1	1	JAYENDRAN	24
2	2	Testing	25

You can find the script along with the Stored Procedure [at the gallery here](#) 

Summary

Using the database scoped credentials and external data source we can easily bulk insert any types of blobs into Azure SQL Table. For simplicity in this, article we take a simple CSV file with 3 fields. But we can do this more complexity as well as different field/Row delimiters as well.

See Also
