

# SSIS Workshop Lab Guide

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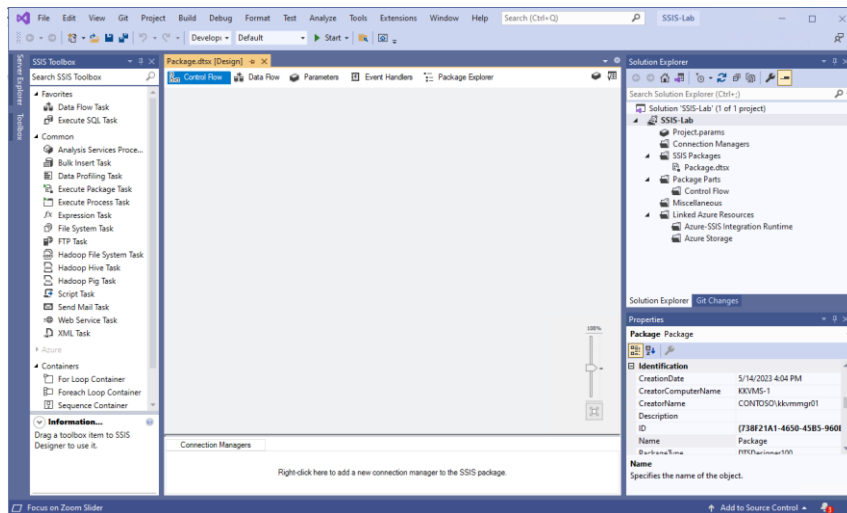
## 環境設置

- 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

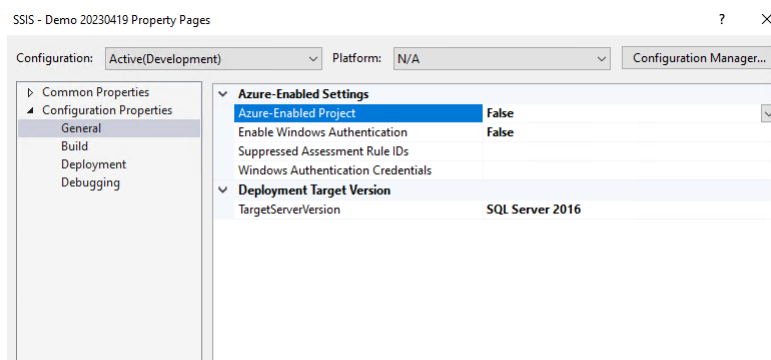
## 建立專案與基本套件

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**

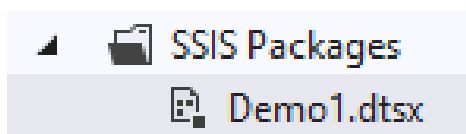
## Step1: 新增專案和建立封包



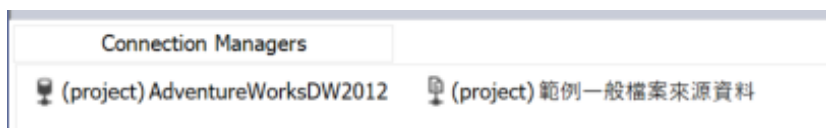
## 切換 TargetServerVersion SQL Server 2016



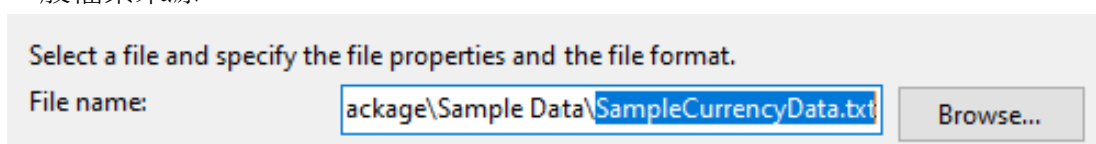
## Demo1.dtsx



## 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: Flat File Connection Manager

Description:

General Columns Advanced Preview

Configure the properties of each column.

AverageRate CurrencyID CurrencyDate EndOfDayRate

Misc

Name AverageRate

ColumnDelimiter Tab (t)

ColumnType Delimited

InputColumnWidth 0

DataPrecision 0

DataScale 0

DataType float [DT\_R4]

OutputColumnWidth 0

TextQualified True

New Delete Suggest Types...

OK Cancel Help

Flat File Connection Manager Editor

Connection manager name: Flat File Connection Manager

Description:

General Columns Advanced Preview

Configure the properties of each column.

AverageRate CurrencyID CurrencyDate EndOfDayRate

Misc

Name CurrencyID

ColumnDelimiter Tab (t)

ColumnType Delimited

InputColumnWidth 0

DataPrecision 0

DataScale 0

DataType Unicode string [DT\_WSTR]

OutputColumnWidth 3

TextQualified True

New Delete Suggest Types...

OK Cancel Help

Flat File Connection Manager Editor

Connection manager name: Flat File Connection Manager

Description:

General Columns Advanced Preview

Configure the properties of each column.

AverageRate CurrencyID CurrencyDate EndOfDayRate

Misc

Name CurrencyDate

ColumnDelimiter Tab (t)

ColumnType Delimited

InputColumnWidth 0

DataPrecision 0

DataScale 0

DataType database date [DT\_DBDA]

OutputColumnWidth 0

TextQualified True

New Delete Suggest Types...

OK Cancel Help

Flat File Connection Manager Editor

Connection manager name: Flat File Connection Manager

Description:

General Columns Advanced Preview

Configure the properties of each column.

AverageRate CurrencyID CurrencyDate EndOfDayRate

Misc

Name EndOfDayRate

ColumnDelimiter (LF)

ColumnType Delimited

InputColumnWidth 0

DataPrecision 0

DataScale 0

DataType float [DT\_R4]

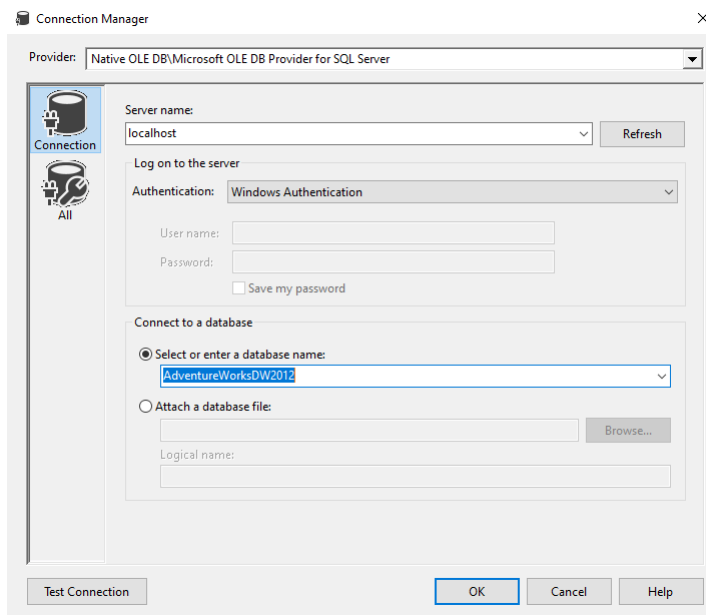
OutputColumnWidth 0

TextQualified True

New Delete Suggest Types...

OK Cancel Help

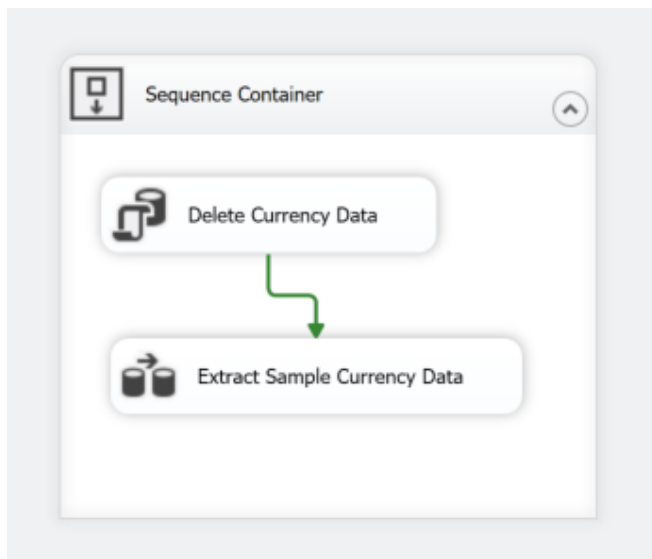
### Step3: 建立 OLE DB 連線管理員



### 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



Execute SQL Task Editor

Configure the properties required to run SQL statements and stored procedures using the selected connection.

General  
Parameter Mapping  
Result Set  
Expressions

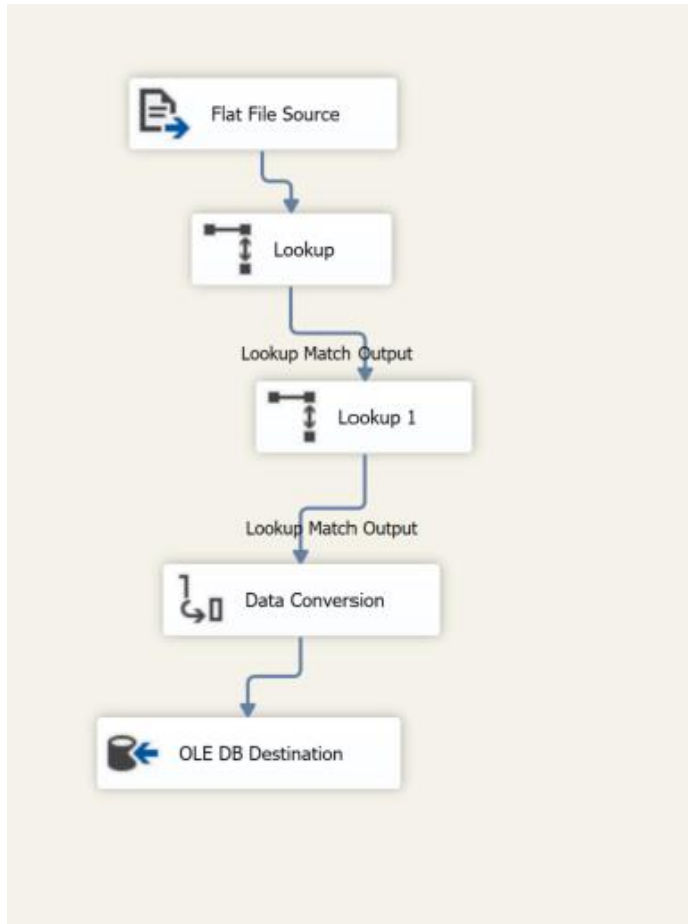
<b>General</b>	
Name	Delete Currency Data
Description	Execute SQL Task
<b>Options</b>	
TimeOut	0
CodePage	1252
TypeConversionMode	Allowed
<b>Result Set</b>	
ResultSet	None
<b>SQL Statement</b>	
ConnectionType	OLE DB
Connection	AdventureWorksDW2012
SQLSourceType	Direct input
SQLStatement	delete FROM [AdventureWorksDW2012].[db
IsQueryStoredProcedure	False
BypassPrepare	True

**Name**  
Specifies the name of the task.

Browse... Build Query... Parse Query

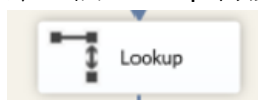
OK Cancel Help

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	Lookup Column
CurrencyKey	CurrencyKey
CurrencyAlternateKey	CurrencyAlternateKey

Lookup Column: CurrencyKey  
Lookup Operation: <add as new column>  
Output Alias: CurrencyKey

OK Cancel Help

Create Relationships

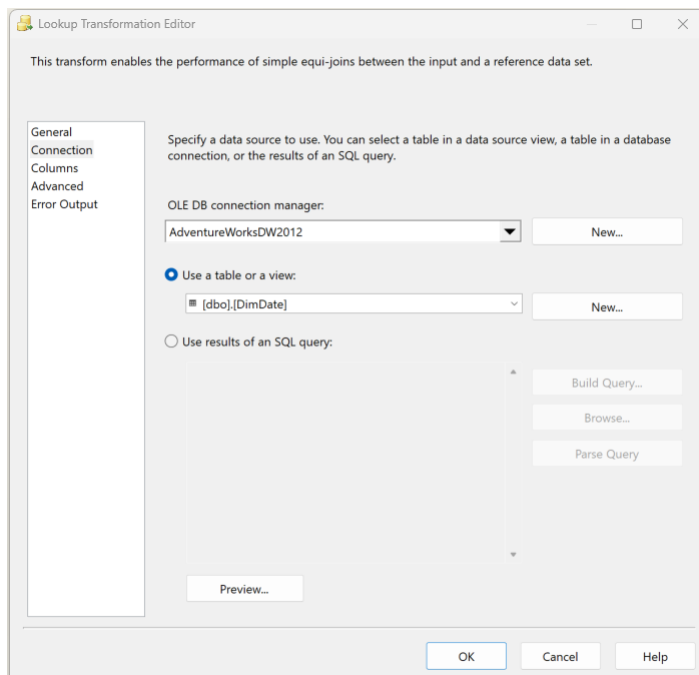
Input Column	Lookup Column
CurrencyID	CurrencyAlternateKey

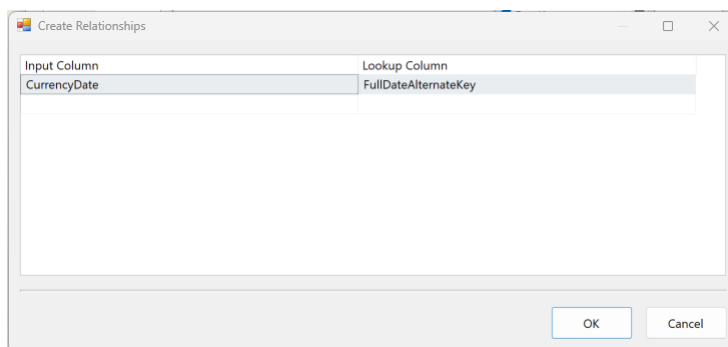
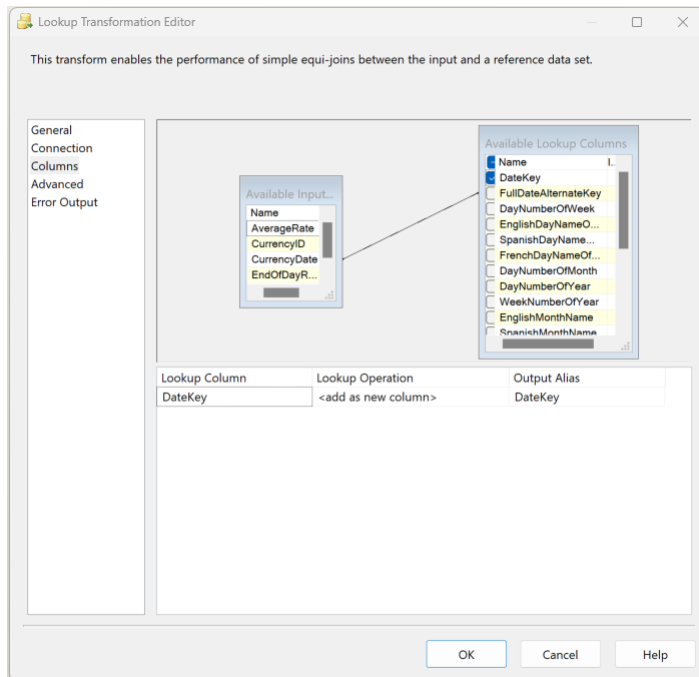
OK Cancel



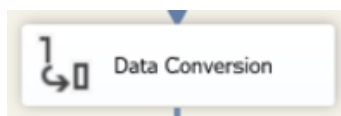
```
SELECT * FROM [dbo].[DimCurrency]
WHERE [CurrencyAlternateKey]
IN ('ARS', 'AUD', 'BRL', 'CAD', 'CNY',
    'DEM', 'EUR', 'FRF', 'GBP', 'JPY',
    'MXN', 'SAR', 'USD', 'VEB')
```

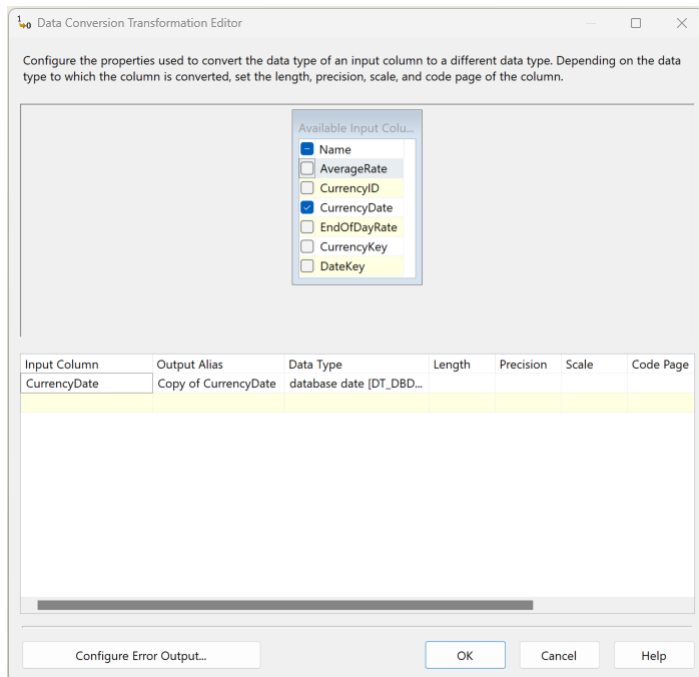
## 新增第二的 Lookup 轉換 CurrencyDate



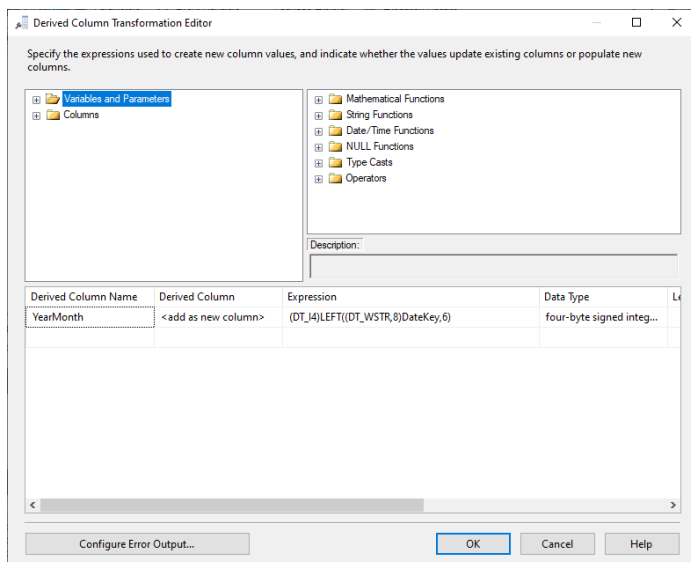


新增資料轉換

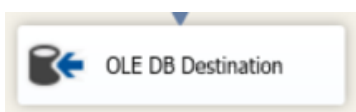


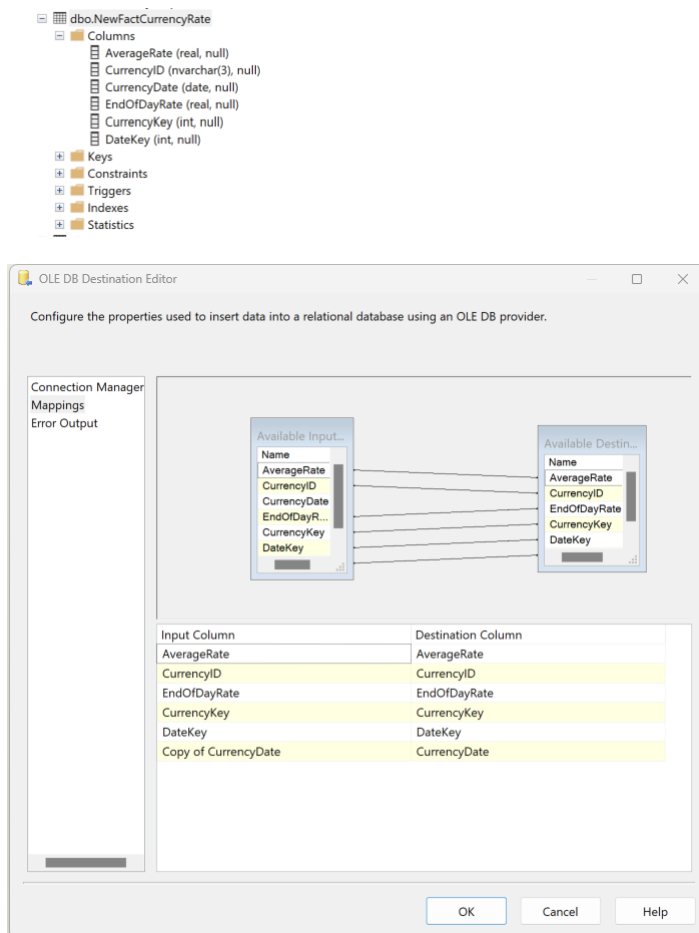


## 新增衍生資料行



## Step7：新增 OLE DB 資料目的地





## Step8: 測試封裝

## 新增迴圈

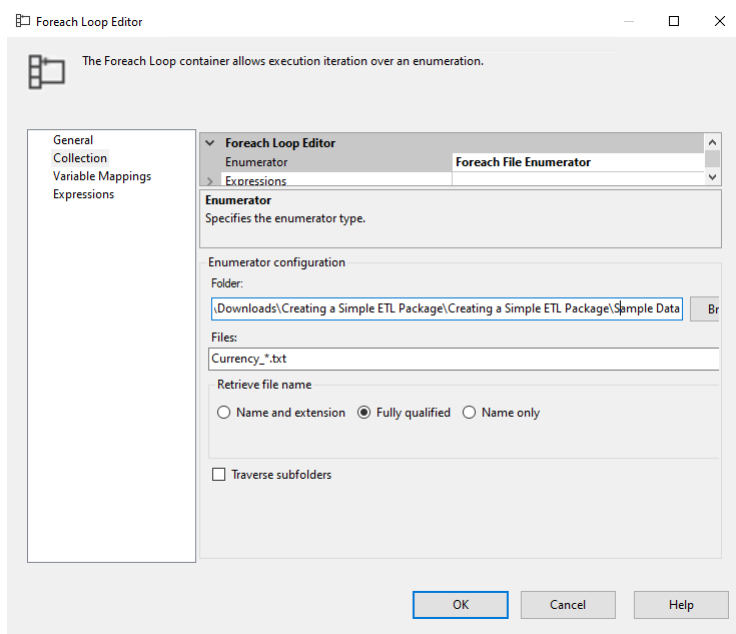
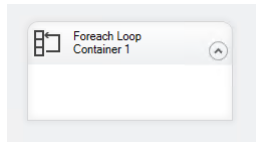
「擷取、轉換和載入」(ETL) 程序通常會從多個一般檔案來源擷取資料。從多個來源擷取資料需要反覆的控制流程。MSSQL Integration Services 可以輕鬆地將反覆運算或迴圈新增至套件。

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。

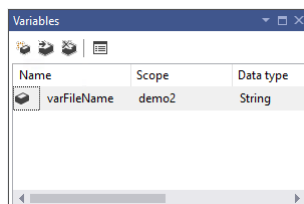
Step1: 複製 Demo1.dtsx 封裝

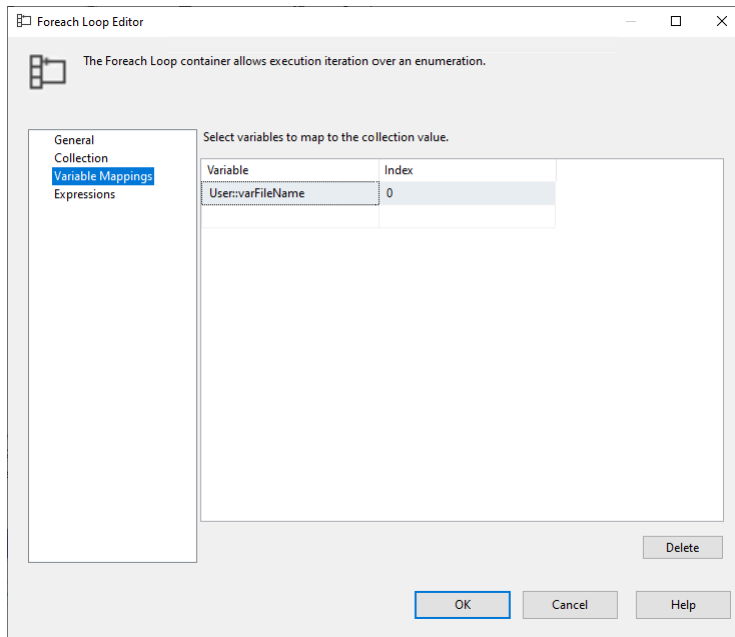
重新命名 Demo2.dtsx

Step2: 設定迴圈

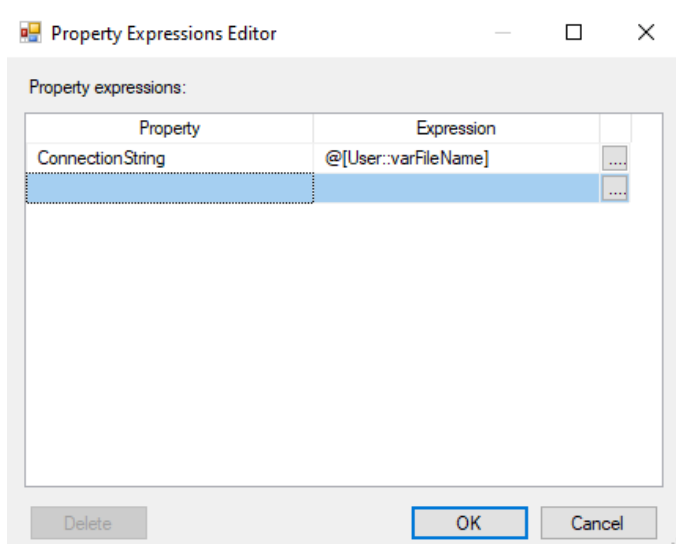
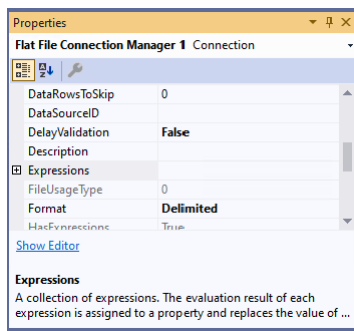


Step3: 新增變數



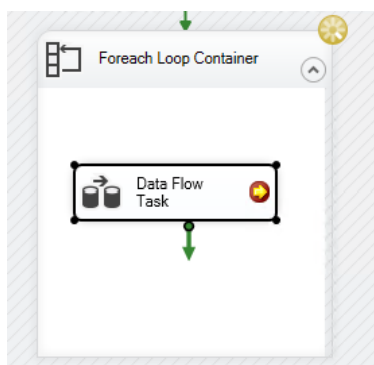


#### Step4: 修改一般檔案連線管理員



#### Step5: 測試封裝

#### Step6: 設定中斷點查看變數



Set Breakpoints - Foreach Loop Container

Select the breakpoints in the task, For Loop, Foreach Loop, or Sequence to enable. Optionally, select the number of times a breakpoint is ignored before execution is suspended on the breakpoint.

Enabl...	Break Condition	Hit Count Type	Hit Count
<input checked="" type="checkbox"/>	Break when the container receives the OnPreExecute event	Always	0
<input type="checkbox"/>	Break when the container receives the OnPostExecute event	Always	0
<input type="checkbox"/>	Break when the container receives the OnError event	Always	0
<input type="checkbox"/>	Break when the container receives the OnWarning event	Always	0
<input type="checkbox"/>	Break when the container receives the OnInformation event	Always	0
<input type="checkbox"/>	Break when the container receives the OnTaskFailed event	Always	0
<input type="checkbox"/>	Break when the container receives the OnProgress event	Always	0
<input type="checkbox"/>	Break when the container receives the OnQueryCancel event	Always	0
<input type="checkbox"/>	Break when the container receives the OnVariableValueChan...	Always	0
<input type="checkbox"/>	Break when the container receives the OnCustomEvent event	Always	0
<input type="checkbox"/>	Break at the beginning of every iteration of the loop	Always	0

OK Cancel Help

Locals

Search (Ctrl+E) Search Depth:

Name	Value	Type
System::UserName	{CONTOSO\\kkvmmgr01}	String
User::varFileName	{C:\\Users\\kkvmmgr01\\Downloads\\Creating a Simple ETL...	String
System::VersionBuild	{29}	Int32
System::VersionComments	{}	String
System::VersionGUID	{{0F626D4B-2196-4D7E-A06B-EC5E20742735}}	String
System::VersionMajor	{1}	Int32

Autos Locals Watch 1

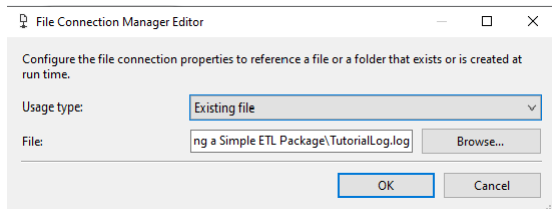
## 新增紀錄

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

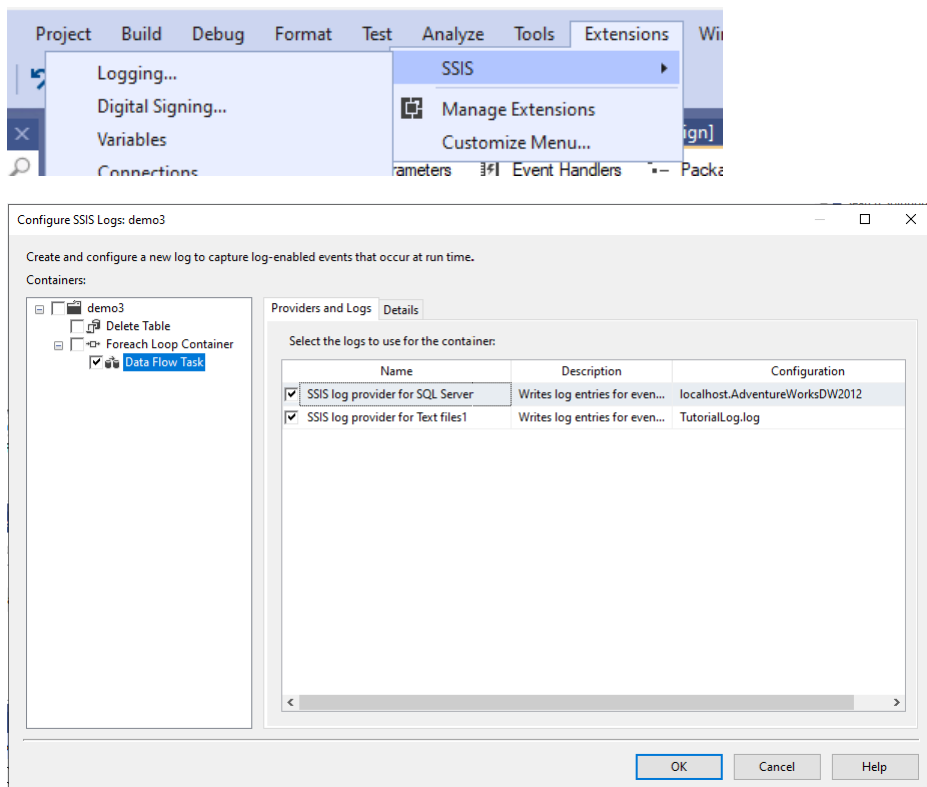
重新命名 demo3.dtsx

## Step2: 新增 TutorialLog.log

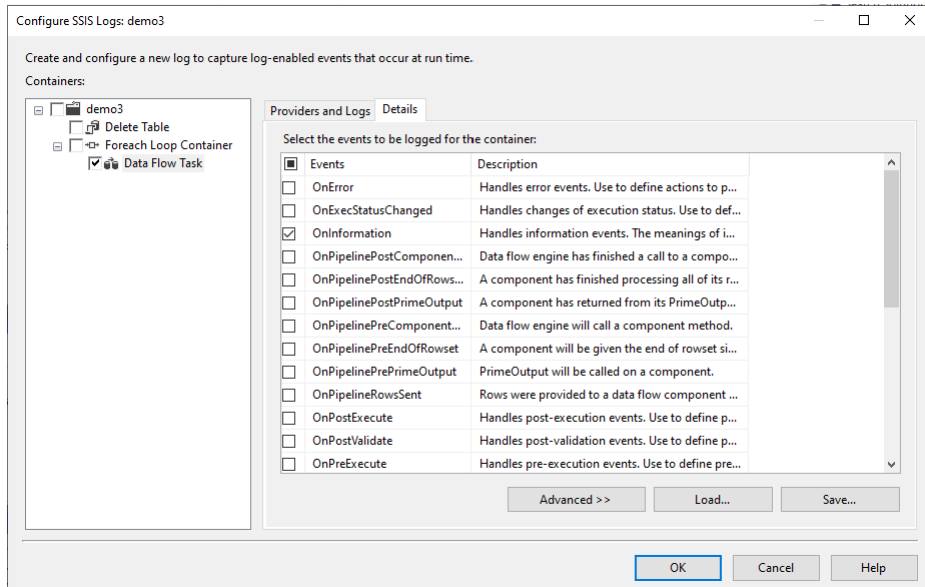


TutorialLog.log

## Step3: 新增 Logging Configuration

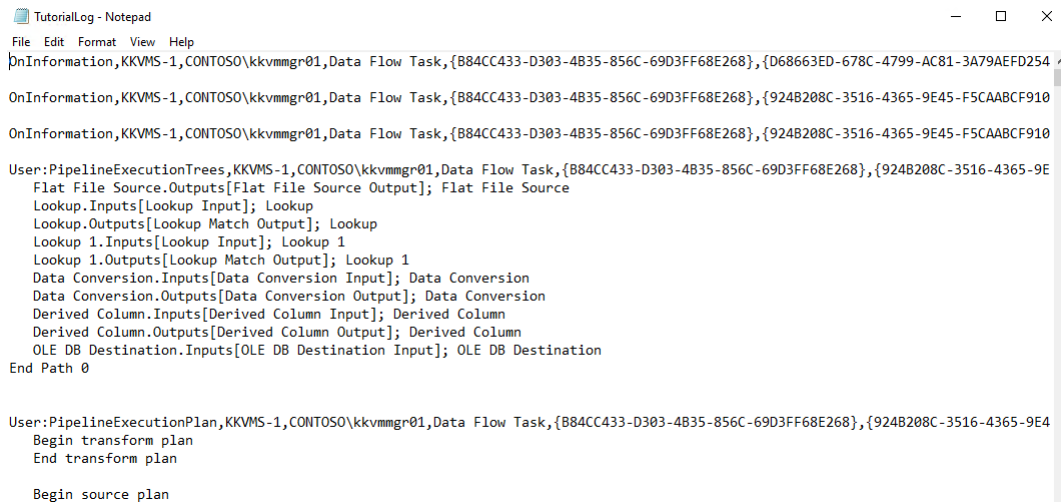


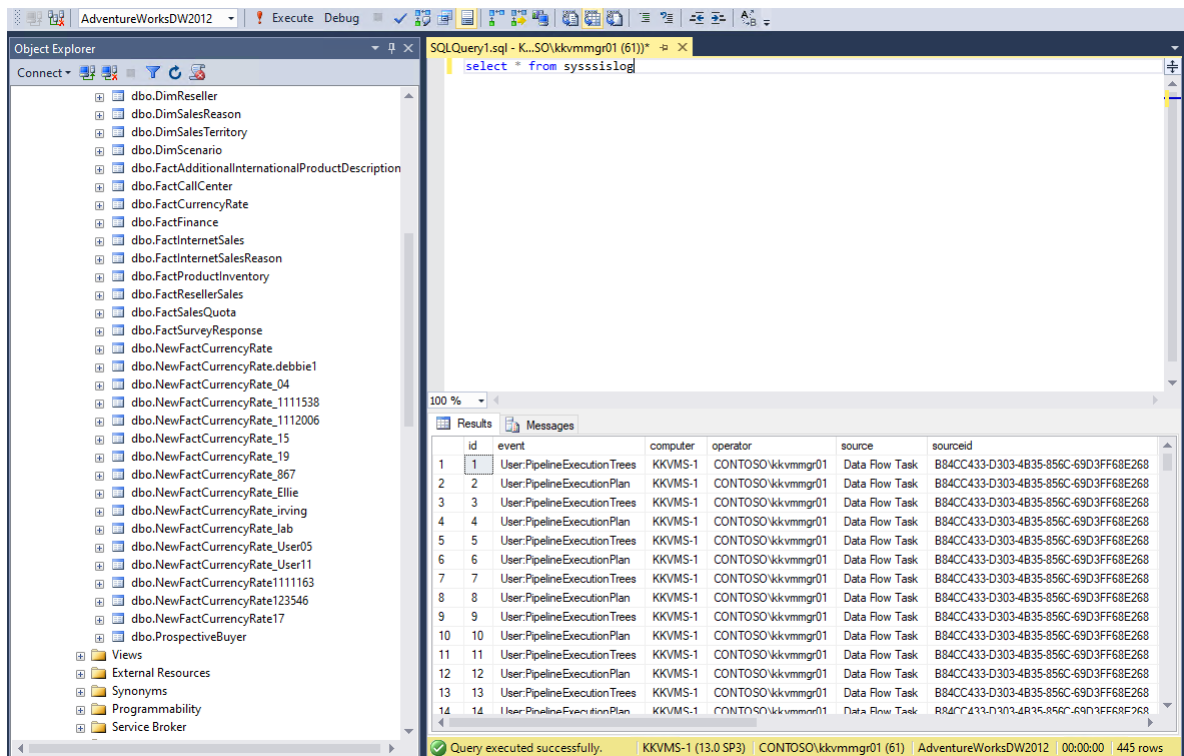




## Step4: 測試封裝

## Step5: 檢查 Log





## 新增錯誤流程導向

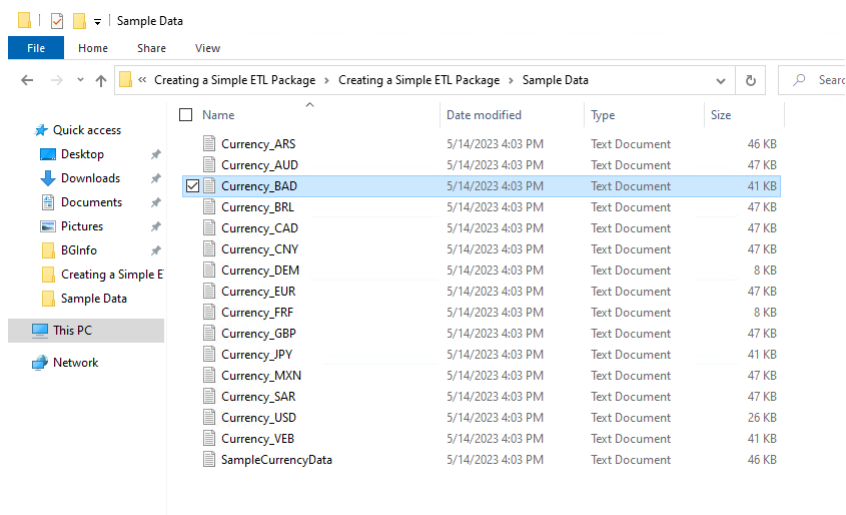
為了處理可能在轉換過程中發生的錯誤，Microsoft Integration Services 可讓您針對每個元件和每個資料行，決定要如何處理 Integration Services 無法轉換的資料。您可以選擇忽略特定資料行的失敗、將整個失敗的資料列重新導向，或讓該元件失敗。根據預設，Integration Services 中的元件會設定為在發生錯誤時失敗。失敗的元件會進而造成套件失敗，接著處理就會停止。

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。

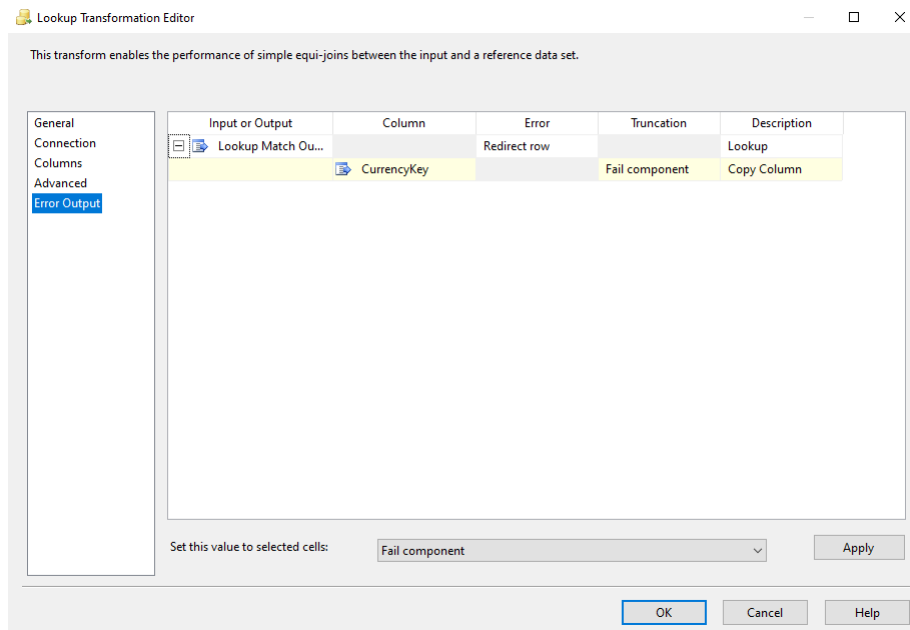
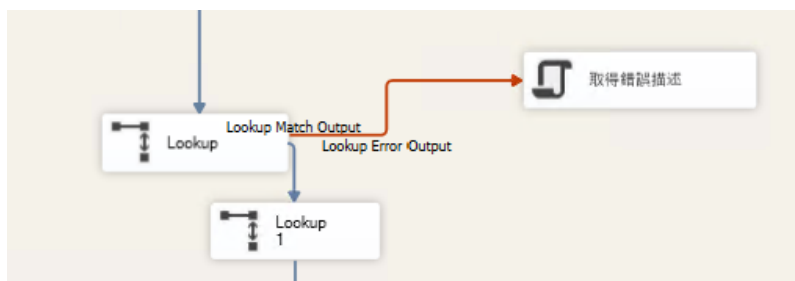
### Step1：複製 demo3.dtsx

重新命名 demo4.dtsx

### Step2：複製損毀的檔案

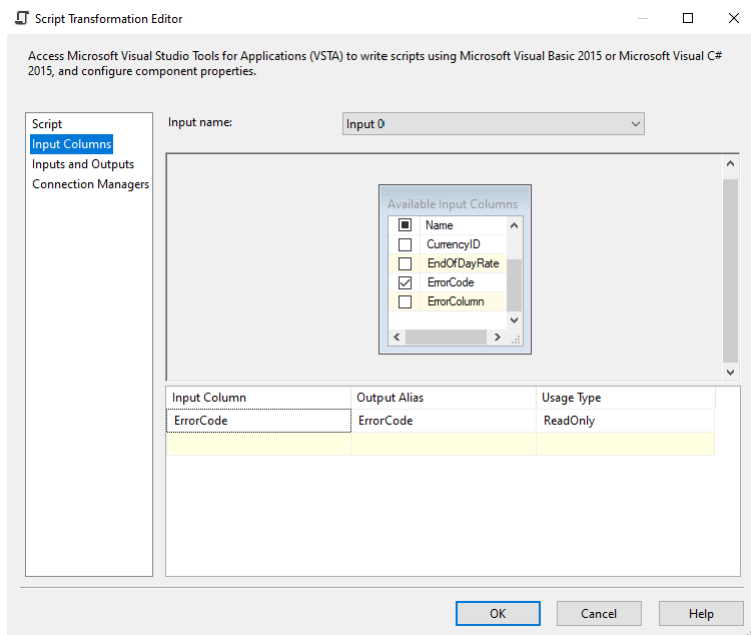
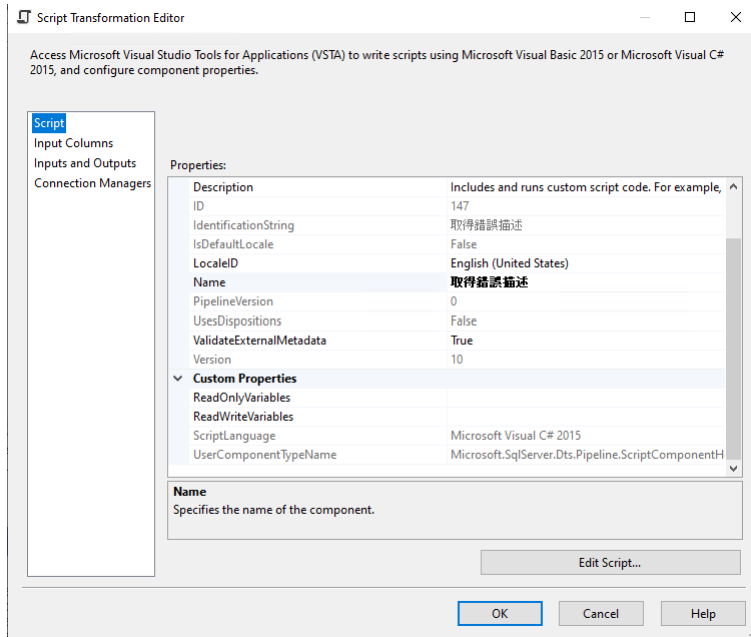


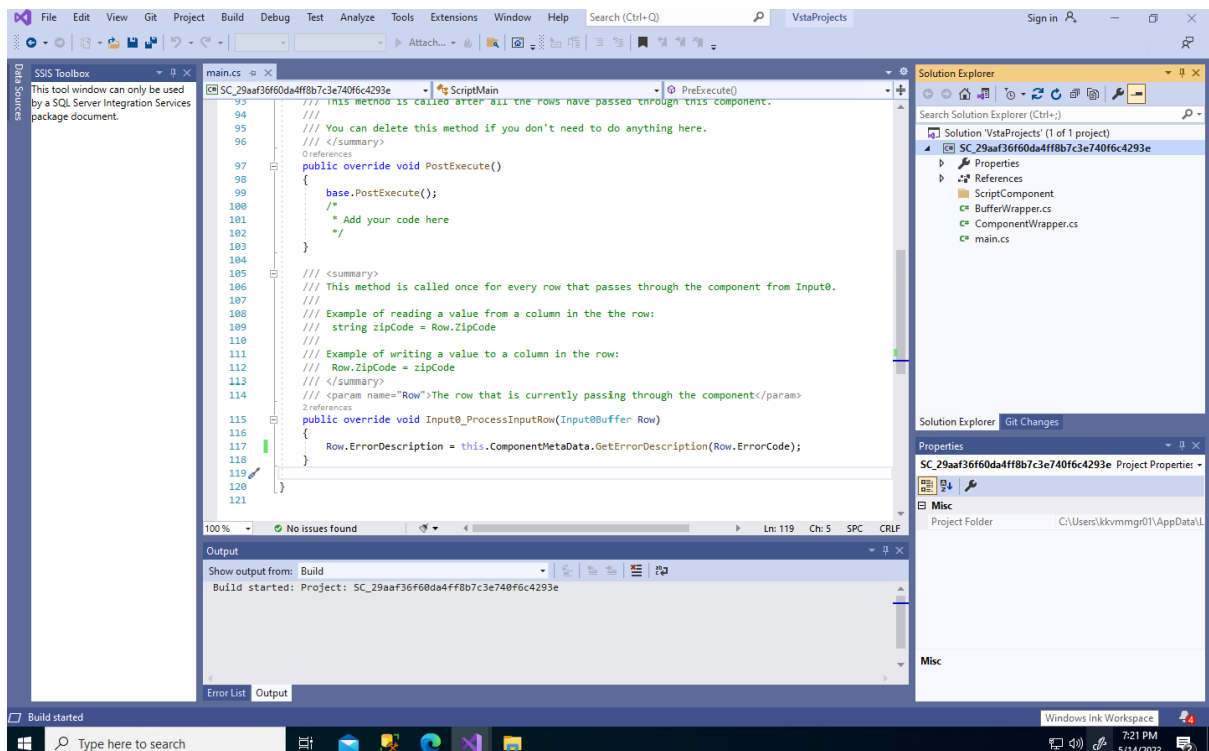
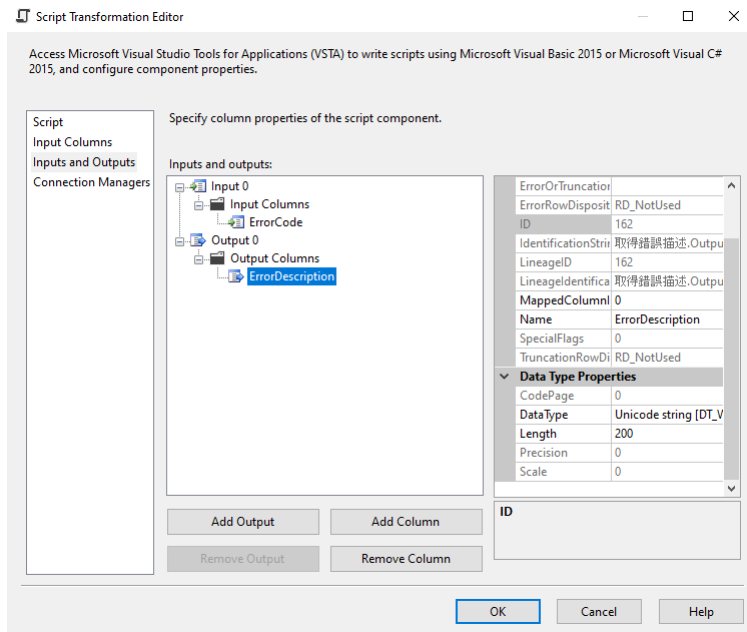
### Step3: 新增錯誤導向流程



### Step4: 新增取得錯誤描述



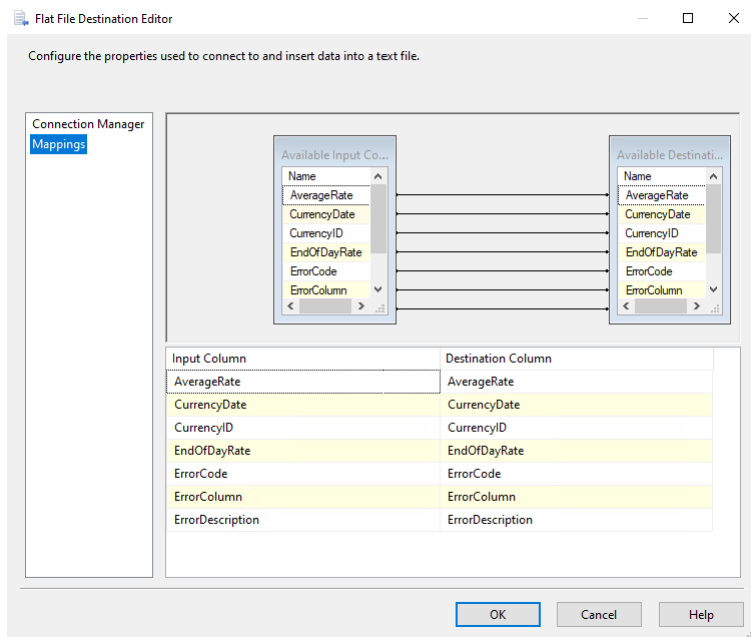




Row.ErrorDescription =

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

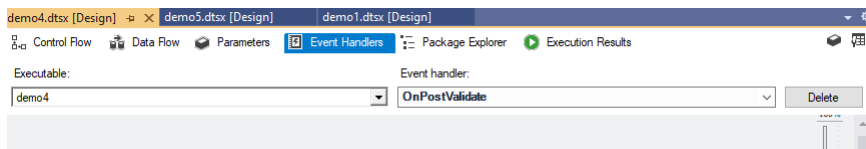
Step5: 新增 Error Data



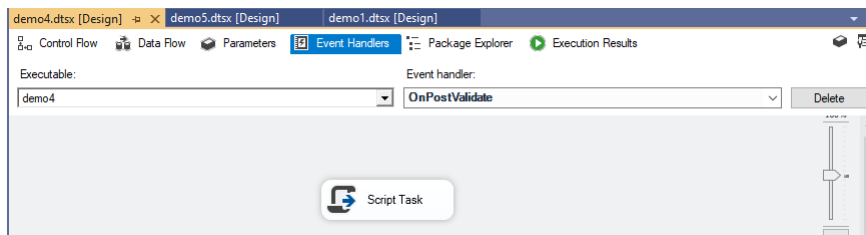
## Step6: 測試封裝

## 新增事件處理

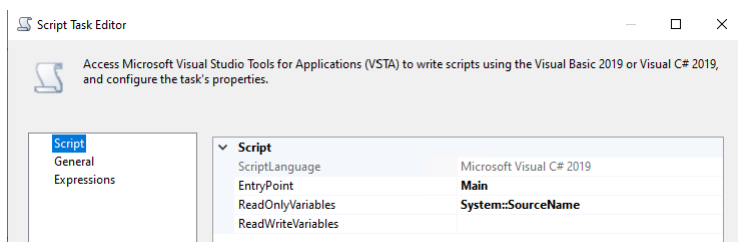
### Step1: 新增事件處理



### Step2: 新增 Script Task



## 新增 ReadOnly Variables : SourceName



### Step3: 顯示訊息

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

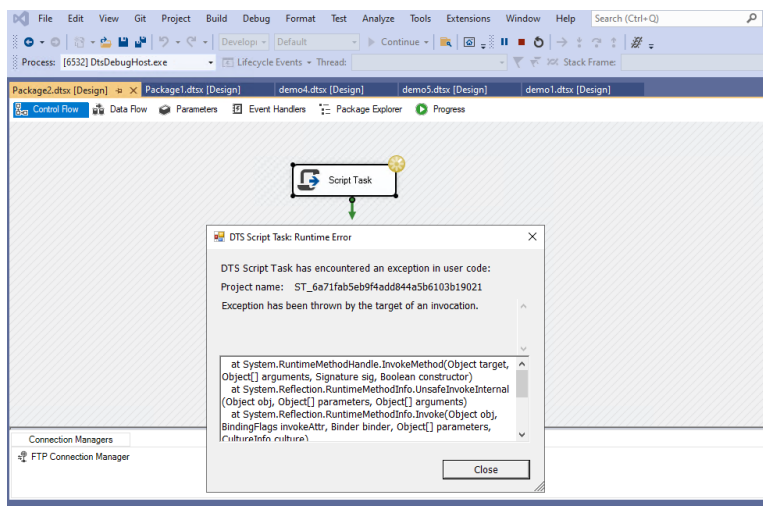
```
public void Main()  
{  
    // TODO: Add your code here  
    //System::SourceName,System::CreatorName  
    MessageBox.Show("OnPostValidate: SourceName [" + Dts.Variables["System::SourceName"].Value + "]);  
    Dts.TaskResult = (int)ScriptResults.Success;  
}
```

### 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

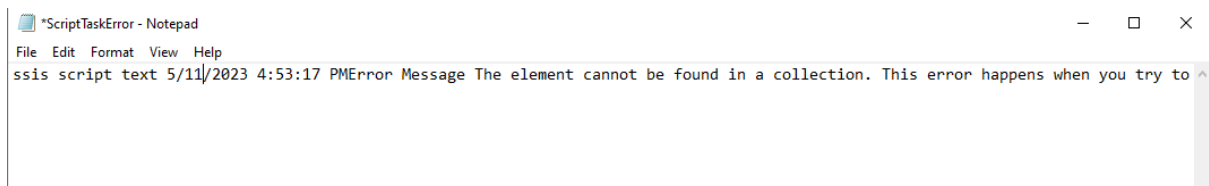
```

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



## Step4: 新增寫入 Progress Reporting

```

MessageBox.Show("catch" + ex.Message);
    bool fireAgain = false;
    Dts.Events.FireInformation(0, null, "catch message :" + ex.Message,
null, 0, ref fireAgain);

```



Step5: 設定 Logging

Step6: 查詢 Logging

新增連線字串加密

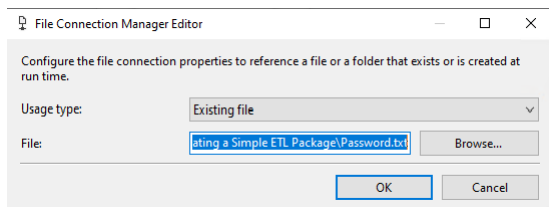
Step1: 複製 demo4.dtsx

重新命名 demo5.dtsx

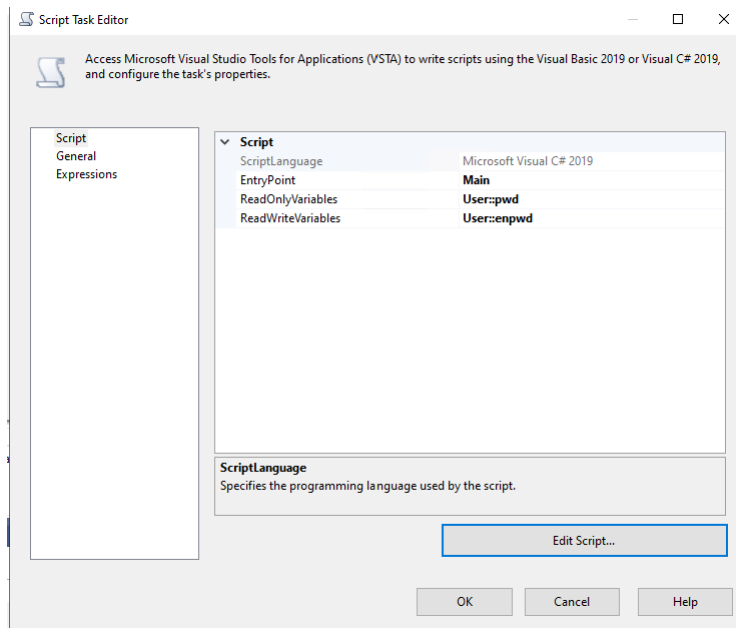
Step2: 新增參數

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");
    }
}
```

```

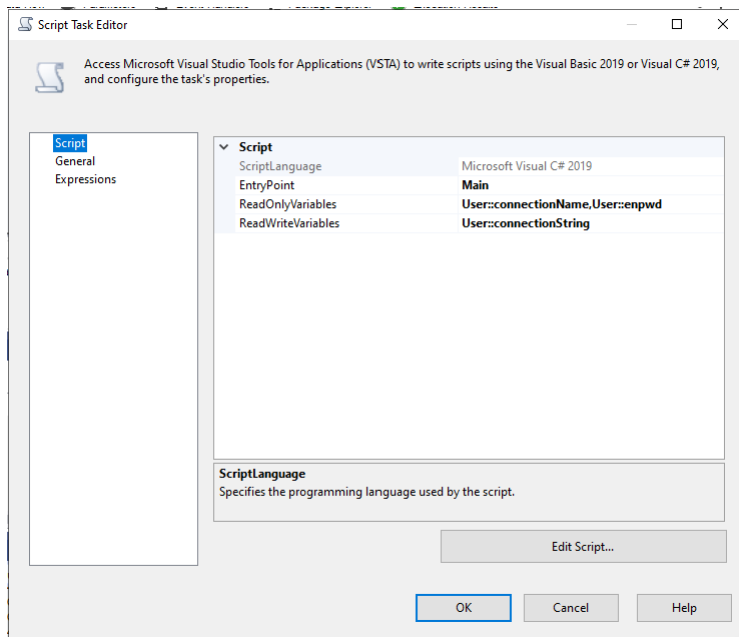
        //加密器
        ICryptoTransform encryptor = aesAlg.CreateEncryptor(aesAlg.Key,
aesAlg.IV);

        //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

---

 localhost\AdventureWorksDW2012

## 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>