SSIS Workshop Lab Guide

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Contents

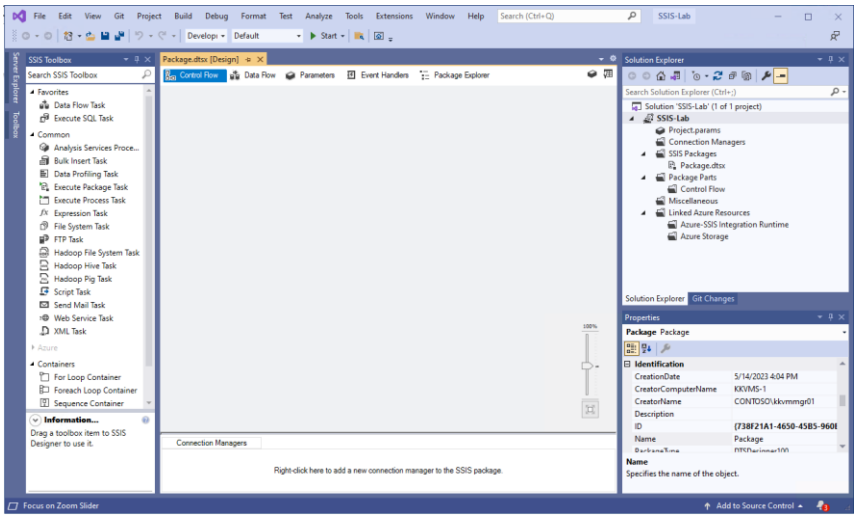
環境設置

- SQL Server Data Tool (Visual Studio 2016~2019)
https://learn.microsoft.com/zh-tw/sql/ssdt/download-sql-server-data-tools-ssdt?view=sql-server-ver16
- Integration Service 套件 ([延伸模組]>[管理延伸模組])
- Database https://github.com/Microsoft/sql-server-samples/releases/download/adventureworks/AdventureWorksDW2012.bak
- Target Server SQL Server 2016

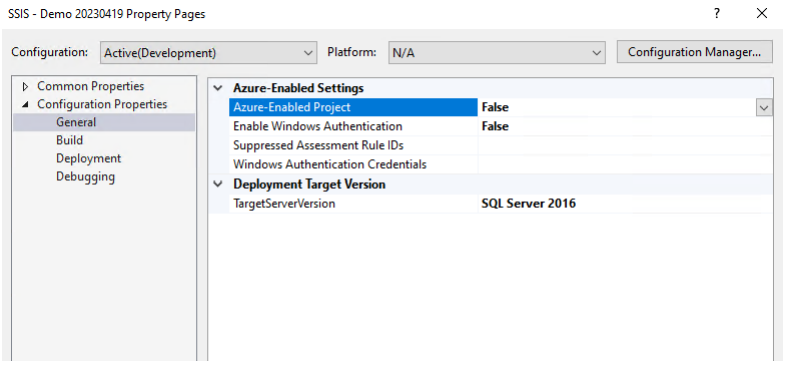
建立專案與基本套件

此套件會從單一一般檔案來源擷取資料、使用兩個查閱轉換來轉換資料，然後將轉換的資料寫入至 **AdventureWorksDW2012** 範例資料庫中 **NewFactCurrencyRate**

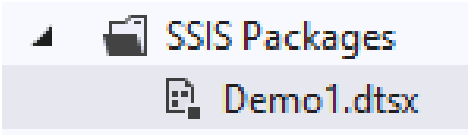
Step1: 新增專案和建立封包



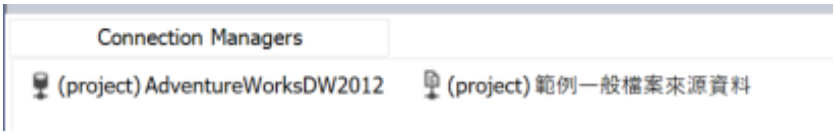
切換 TargetServerVersion SQL Server 2016



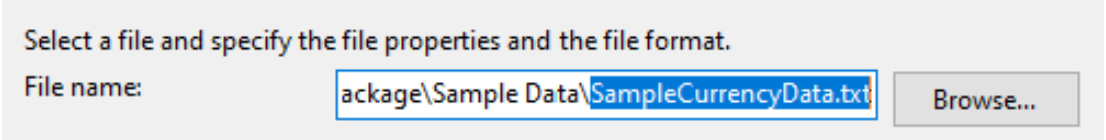
Demo1.dtsx

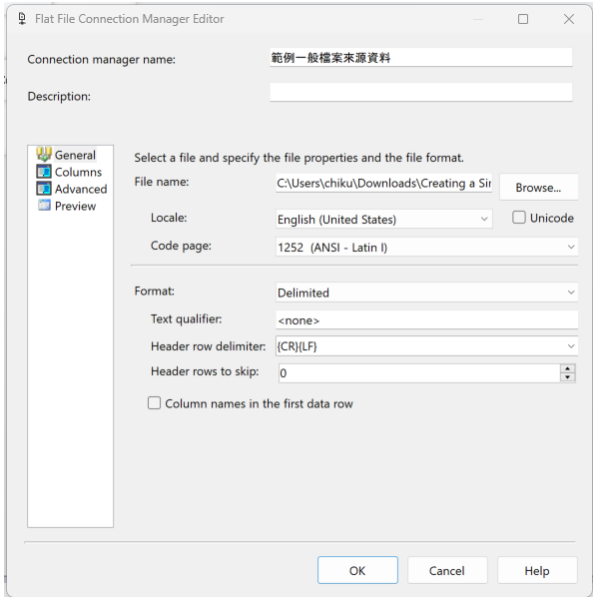


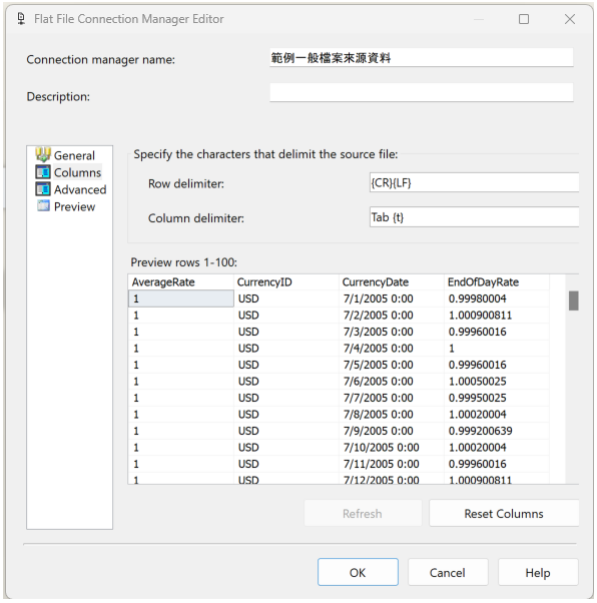
Step2： 建立檔案連線管理員

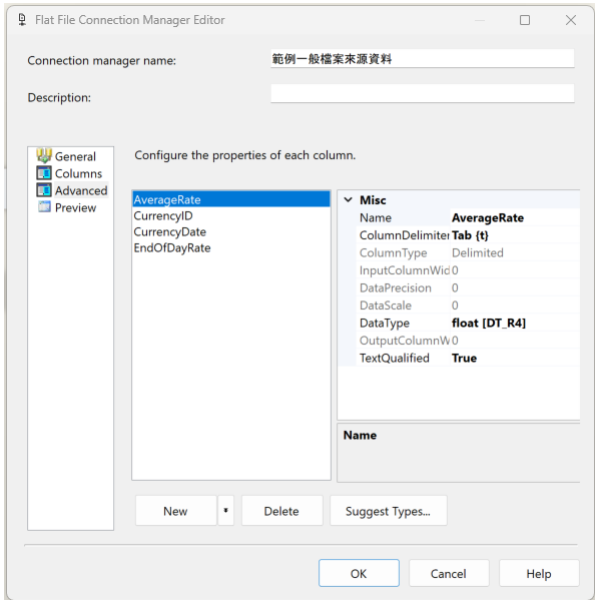


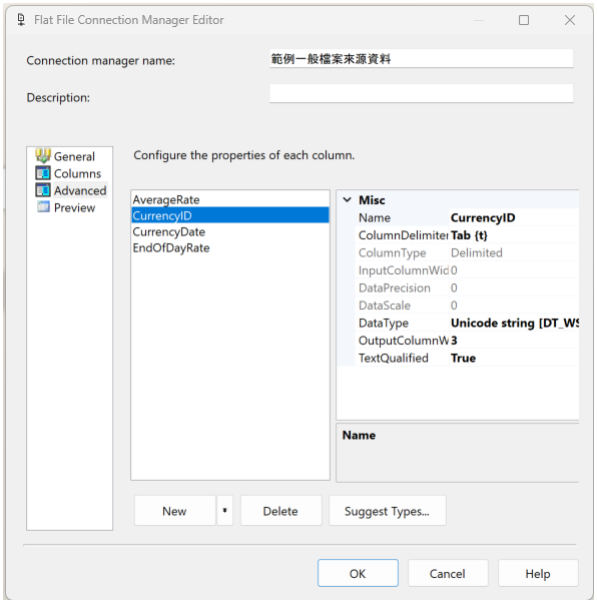
一般檔案來源

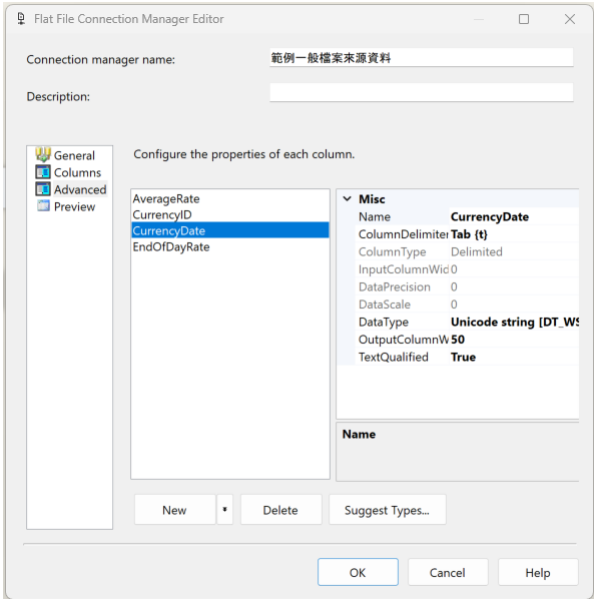


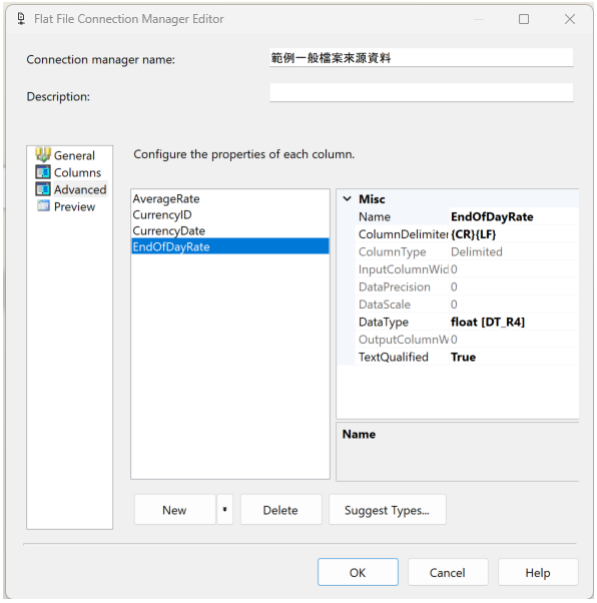

Flat File Connection Manager Editor
Connection manager name:
範例一般檔案來源資料
Description:
General
Columns
Advanced
Preview
Select a file and specify the file properties and the file format.
File name:
C:\Users\chiku\Downloads\Creating a Sir
Browse...
Locale:
English (United States)
Unicode
Code page:
1252 (ANSI - Latin I)
Format:
Delimited
Text qualifier:
<none>
Header row delimiter:
{CR}{LF}
Header rows to skip:
0
Column names in the first data row
OK
Cancel
Help


Flat File Connection Manager Editor
Connection manager name:
範例一般檔案來源資料
Description:
General
Columns
Advanced
Preview
Specify the characters that delimit the source file:
Row delimiter:
{CR}{LF}
Column delimiter:
Tab (t)
Preview rows 1-100:
AverageRate CurrencyID CurrencyDate EndOfDayRate
1 USD 7/1/2005 0:00 0.99980004
1 USD 7/2/2005 0:00 1.000900811
1 USD 7/3/2005 0:00 0.99960016
1 USD 7/4/2005 0:00 1
1 USD 7/5/2005 0:00 0.99960016
1 USD 7/6/2005 0:00 1.00050025
1 USD 7/7/2005 0:00 0.99950025
1 USD 7/8/2005 0:00 1.00020004
1 USD 7/9/2005 0:00 0.999200639
1 USD 7/10/2005 0:00 1.00020004
1 USD 7/11/2005 0:00 0.99960016
1 USD 7/12/2005 0:00 1.000900811
Refresh
Reset Columns
OK
Cancel
Help

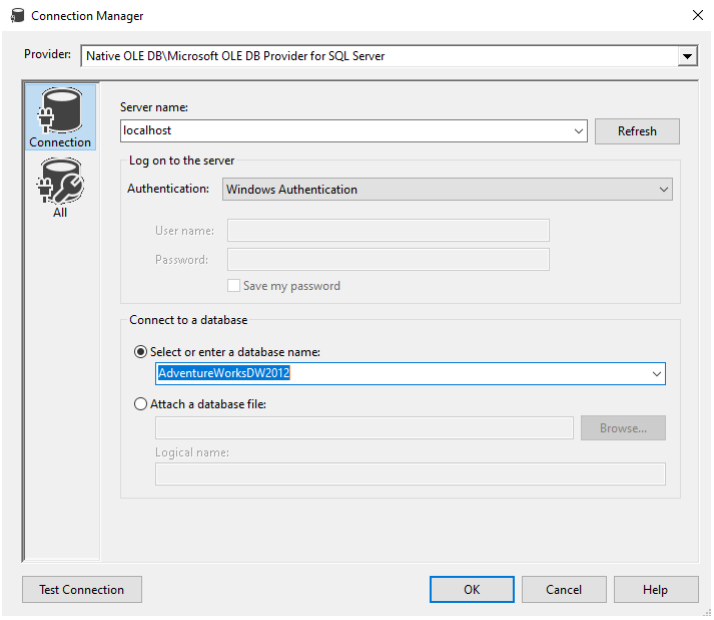

Flat File Connection Manager Editor
Connection manager name:
範例一般檔案來源資料
Description:
General
Columns
Advanced
Preview
Configure the properties of each column.
AverageRate
CurrencyID
CurrencyDate
EndOfDayRate
Misc
Name AverageRate
ColumnDelimiter Tab {t}
ColumnType Delimited
InputColumnWid 0
DataPrecision 0
DataScale 0
DataType float [DT_R4]
OutputColumnW 0
TextQualified True
Name
New
Delete
Suggest Types...
OK
Cancel
Help


Flat File Connection Manager Editor
Connection manager name:
範例一般檔案來源資料
Description:
General
Columns
Advanced
Preview
Configure the properties of each column.
AverageRate
CurrencyID
CurrencyDate
EndOfDayRate
Misc
Name CurrencyID
ColumnDelimiter Tab {t}
ColumnType Delimited
InputColumnWid 0
DataPrecision 0
DataScale 0
DataType Unicode string [DT_WS
OutputColumnW 3
TextQualified True
Name
New
Delete
Suggest Types...
OK
Cancel
Help





Step3: 建立 OLE DB 連線管理員

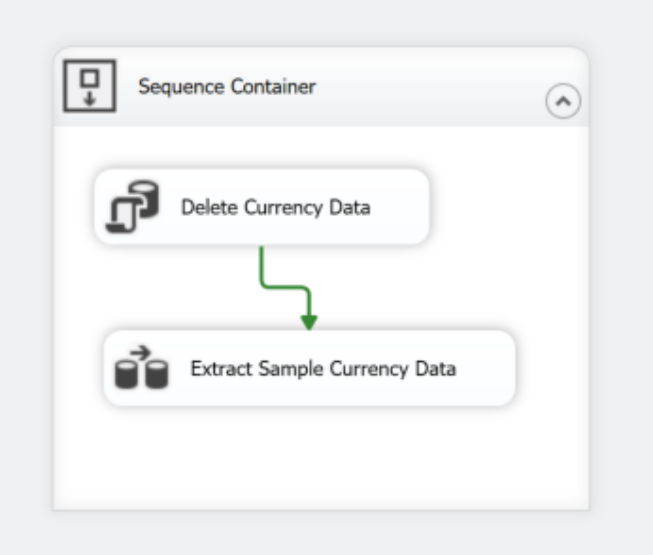


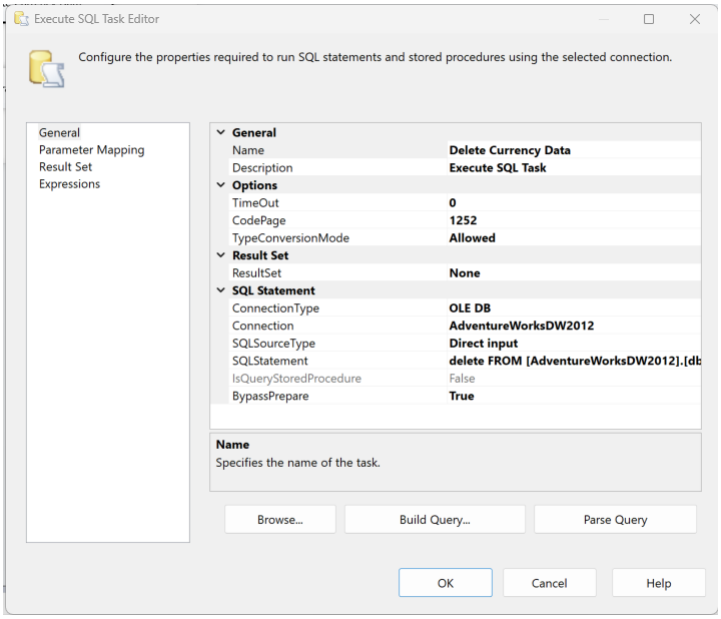
建立資料表

```
CREATE TABLE [dbo].[NewFactCurrencyRate](
    [AverageRate] [real] NULL,
    [CurrencyID] [nvarchar](3) NULL,
    [CurrencyDate] [date] NULL,
    [EndOfDayRate] [real] NULL,
    [CurrencyKey] [int] NULL,
    [DateKey] [int] NULL,
    [YearMonth]  [int] NULL
```

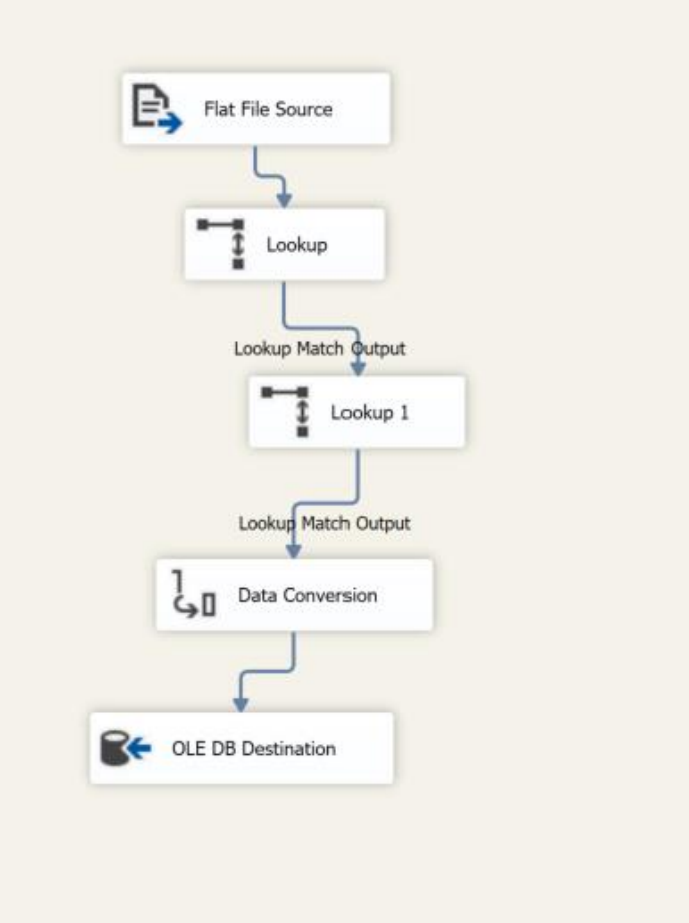
```
) ON [PRIMARY]
GO
```

Step4： 新增控制流程



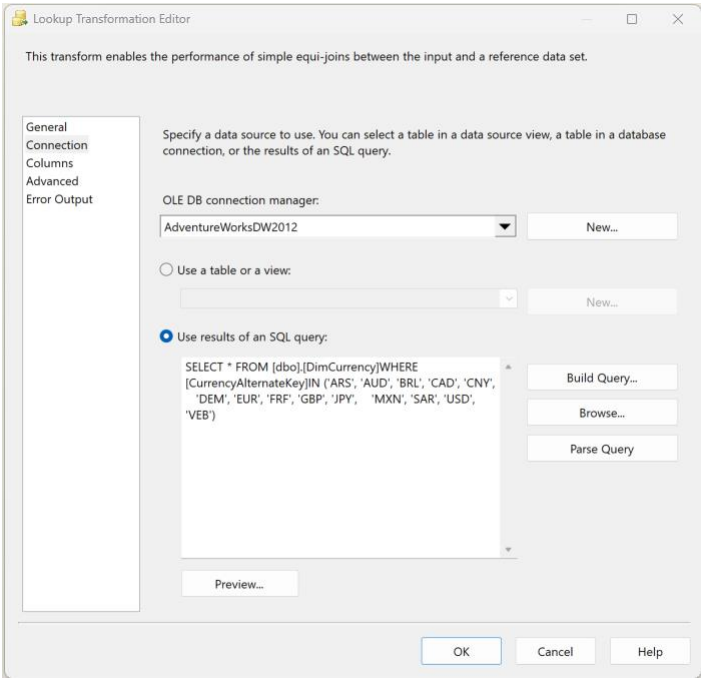


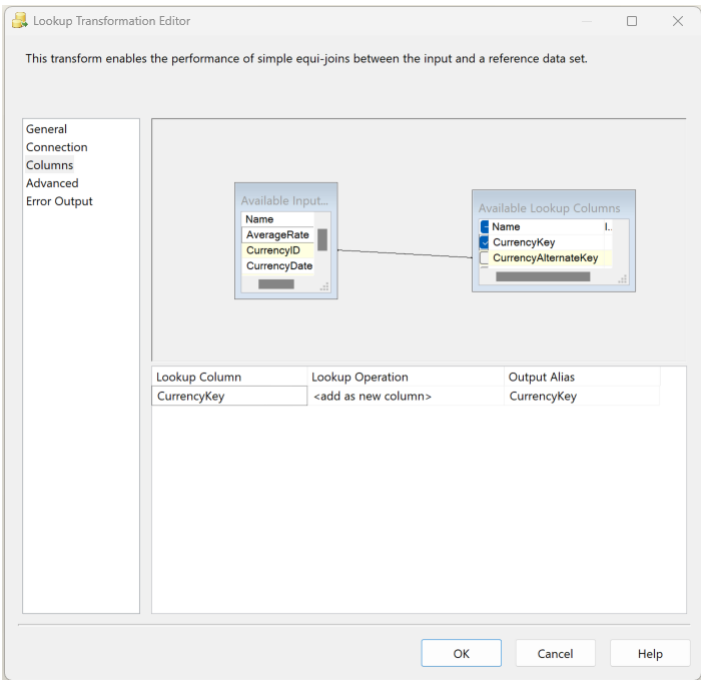
Step5： 加入一般檔案來源

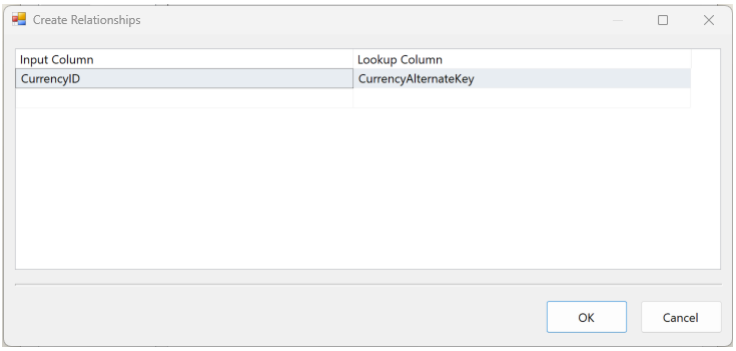


Step6: 新增轉換

第一個 Lookup 轉換 CurrencyID

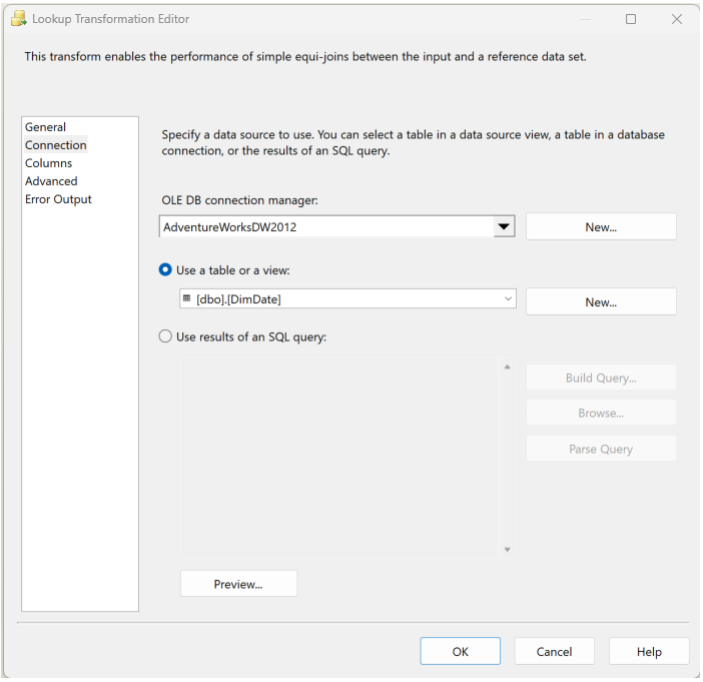

Lookup Transformation Editor
This transform enables the performance of simple equi-joins between the input and a reference data set.
General
Connection
Columns
Advanced
Error Output
Specify a data source to use. You can select a table in a data source view, a table in a database connection, or the results of an SQL query.
OLE DB connection manager:
AdventureWorksDW2012
New...
Use a table or a view:
New...
Use results of an SQL query:
SELECT * FROM [dbo].[DimCurrency]WHERE [CurrencyAlternateKey]IN ('ARS', 'AUD', 'BRL', 'CAD', 'CNY', 'DEM', 'EUR', 'FRF', 'GBP', 'JPY', 'MXN', 'SAR', 'USD', 'VEB')
Build Query...
Browse...
Parse Query
Preview...
OK
Cancel
Help

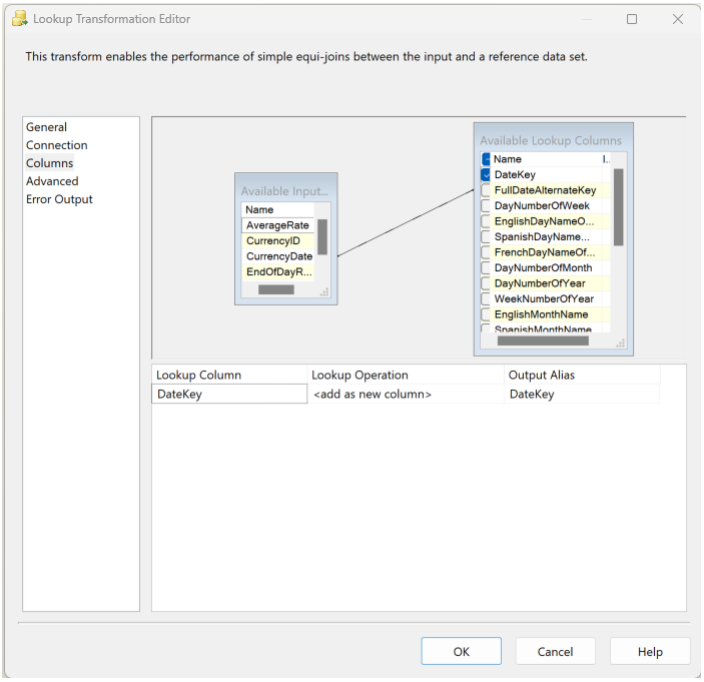

Lookup Transformation Editor
This transform enables the performance of simple equi-joins between the input and a reference data set.
General
Connection
Columns
Advanced
Error Output
Available Input...
Name
AverageRate
CurrencyID
CurrencyDate
Available Lookup Columns
Name
CurrencyKey
CurrencyAlternateKey
Lookup Column
Lookup Operation
Output Alias
CurrencyKey
<add as new column>
CurrencyKey
OK
Cancel
Help

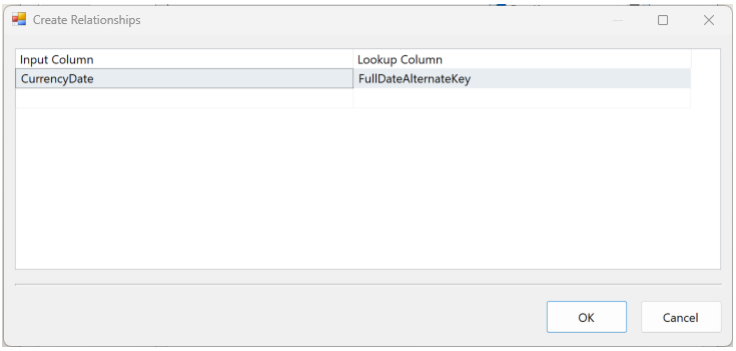

Create Relationships
Input Column
Lookup Column
CurrencyID
CurrencyAlternateKey
OK
Cancel

```
SELECT * FROM [dbo].[DimCurrency]
WHERE [CurrencyAlternateKey]
IN ('ARS', 'AUD', 'BRL', 'CAD', 'CNY',
        'DEM', 'EUR', 'FRF', 'GBP', 'JPY',
        'MXN', 'SAR', 'USD', 'VEB')
```

新增第二的 Lookup 轉換 CurrencyDate

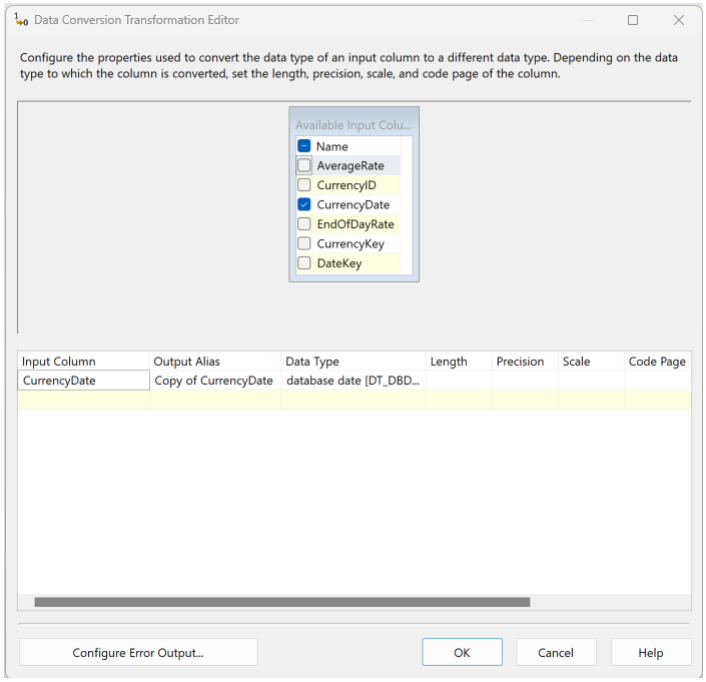



Lookup Transformation Editor
This transform enables the performance of simple equi-joins between the input and a reference data set.
General
Connection
Columns
Advanced
Error Output
Available Input...
Name
AverageRate
CurrencyID
CurrencyDate
EndOfDayR...
Available Lookup Columns
Name
DateKey
FullDateAlternateKey
DayNumberOfWeek
EnglishDayNameO...
SpanishDayName...
FrenchDayNameOf...
DayNumberOfMonth
DayNumberOfYear
WeekNumberOfYear
EnglishMonthName
Lookup Column
Lookup Operation
Output Alias
DateKey
<add as new column>
DateKey
OK
Cancel
Help


Create Relationships
Input Column
Lookup Column
CurrencyDate
FullDateAlternateKey
OK
Cancel

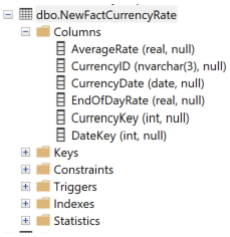
新增資料轉換

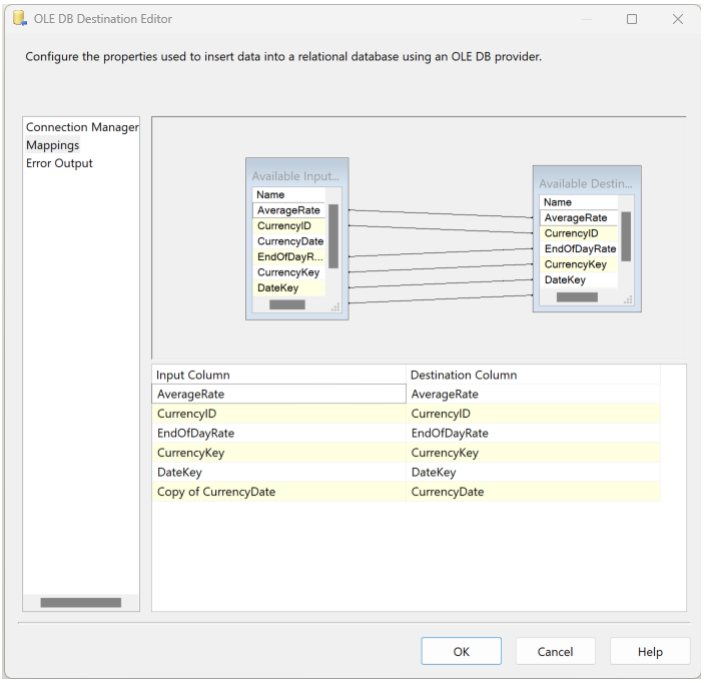

Data Conversion



新增衍生資料行

Step7： 新增 OLE DB 資料目的地





Step8: 測試封裝

新增迴圈

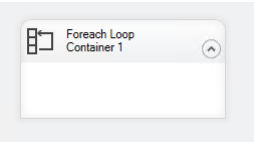
「擷取、轉換和載入」(ETL) 程序通常會從多個一般檔案來源擷取資料。 從多個來源擷取資料需要反覆的控制流程。 MSSQL Integration Services 可以輕鬆地將反覆運算或迴圈新增至套件。

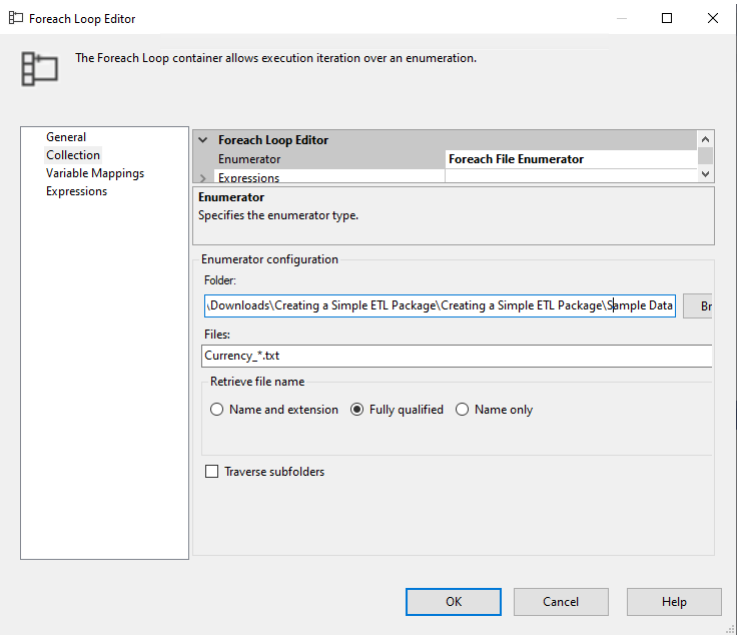
Integration Services 提供兩種類型的容器來循環使用封裝迴圈：Foreach 迴圈容器和 For 迴圈容器。 雖然「Foreach 迴圈」容器通常使用變數運算式，但「Foreach 迴圈」容器會使用列舉值來執行迴圈。 這一課使用 Foreach 迴圈容器。

Step1: 複製 Demo1.dtsx 封裝

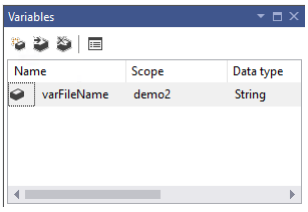
重新命名 Demo2.dtsx

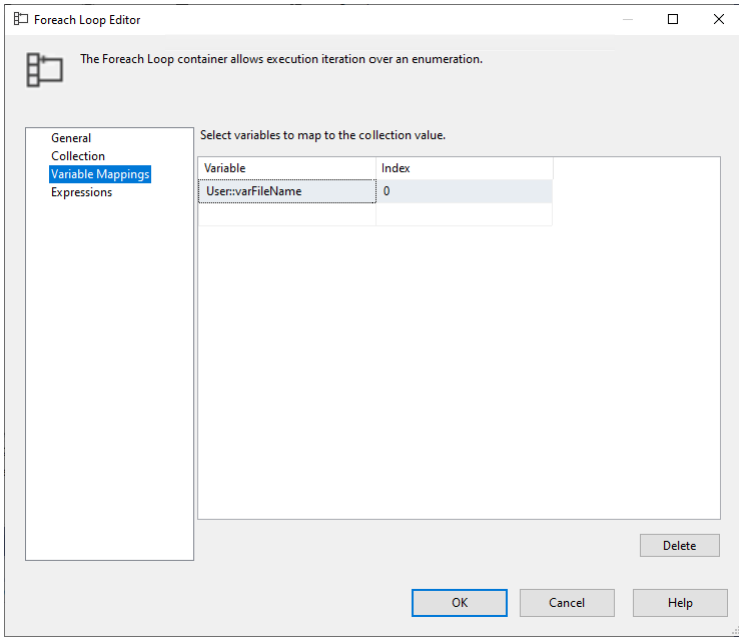
Step2: 設定迴圈



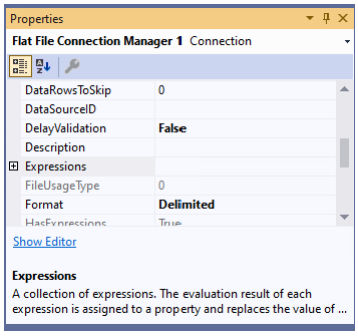


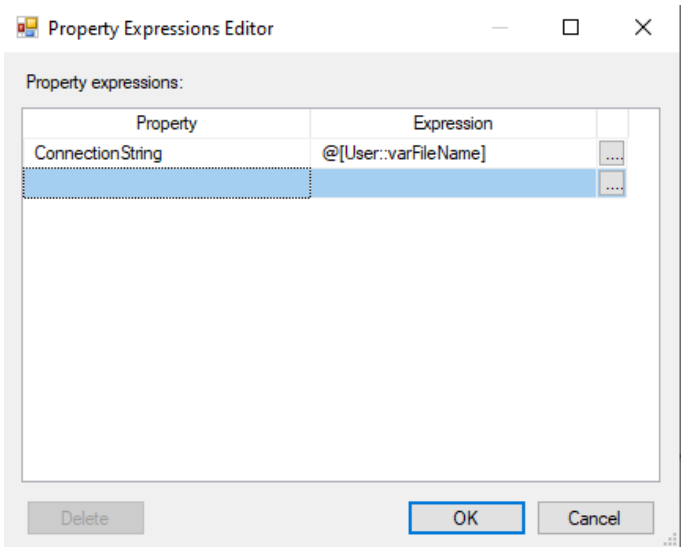
Step3: 新增變數





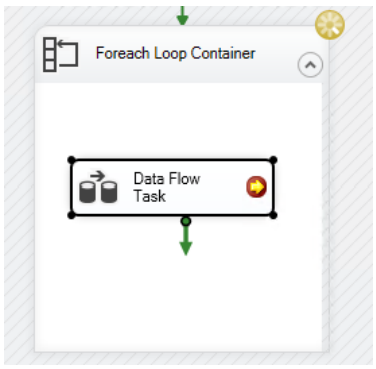
Step4: 修改一般檔案連線管理員

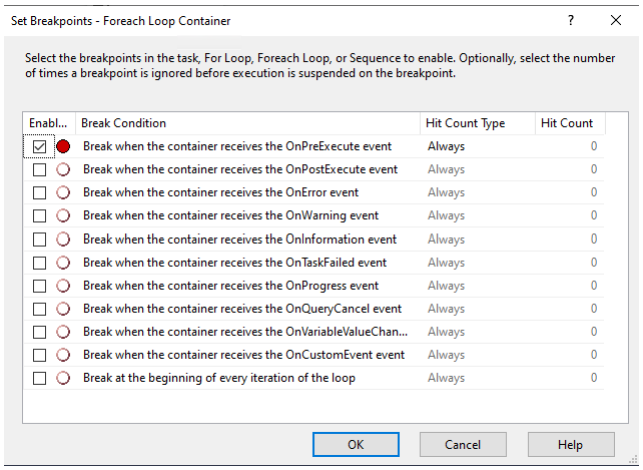


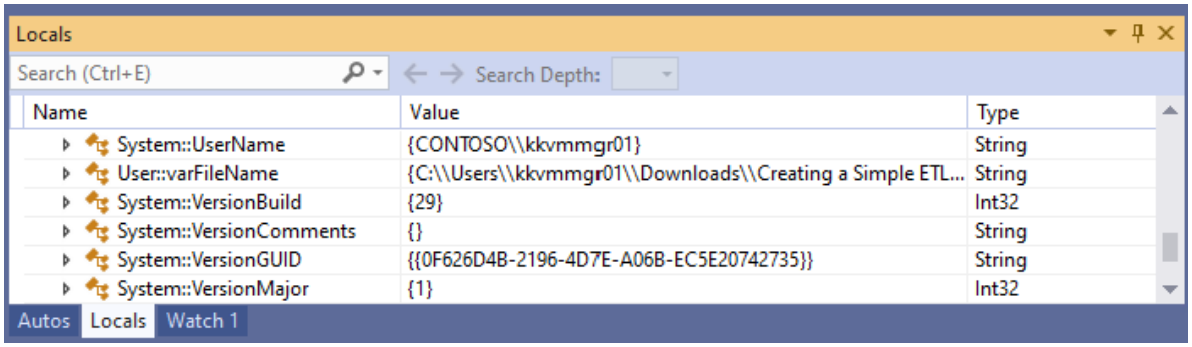


Step5: 測試封裝

Step6: 設定中斷點查看變數







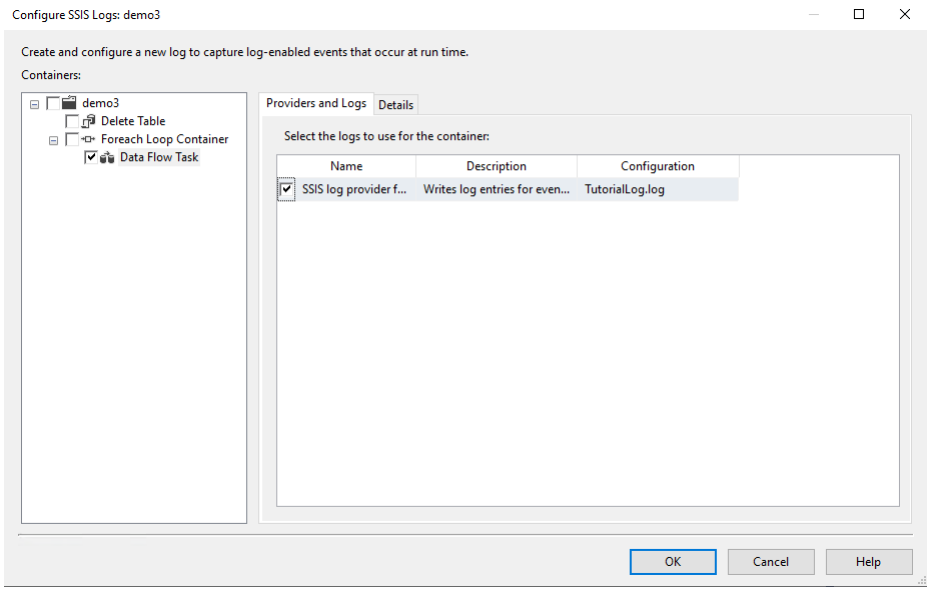
新增紀錄

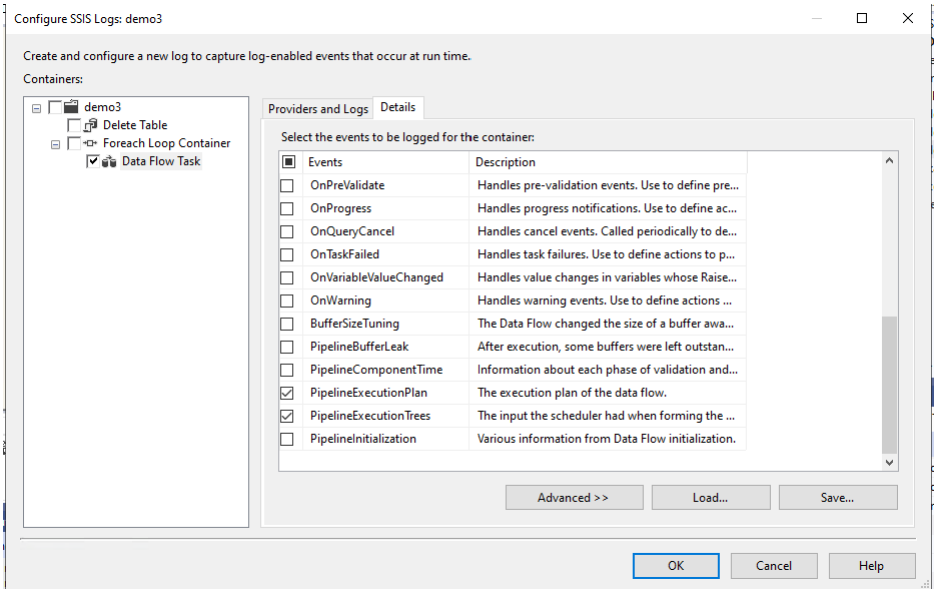
Microsoft Integration Services 包含的記錄功能，可讓您藉由提供工作和容器事件的追蹤，對套件執行進行疑難排解和監視。 記錄功能是具有彈性的。 您可以在套件層級啟用記錄功能，也可以在套件內的個別工作或容器上啟用記錄功能。 您可以選取要記錄哪些事件，以及針對單一套件建立多個記錄。

Step1： 複製 demo2.dtsx

重新命名 demo3.dtsx

Step2： 新增 Logging





Step3： 測試封裝

新增錯誤流程導向

為了處理可能在轉換過程中發生的錯誤，Microsoft Integration Services 可讓您針對每個元件和每個資料行，決定要如何處理 Integration Services 無法轉換的資料。 您可以選擇忽略特定資料行的失敗、將整個失敗的資料列重新導向，或讓該元件失敗。

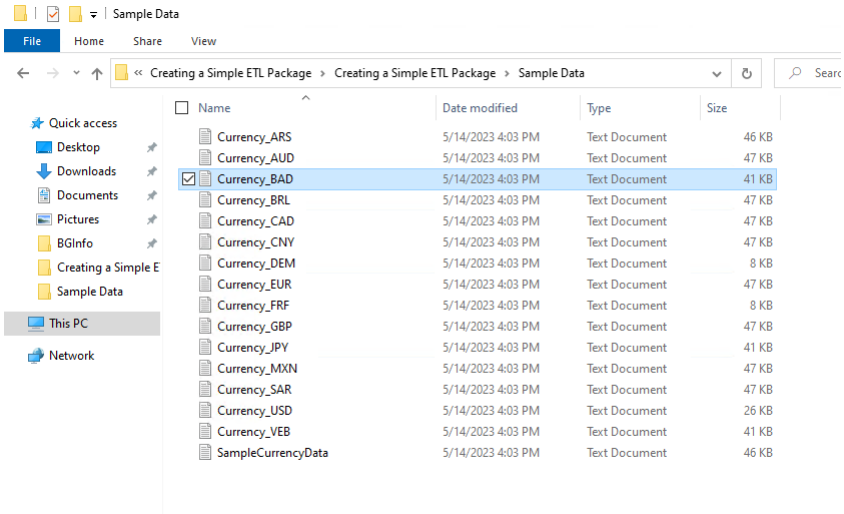
根據預設，Integration Services 中的元件會設定為在發生錯誤時失敗。 失敗的元件會進而造成套件失敗，接著處理就會停止。

您可以設定和處理可能發生的處理錯誤，而不要讓失敗停止套件執行。 其中一個選項是忽略全部失敗，讓您的套件一律執行成功。 您也可以將失敗的資料列重新導向到另一個處理路徑，以便在該處保存、檢查或重新處理資料和錯誤。

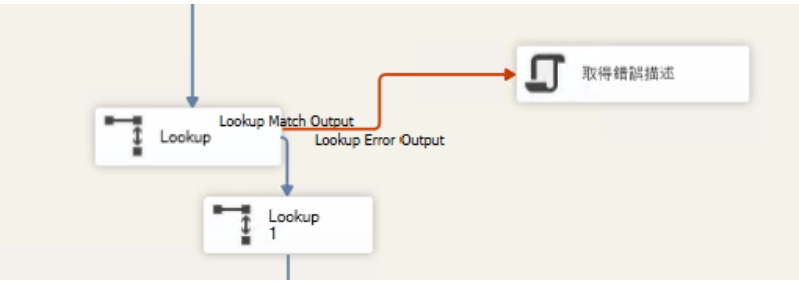
Step1： 複製 demo3.dtsx

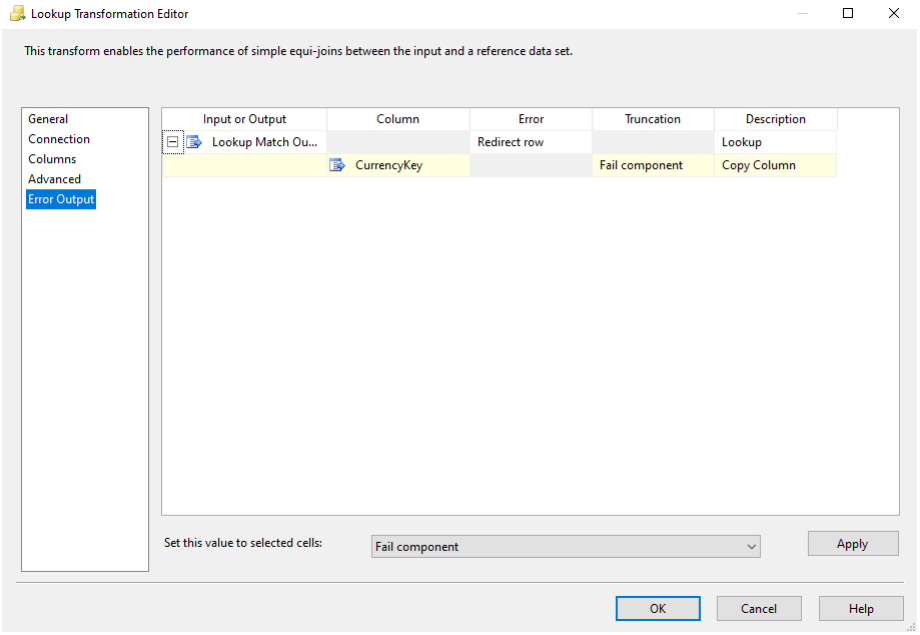
重新命名 demo4.dtsx

Step2： 複製損毀的檔案

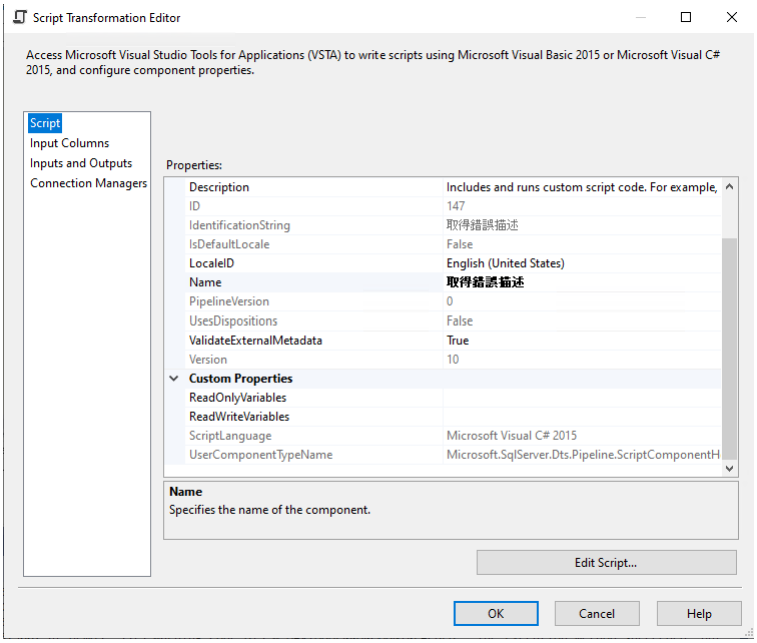


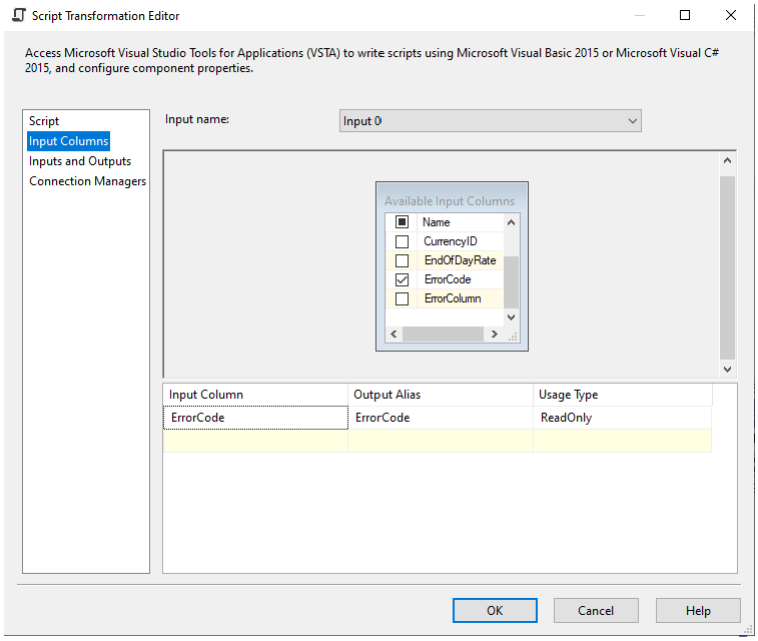
Step3： 新增錯誤導向流程

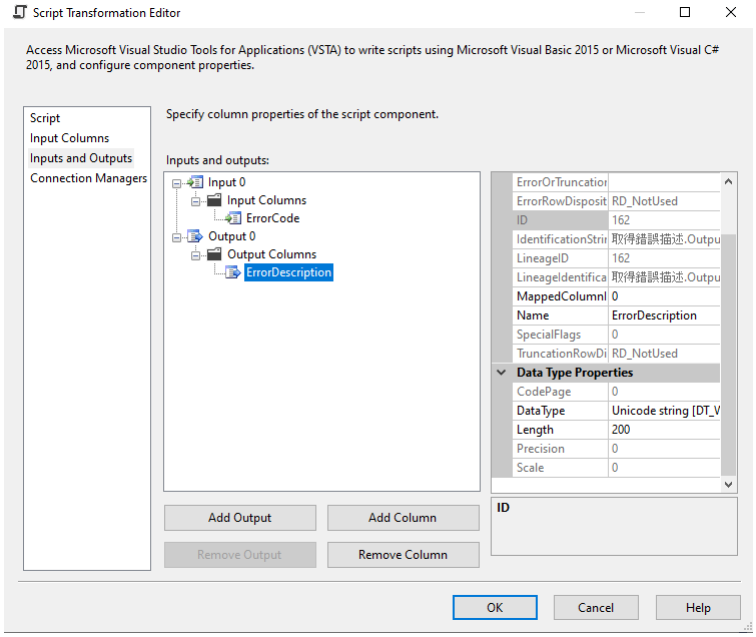


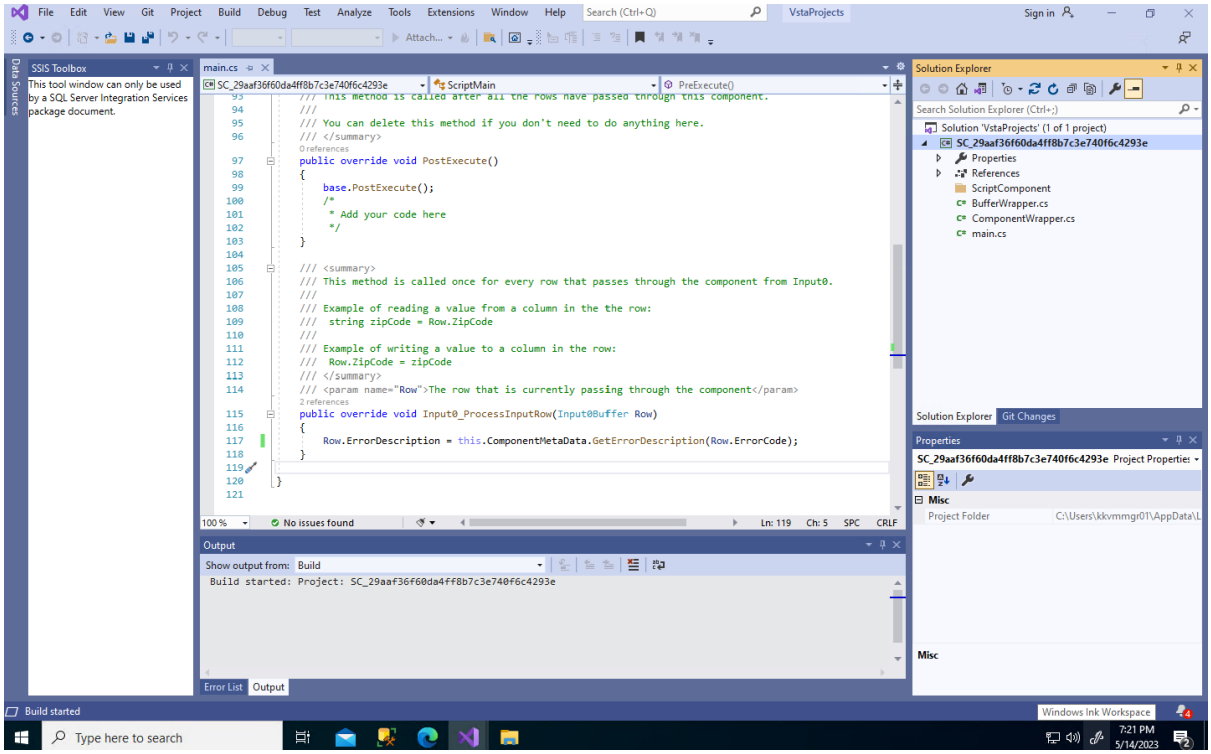


Step4: 新增取得錯誤描述



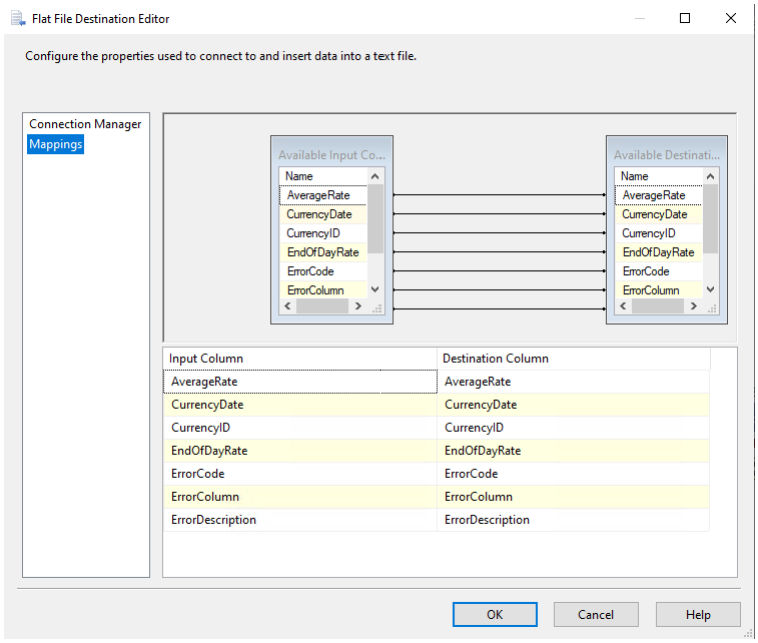

Script Transformation Editor
Access Microsoft Visual Studio Tools for Applications (VSTA) to write scripts using Microsoft Visual Basic 2015 or Microsoft Visual C# 2015, and configure component properties.
Script
Input Columns
Inputs and Outputs
Connection Managers
Input name:
Input 0
Available Input Columns
Name
CurrencyID
EndOfDayRate
ErrorCode
ErrorColumn
Input Column
Output Alias
Usage Type
ErrorCode
ErrorCode
ReadOnly
OK
Cancel
Help


Script Transformation Editor
Access Microsoft Visual Studio Tools for Applications (VSTA) to write scripts using Microsoft Visual Basic 2015 or Microsoft Visual C# 2015, and configure component properties.
Script
Input Columns
Inputs and Outputs
Connection Managers
Specify column properties of the script component.
Inputs and outputs:
Input 0
Input Columns
ErrorCode
Output 0
Output Columns
ErrorDescription
Name
ErrorDescription
Data Type Properties
DataType
Unicode string [DT_V
Length
200
ID
Add Output
Add Column
Remove Output
Remove Column
OK
Cancel
Help




```
Row.ErrorDescription =
this.ComponentMetaData.GetErrorDescription(Row.ErrorCode);
```

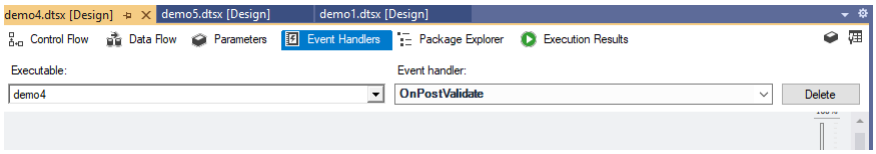
Step5: 新增 Error Data



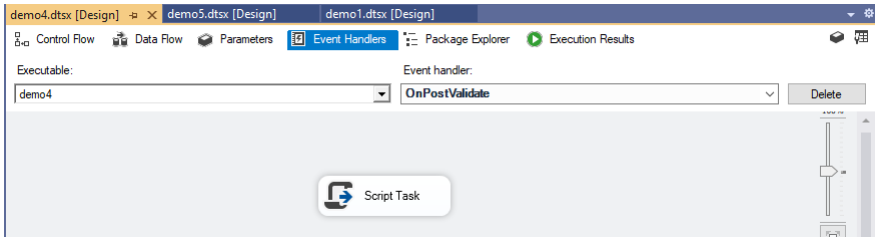
Step6: 測試封裝

新增事件處理

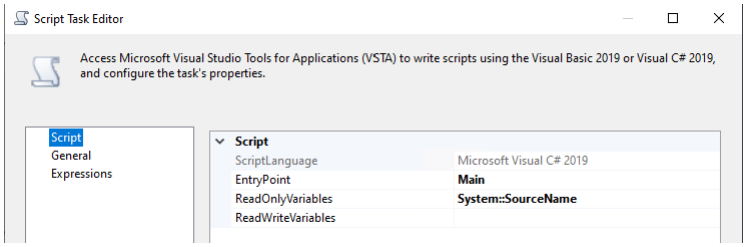
Step1: 新增事件處理



Step2: 新增 Script Task



新增 ReadOnly Variables : SourceName



Step3: 顯示訊息

MessageBox.Show("OnPostValidate: SourceName [" + Dts.Variables["System::SourceName"].Value + "]");

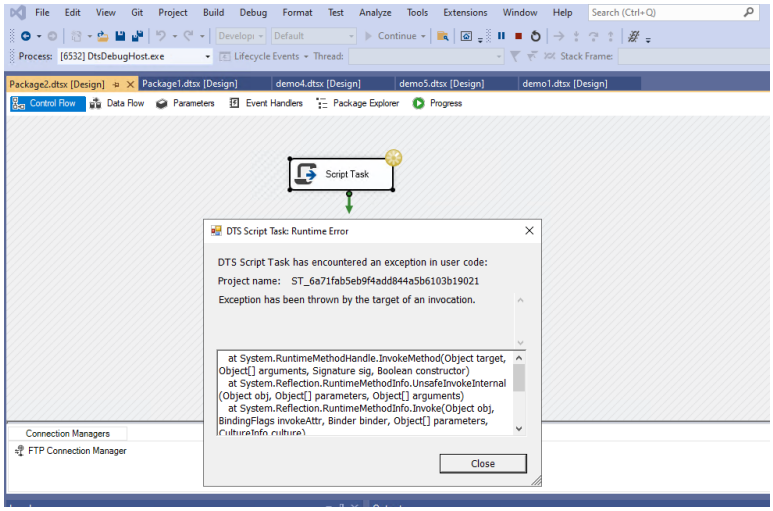
```
public void Main()
{
    // TODO: Add your code here
    //System::SourceName,System::CreatorName
    MessageBox.Show("OnPostValidate: SourceName [" + Dts.Variables["System::SourceName"].Value + "]");
    Dts.TaskResult = (int)ScriptResults.Success;
}
```

Step4: 執行封裝

新增指令碼錯誤訊息

Step1: 新增 demo6.dtsx

Step2: 新增一個有 Runtime Error 指令碼



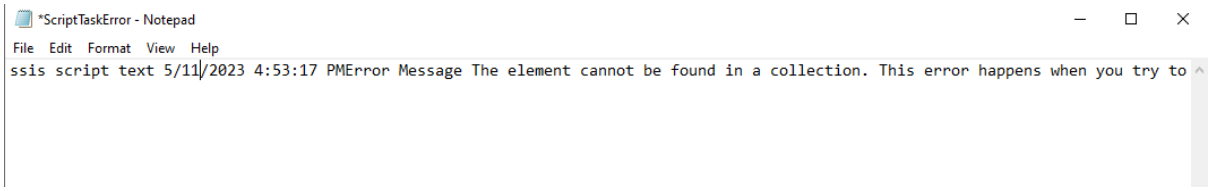

```
public void Main()
        {
          // TODO: Add your code here
         String bb = Dts.Variables["aa"].Value.ToString();
             Dts.TaskResult = (int)ScriptResults.Success;
          }

      }
```

Step2: 新增 Try Catch 指令

```
public void Main()
        {
          // TODO: Add your code here
          try
          {

             String bb = Dts.Variables["aa"].Value.ToString();
             Dts.TaskResult = (int)ScriptResults.Success;
          }
          catch (Exception ex)
          {
             File.AppendAllText(@"C:\Users\kkvmmgr01\Downloads\Creating a Simple ETL
```

```
Package\Creating a Simple ETL Package\ScriptTaskError.txt", "ssis script text " +
DateTime.Now.ToString() + "Error Message "+ ex.Message + Environment.NewLine);

            }

        }
```

Step3: 執行封裝查看 ScriptTaskError.txt



新增連線字串加密

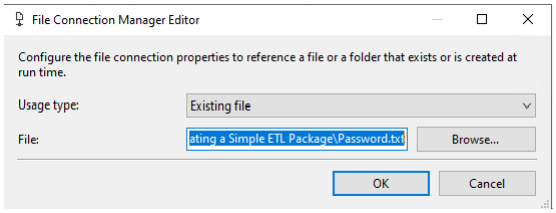
Step1: 複製 demo4.dtsx

重新命名 demo5.dtsx

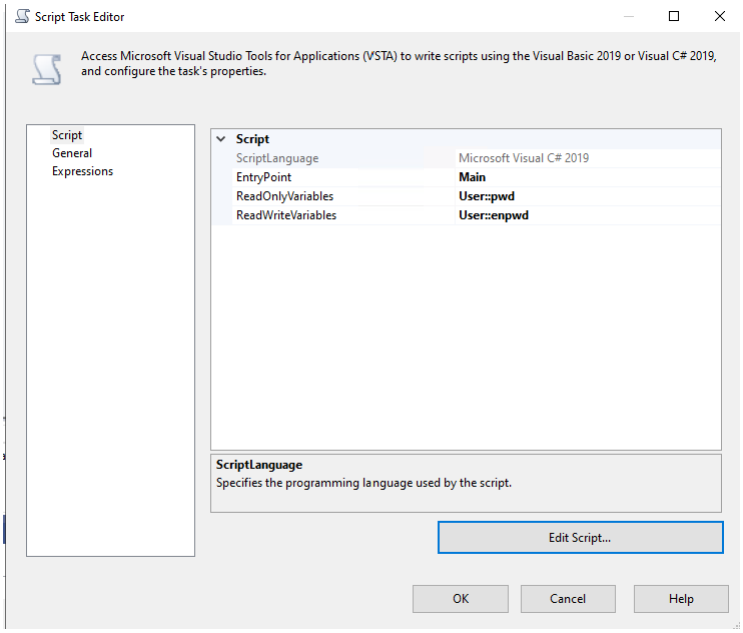
Step2: 新增參數

String : pwd = p@ssword, enpwd, connectionName = localhost, connectionString

Step3: 新增檔案存密碼



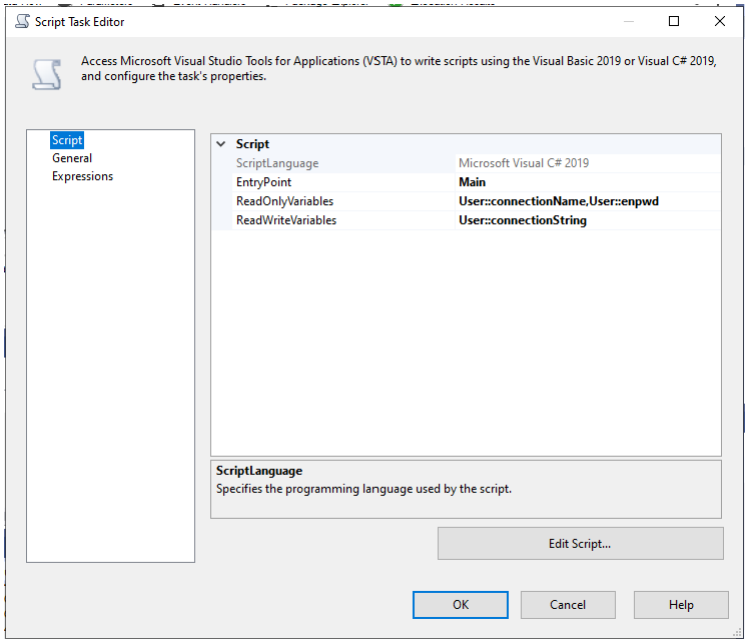
Step4 : 新增 Script Task 加密(AES256 加密程式)




```
using System.Security.Cryptography;
using System.Text;
public void Main()
        {
          // TODO: Add your code here

          string pwd = (string)Dts.Variables["pwd"].Value;
          string enpwd = Encryption(pwd);
          Dts.Variables["enpwd"].Value = enpwd;
          ConnectionManager cm = Dts.Connections["Password.txt"];
          var outputFile = cm.ConnectionString;
          System.IO.File.WriteAllText(outputFile, enpwd);
          Dts.TaskResult = (int)ScriptResults.Success;
        }
  public string Encryption(string PlainText)
      {
          using (Aes aesAlg = Aes.Create())
          {
              //加密金鑰(32 Byte)
              aesAlg.Key = Encoding.Unicode.GetBytes("我是金鑰我是機密別和人說我是金鑰
");
              //初始向量(Initial Vector, iv) 類似雜湊演算法中的加密鹽(16 Byte)
              aesAlg.IV = Encoding.Unicode.GetBytes("台塩高級精鹽加碘");
```

```
            //加密器
            ICryptoTransform encryptor = aesAlg.CreateEncryptor(aesAlg.Key,
aesAlg.IV);
            //執行加密
            byte[] encrypted =
encryptor.TransformFinalBlock(Encoding.Unicode.GetBytes(PlainText), 0,
        Encoding.Unicode.GetBytes(PlainText).Length);

            return Convert.ToBase64String(encrypted);
        }
    }
```

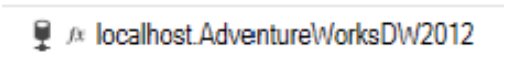
Step5： 新增 Script Task 執行解密




```
using System.Security.Cryptography;
using System.Text;

public void Main()
        {
          // TODO: Add your code here

          string connectionName = (string)Dts.Variables["connectionName"].Value;
          string enpwd = (string)Dts.Variables["enpwd"].Value;
          string pwd = Decryption(enpwd);
```

```
            string connectionString = $"Data Source={connectionName};Initial
Catalog=AdventureWorksDW2012;Provider=SQLOLEDB.1;User ID=sa;Password={pwd};Auto
Translate=False;";

            Dts.Variables["connectionString"].Value = connectionString;
            Dts.TaskResult = (int)ScriptResults.Success;
          }
    public string Decryption(string CipherText)
        {
            using (Aes aesAlg = Aes.Create())
            {
                //加密金鑰(32 Byte)
                aesAlg.Key = Encoding.Unicode.GetBytes("我是金鑰我是機密別和人說我是金鑰
");
                //初始向量(Initial Vector, iv) 類似雜湊演算法中的加密鹽(16 Byte)
                aesAlg.IV = Encoding.Unicode.GetBytes("台塩高級精鹽加碘");
                //加密器
                ICryptoTransform decryptor = aesAlg.CreateDecryptor(aesAlg.Key,
aesAlg.IV);
                //執行解密
                byte[] decrypted =
decryptor.TransformFinalBlock(Convert.FromBase64String(CipherText), 0,
Convert.FromBase64String(CipherText).Length);
                return Encoding.Unicode.GetString(decrypted);
            }
        }
```

Step6： 編輯連線管理員



Step6： 測試封裝

參考資料

https://learn.microsoft.com/zh-tw/sql/integration-services/ssis-how-to-create-an-etl-package?view=sql-server-ver16

https://ithelp.ithome.com.tw/articles/10187947

https://learn.microsoft.com/en-us/sql/integration-services/extending-packages-scripting-task-examples/script-task-examples?view=sql-server-ver16