

Character Map Transformation in SSIS:

Character Map Transformation in SSIS is useful to transform input characters. If we want to change our string columns to Upper Case, Lower case, Simplified Chinese, Katakana, Hiragana, and Traditional Chinese, then SSIS character map transformation do the trick for you. It gives you the option to select whether you want to override the existing column with output result, or you want to add it as a new column.

Character Map Transformation in SSIS supports 10 types of operations. The operations and the description is displayed below.

1. Lowercase: Converts the string column characters to lowercase. For instance, TutorialGateway column converted into tutorialgateway
2. Uppercase: Converts the string column characters to uppercase. For example, TutorialGateway column turns into TUTORIALGATEWAY
3. Byte Reversal: This SSIS Character Map Transformation reverses the bytes order of the Unicode
4. Hiragana: Converts Katakana characters to Hiragana characters.
5. Katakana: Converts Hiragana characters to Katakana characters.
6. Half Width: Converts Full-width characters to Half-width characters. For instance, h e l l o converted to hello.
7. Full Width: This SSIS Character Map Transformation converts Half-width characters to Full-width characters. For instance, hello is converted to h e l l o
8. Linguistic casing: In general database uses its system language to store the data into columns. For example, my system stores date in English US format because it is my system's local language. To use other regional languages, then we can use this Linguistic casing option
9. Simplified Chinese: This SSIS Character Map Transformation Converts traditional Chinese characters to simplified Chinese characters. For instance, how are you in Simplified Chinese is 你好吗
10. Traditional Chinese: Converts simplified Chinese characters to Traditional Chinese characters.

Copy Column Transformation in SSIS

Copy Column Transformation in SSIS duplicates the source columns. Just like copying the column data and pasting the data into a new column. It is a significant transformation because if we want to perform multiple operations on a single column, then we can create multiple copies. And later, we can perform one action on one copy.

For example, we have column name product price, and we want to calculate dealer price, distributor price, price including VAT, price plus wastage cost. Now we create duplicate columns for the above requirements using SSIS Copy Column Transformation. And then, we will calculate dealer, distributor, VAT, etc., prices individually.

Derived Column SSIS:

Derived Column Transformation in SSIS plays a virtual role in dealing with expressions in SQL Server Integration Services. The SSIS Expression Language has powerful built-in functions for string manipulation, data type conversions, mathematical functions, conditional expressions, and handling Null values.

Using SSIS derived column transformation, we can create the required expression using those built-in functions, Columns, Operators, and variables. The SSIS Derived Column Transformation also provides an option to choose whether you want to create new columns or replace existing columns with values calculated from expressions.

Percentage Sampling Transformation in SSIS

In general, the Percentage sampling transformation in SSIS is for data modelling. This SSIS Percentage Sampling transformation selects a given percentage of rows from the data source. Next, it transfers them to selected

output rows option, and the remaining rows will move to unselected output rows.

For example, if the input has 1000 rows, and if we specify ten as a percentage sample, then the SSIS Percentage Sampling transformation returns approximately 10% of the RANDOM records from the input data.

Row Sampling Transformation in SSIS

Row Sampling Transformation in SSIS provides an option to specify the number of rows you would like to retrieve from the data source. SSIS Row Sampling Transformation Data is randomly selected unless you use this Use the following random seed option.

Row Sampling Transformation in SSIS will take the whole data from a source, and it randomly extracts the selected number of rows. SSIS Row Sampling gives you two outputs. The first is the selected data, and the second one is unselected data. This SSIS Row Sampling transformation is useful in training the data mining model.

Sort Transformation in SSIS

The Sort Transformation in SSIS is used to sort the source data in either Ascending or Descending order, which is similar to the T-SQL command ORDER BY statement.

- If the Sort Order value is a positive number, then Sort Transformation sort the data in Ascending order
- If the Sort Order value is Negative number, SSIS Sort Transformation sort the data in descending order

Some transformations like [Merge Transformation](#) and [Merge Join Transformation](#) needs data to sort before using them. In these situations, we use SSIS Sort Transformation to sort the data.

Union All Transformation in SSIS

Union All Transformation in SSIS is used to combine data from multiple sources (excel files, flat files, etc.). Or multiple SQL tables and produce one output to store in the destination table. Union All Transformation in SSIS does not follow any particular order while merging the data and storing in the destination table

Multi-Cast:

Multicast Transformation in SSIS sends input data to multiple destination paths without applying any conditions or transformations. OR, Takes ONE Input and makes the logical COPY of data and passes the same data to multiple outputs.

SSIS Multicast Transformation is very useful when we want to apply different transformations on the same dataset in parallel. For instance, If we're going to perform two types of transformations on the same dataset. Then use SSIS Multicast Transformation to make two copies of the same data. Next, on each copy, we can perform different transformations.

Conditional Split:

A Conditional Split Transformation in SSIS is just like the IF condition or CASE statement. It checks the given condition and based on the condition result; the output will send to the appropriate destination path. It has ONE input and MANY outputs.

Aggregate:

The Aggregate Transformation in SSIS performs two main tasks:

1. Applying Aggregate Operations on your input data
2. It allows you to group your data based on values in your input columns.

Aggregate Transformation in SSIS performs a function similar to the [SQL Server Aggregate functions](#). The operations include the following:

1. GROUP BY: Just like the [GROUP BY Clause](#) in SQL [SELECT](#) queries.
2. COUNT: It will [Count](#) the number of values in this column. Null values are included in the count if you select (*) as the input column. Otherwise, null values ignored.
3. COUNT DISTINCT: It will count the number of [Distinct](#) values in this column.
4. SUM: Calculate the [Sum](#) of the Column values.
5. AVERAGE: Calculate the [Average](#) of the Column values.
6. MINIMUM: Calculate the [Minimum](#) of Column values.
7. MAXIMUM: Calculate the [Maximum](#) of Column values.

The Aggregate transformation in [SSIS](#) can configure in Basic mode or Advanced mode. In Basic mode, the Aggregate transformation has one output. And in Advanced mode, it can have more than one output, each containing the result of a different aggregation.

Audit Transformation in SSIS

Audit Transformation in SSIS allows you to add extra columns with auditing information (Machine name, package name, id, date, etc.) required in auditing. We can use this SSIS audit transformation to save that information in the target table.

1. ExecutionInstanceGUID – The GUID that identifies the execution instance of the package.
2. PackageID – This is the unique identifier of the package.
3. PackageName – Shows the name of the package.
4. VersionID – The unique version number of the package.
5. ExecutionStartTime – The time the package started to run.
6. MachineName – The Name of the computer.
7. UserName – The login name of the person who started the package.
8. TaskName – Name of the Data Flow task with which the Audit transformation is associated.

9. TaskId – The unique identifier of the Data Flow task.

Export Column Transformation in SSIS

Export Column Transformation in SSIS is useful to export images, binary files, media, or any large documents from SQL Server to file system. The SSIS Export Column Transformation reads the path or location present in the source column and transfers the data to that particular path.

For example, if we have a product description stored in the text file and the text file is stored in one column. We have a situation to send product descriptions only to any specific store. Then, we can use the SSIS Export Column Transformation to transfer and save those text files to the path we specified.

Import Column Transformation in SSIS

Import Column Transformation in SSIS is used to import data from the text file to the data flow. And do some manipulations, and then forward the data to the destination. Here, data includes binary files, images, media, or any document which is vast to transfer. The data type of the SSIS import column transformation output column must be DT_TEXT, DT_NTEXT, or DT_IMAGE.

For example, We are filling the Product details into the table. We have product pictures in the Manufacturing unit, and every individual store placed the product reviews in a text file. In this situation, we use SSIS import column transformation to bring the pictures, Reviews into data flow. Next, merge them with Product details and store them in Data Warehouse. Let's see a straightforward example for better understanding

Merge Transformation in SSIS

Merge Transformation in SSIS is used to merge two inputs (such as tables or files) and produce one output. Merge Transformation is very useful when we want to combine the error path data (after handling the errors) and normal data. This SSIS Merge transformation uses key column values to insert the data into destination columns.

Merge Join Transformation in SSIS

The Merge Join Transformation in SSIS is used to perform [SQL Joins](#) such as Inner Join, [Left Outer Join](#), [Full Outer Join](#) and [Right Outer Join](#) (indirectly achieved by Swapping the tables) in [SQL Server Integration Services](#). SSIS Merge Join Transformation is very useful to load data into the Dimension tables in Data Warehouse.

NOTE: The Merge Join Transformation in SSIS will only work with Sorted data. So, Sort Transformation is mandatory before applying any joins using Merge Join Transformation. Please refer to [Sort Transformation in SSIS](#) article to understand, How to perform Sort Operations on the Source Data.

Lookup transformation

The Lookup transformation performs lookups by joining data in input columns with columns in a reference dataset. You use the lookup to access additional information in a related table that is based on values in common columns.

The reference dataset can be a cache file, an existing table or view, a new table, or the result of an SQL query. The Lookup transformation uses either an OLE DB connection manager or a Cache connection manager to connect to the reference dataset. For more information, see [OLE DB Connection Manager](#) and [Cache Connection Manager](#)

Cache Transformation in SSIS

Cache Transformation in SSIS is used to read data from a wide variety of sources such as flat files, Excel sheets, and ADO.NET data sources. And then save data from those data sources in .caw file.

By default, the Lookup Transformation in SSIS uses the OLE DB Connection Manager for the lookup reference table. We can use other sources also, but they must be used indirectly via SSIS Cache Transformation.

Fuzzy Lookup Transformation in SSIS

The Fuzzy Lookup Transformation in SSIS is used to replace the wrongly typed words with correct words. Unlike Lookup Transformation, the Fuzzy Lookup transformation in SSIS uses fuzzy matching to find one or more close matches in the reference table and replace the source data with reference data.

The Fuzzy Lookup Transformation in SSIS is an important transformation in real-time. For example, while entering the product information, sometimes, we may enter the data with spelling mistakes. While doing Lookup Transformation, due to these wrongly typed words, we can't match the source data with a lookup table. In these situations, SSIS Fuzzy Lookup Transformation will look for the nearest matching right word and replace the wrong value with the correct word

Fuzzy Grouping Transformation in SSIS

The Fuzzy Grouping Transformation in SSIS is used to replace the wrongly typed words with correct words. For example, if 98 people typed the country name as India and two people types as Indi, then SSIS Fuzzy Grouping Transformation will replace the Indi with India.

Row Count Transformation in SSIS

The Row Count Transformation in SSIS used to counts the rows as they pass through a data flow and store the final count in a variable. For example, If we want to inform the Manager to notify the number of rows inserted, then we can use SSIS Row Count Transformation for counting the rows. Then use the Script Task to send an e-mail message to the Manager.

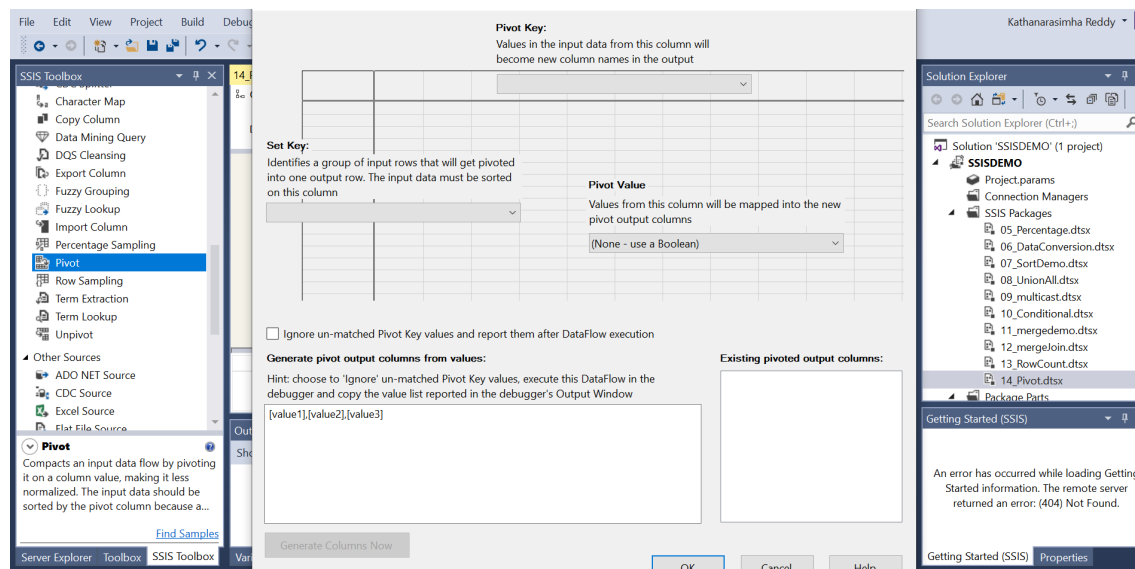
In SQL Server Integration Services, Row Count Transformation will not update the variable value until the last row of the source data has passed through this SSIS Transformation. So, we can't use the updated values in the middle. Let us design one package so that we can understand this SSIS Row Count transformation better

OLE DB Command Transformation in SSIS

OLE DB Command Transformation in SSIS is used to run the SQL statements like [INSERT](#), [UPDATE](#), and [DELETE](#) statements in the Data Flow. Please refer to [Delete Data Using OLEDB Command Transformation](#) article to understand how to delete data using SSIS OLE DB Command Transformation and [Update Data using OLEDB Command Transformation](#) article to understand the Update operations.

Pivot Transformation in SSIS

The Pivot Transformation in SSIS is used to perform pivot operations on input data (Source Data). A pivot operation in SSIS means converting individual row data into separate columns.



Unpivot Transformation in SSIS

The UNPIVOT Transformation in SSIS is used to convert the DE Normalized data into a more normalized version, which is similar to SQL UNPIVOT. The

SSIS UNPIVOT Transformation acts precisely opposite to Pivot Transformation.

Term Extraction in SSIS

The Term Extraction transformation in SSIS first extracts terms from the text present in the source data and then writes the extracted terms to a Transformation output column.

For example, people are writing reviews on your products, and you want to contact them for further assistance. In these situations, you can use SSIS Term Extraction transformation to extract the email address and name of the user from the reviews

In [SSIS](#), We can perform Term Extraction Transformations only on the column with the DT_WSTR and DT_NTEXT data type. If your input column is different from these two then Please use the [SSIS Data Conversion](#) to convert other Data Types to DT_WSTR and DT_NTEXT data type.

Term Lookup Transformation in SSIS

The Term Lookup Transformation in SSIS is used to find terms within the string or text. It uses the reference table (contains terms) to find the matched sentences from the source data and also counts the number of times a term repeated in the source data row.

The SSIS Term Lookup transformation adds two extra columns to the transformation output called Term and Frequency by default. SSIS Term contains a term from the lookup table, and Frequency includes the number of times the phrase is repeated or occurred in the input data set.

The [SSIS](#) Term Lookup Transformation only allows the columns with DT_WSTR and DT_NTEXT data type to perform term lookup. If your input column is different from these two, Please use the [SSIS Data Conversion](#) to convert other Data Types to DT_WSTR and DT_NTEXT data type.

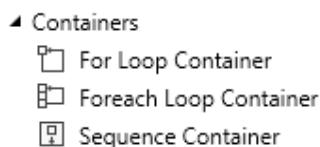
Bulk Insert Task in SSIS

The Bulk Insert task in SSIS can transfer data only from a text file into a SQL Server table or view, which is similar to Bulk Insert in SQL Server. If the destination table or view already contains data, the new data is appended to the existing data when the SSIS Bulk Insert task runs. If you want to replace the data, run an Execute SQL task that runs a DELETE or TRUNCATE statement before you run the Bulk Insert task.

For instance, We are working with stock market data, and every day we are getting billions of data in .csv format (Comma Separated Values). Our task is to copy data inside this .csv file to SQL database table every day. We usually have two approaches to do the same in SSIS

Sequence Containers in SSIS packages

SSIS package control flow is useful for executing multiple tasks and design workflow for execution. A container in the control flow plays an essential role in workflow design. We can see the following containers in SSIS Toolbox:



For loop container

We can use this container for executing all inside tasks for a fixed number of executions. You can consider it equivalent to For loop in the programming language.

Foreach loop container

It works similar to For loop; however, we define a collection for determining the number of executions of For loop instead of a fixed number of executions. You can read more about in [Using SSIS ForEach Loop containers to process files in Date Order](#) article.

Sequence Container

The sequence container in SSIS is useful for grouping tasks together. We can split the control flow into multiple logical units using this.

Execute Process Task

The Execute Process task runs an application or batch file as part of a SQL Server Integration Services package workflow. Although you can use the Execute Process task to open any standard application, such as Microsoft Excel or Microsoft Word, you typically use it to run business applications or batch files that work against a data source. For example, you can use the Execute Process task to expand a compressed text file. Then the package can use the text file as a data source for the data flow in the package. As another example, you can use the Execute Process task to run a custom Visual Basic application that generates a daily sales report. Then you can attach the report to a Send Mail task and forward the report to a distribution list.

File System Task in SSIS

The File System Task in SSIS is used to perform a different kinds of operations on Files and Folders (or Directories). For instance, if you want to move the directory content from one location to another, we can use this SSIS File System Task.

SSIS Web Service Task

The SSIS Web Service Task is used to execute the web service methods. For instance, if you want to store the weather report as an SQL extra column, then consume the Web service provided by the Yahoo or MSN weather, and store the output in a variable so that you can pass the variable to Data Flow Task.

~~The SSIS Task, we show you how to use the file system task to perform file operations.~~

NOTE: The SSIS Web Service Task uses the HTTP Connection Manager to connect with the Web service and to send or receive Files.

Data Profiling Task in SSIS

The Data Profiling Task in SSIS used to computes various profiles that help us to become familiar with the data source and to identify the problems in the data (if any) that have to fix. Here, we show you how to profile the source data using the Data Profiling Task in SSIS with example.

The Data Profiling Task in SSIS will work only with the data present in SQL Server. The SSIS Data Profiling Task doesn't support the data present in the file system, or the third-party data.

Transfer SQL Server Tables with Data in SSIS

In this article, we will show you how to transfer SQL Server tables with data from one Database to another Database using the [Transfer SQL Server Objects task](#). If you want to transfer SQL Server Table Structures (without data) then

Transfer SQL Server Objects Task in SSIS

The Transfer SQL Server Objects task in SSIS is used to transfer one or more SQL Server objects (such as Tables, View, Stored Procedures, User Defined Functions, Indexes, Users, Logins, etc.) from one Database to another Database. Transfer SQL Server Objects task in SQL Server Integration Services allows us to use either the same SQL Server instance for Source and Destination connections or use different instances.

Transfer Jobs Task

The Transfer Jobs task transfers one or more SQL Server Agent jobs between instances of SQL Server.

The Transfer Jobs task can be configured to transfer all jobs, or only specified jobs. You can also indicate whether the transferred jobs are enabled at the destination.

The jobs to be transferred may already exist on the destination. The Transfer Jobs task can be configured to handle existing jobs in the following ways:

- Overwrite existing jobs.
- Fail the task when duplicate jobs exist.
- Skip duplicate jobs.

For Loop Container in SSIS

The For Loop Container in SSIS will repeat the SQL Integration Services tasks for a given number of times until the given condition is False. It is the same as the For Loop in any programming language. In this chapter, we show you the step by step approach to configure the For Loop container in SSIS

SSIS Foreach Loop File Enumerator

The SSIS Foreach Loop container will repeat the control flow task for N number of times, which is similar to the Foreach loop in any programming language. The SQL Server Integration Services or SSIS provides eight types of enumerators. In this article, we will show you the steps involved in configuring the SSIS Foreach Loop File Enumerator.

SSIS Foreach File Enumerator: This is used to enumerate files present in the specified folder. SSIS Foreach Loop File Enumerator will also traverse the subfolder present in the specified folder. For example, if you want to move multiple files from one folder to another or uploading multiple files to the FTP server using the FTP task, etc. Before we step into the package creation, let us see the source data.

SSIS Foreach Item File Enumerator

Foreach Loop Container is one of the looping constructs available in SSIS packages. One of its enumerator options is the Foreach Item Enumerator. It enumerates through a list of items populated at design time. The list is static at execution time, i.e. you cannot load the list items dynamically from a configuration file or another source like an SQL table. It is probably due to the static nature of the item list, that this enumerator type is not used too often in packages.

On the other hand, there are some scenarios where a static list can prove to be useful. For example –

- no need to create a database table just to pass on values for the Foreach Loop
- enforce a specific order to the parameters passed to the loop
- initialize variables values with the Item Enumerator instead of doing that in a Script task

Event Handlers in SSIS

Event Handlers in SSIS is one of the most useful, and powerful feature. At the run-time executables such as Containers, Tasks will raise events.

For SSIS Event Handling, we have example, before starting On Pre Task On Pre Execute, On Error On Error Handling, On Error, On Post Task On Post Execute,

Few examples where we use the SSIS Event Handlers are:

- Truncating, or Cleaning tables before we start loading the data.
- Removing unwanted files after we exported them to other location (or to SQL).
- Sending Email when an error occurs.
- Retrieving system information etc.

WMI Data Reader Task

The WMI Data Reader task runs queries using the Windows Management Instrumentation (WMI) Query Language that returns information from WMI about a computer system. You can use the WMI Data Reader task for the following purposes:

- Query the Windows event logs on a local or remote computer and write the information to a file or variable.
- Obtain information about the presence, state, or properties of hardware components, and then use this information to determine whether other tasks in the control flow should run.
- Get a list of applications and determine what version of each application is installed.

You can configure the WMI Data Reader task in the following ways:

- Specify the WMI connection manager to use.
- Specify the source of the WQL query. The query can be stored in a task property, or the query can be stored outside the task, in a variable or a

- file.
- Define the format of the WQL query results. The task supports a table, property name/value pair, or property value format.
- Specify the destination of the query. The destination can be a variable or a file.
- Indicate whether the query destination is overwritten, kept, or appended.

If the source or destination is a file, the WMI Data Reader task uses a File connection manager to connect to the file. For more information, see [Flat File Connection Manager](#).

WMI Event Watcher Task

The WMI Event Watcher task watches for a Windows Management Instrumentation (WMI) event using a Management Instrumentation Query Language (WQL) event query to specify events of interest. You can use the WMI Event Watcher task for the following purposes:

- Wait for notification that files have been added to a folder and then initiate the processing of the file.
- Run a package that deletes files when the available memory on a server drops lower than a specified percentage.
- Watch for installation of an application, and then run a package that uses the application.

Integration Services includes a task that reads WMI information.