

U3M3.LW.Implementing Data Flow

Mastykina Elizaveta

1.1. Exercise 1: Creating new database for HR department

```
-- creation of the db HumanResources
CREATE DATABASE HumanResources
GO

ALTER DATABASE HumanResources SET RECOVERY SIMPLE
GO
```

100 %

Messages

Commands completed successfully.

```
USE HumanResources
GO

-- creation of the table dbo.EmployeesExternal
CREATE TABLE dbo.EmployeesExternal(
    EmployeeID          int NOT NULL,
    FirstName            nvarchar(50) NOT NULL,
    LastName             nvarchar(50) NOT NULL,
    JobTitle             nvarchar(50) NOT NULL,
    EmailAddress         nvarchar(50),
    City                nvarchar(50) NOT NULL,
    StateProvinceName    nvarchar(50) NOT NULL,
    CountryRegionName    nvarchar(50) NOT NULL,
    CONSTRAINT PK_Employee PRIMARY KEY(EmployeeID)
)
GO

-- creation of the table dbo.EmployeesAW
CREATE TABLE dbo.EmployeesAW(
    BusinessEntityID    int NOT NULL,
    FirstName            nvarchar(50) NOT NULL,
    LastName             nvarchar(50) NOT NULL,
    JobTitle             nvarchar(50),
    CONSTRAINT PK_BusinessEntity PRIMARY KEY(BusinessEntityID)
)
GO

-- creation of the table dbo.EmailAddressesAW
CREATE TABLE dbo.EmailAddressesAW(
    EmailAddressId       int NOT NULL,
    BusinessEntityID     int NOT NULL,
    EmailAddress         nvarchar(50) NOT NULL,
    CONSTRAINT PK_EmailAddress PRIMARY KEY(EmailAddressId)
)
GO
```

100 %

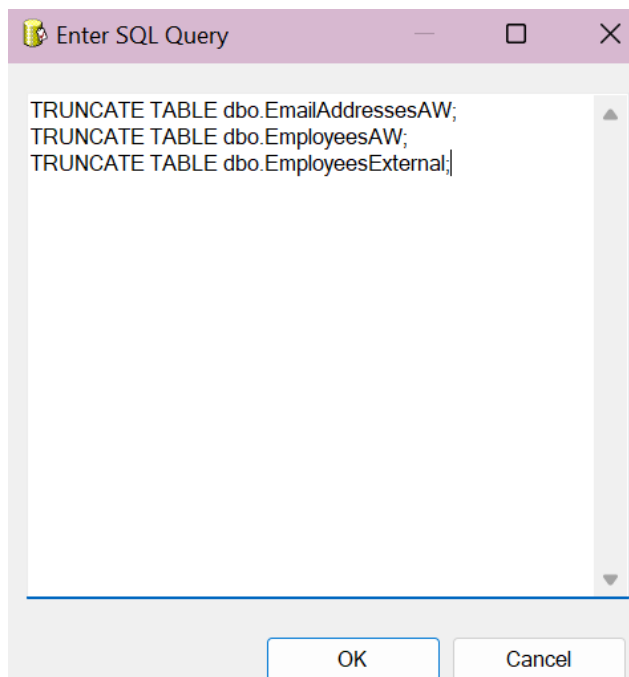
Messages

Commands completed successfully.

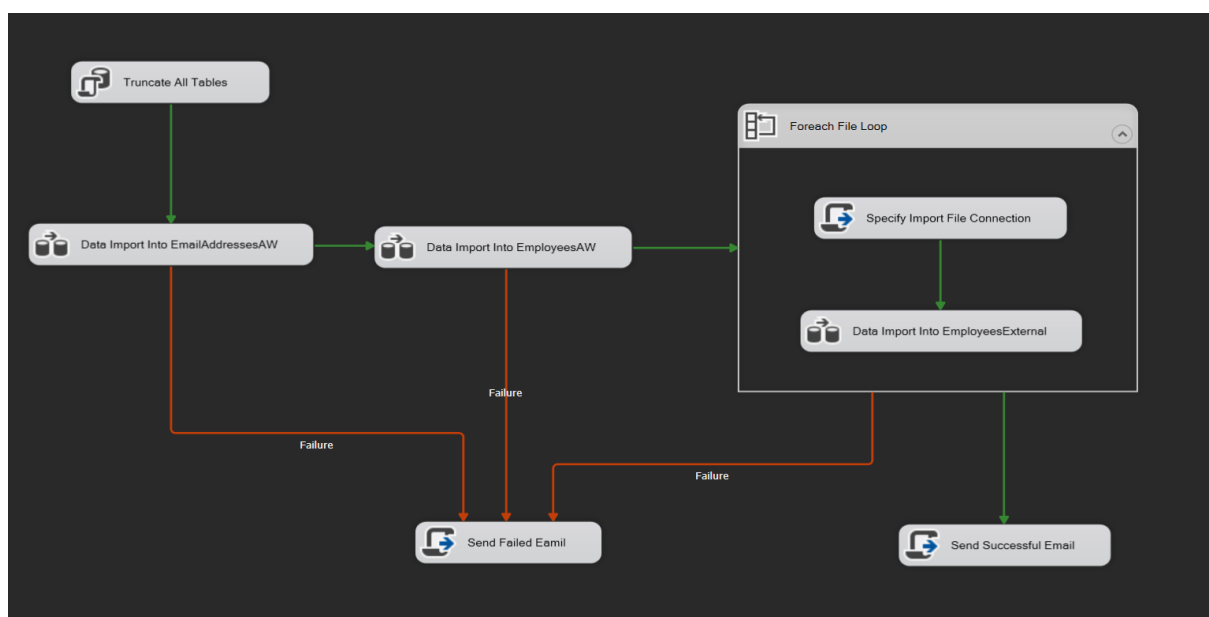
2. Exercise 2: Creating ETL solution to import employees from different sources

At the first step we truncate all destination tables to make our process repeatable.

To achieve this goal we create Execute SQL Task component on Control Flow with the next Query:

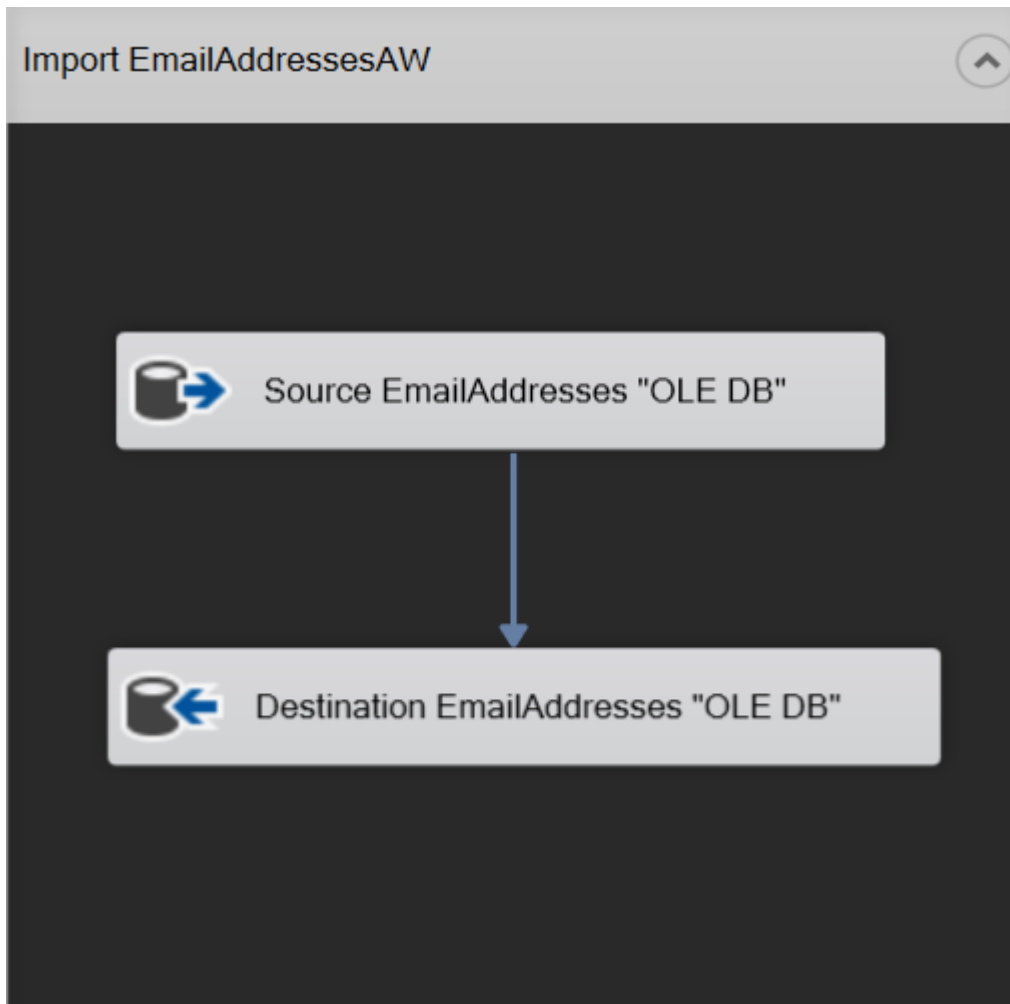


Then we organize Control Flow Logic:



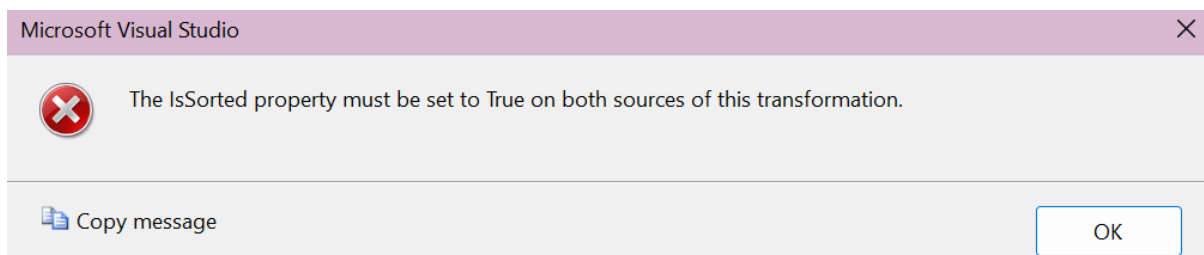
Lets look in details on each dataflow component:

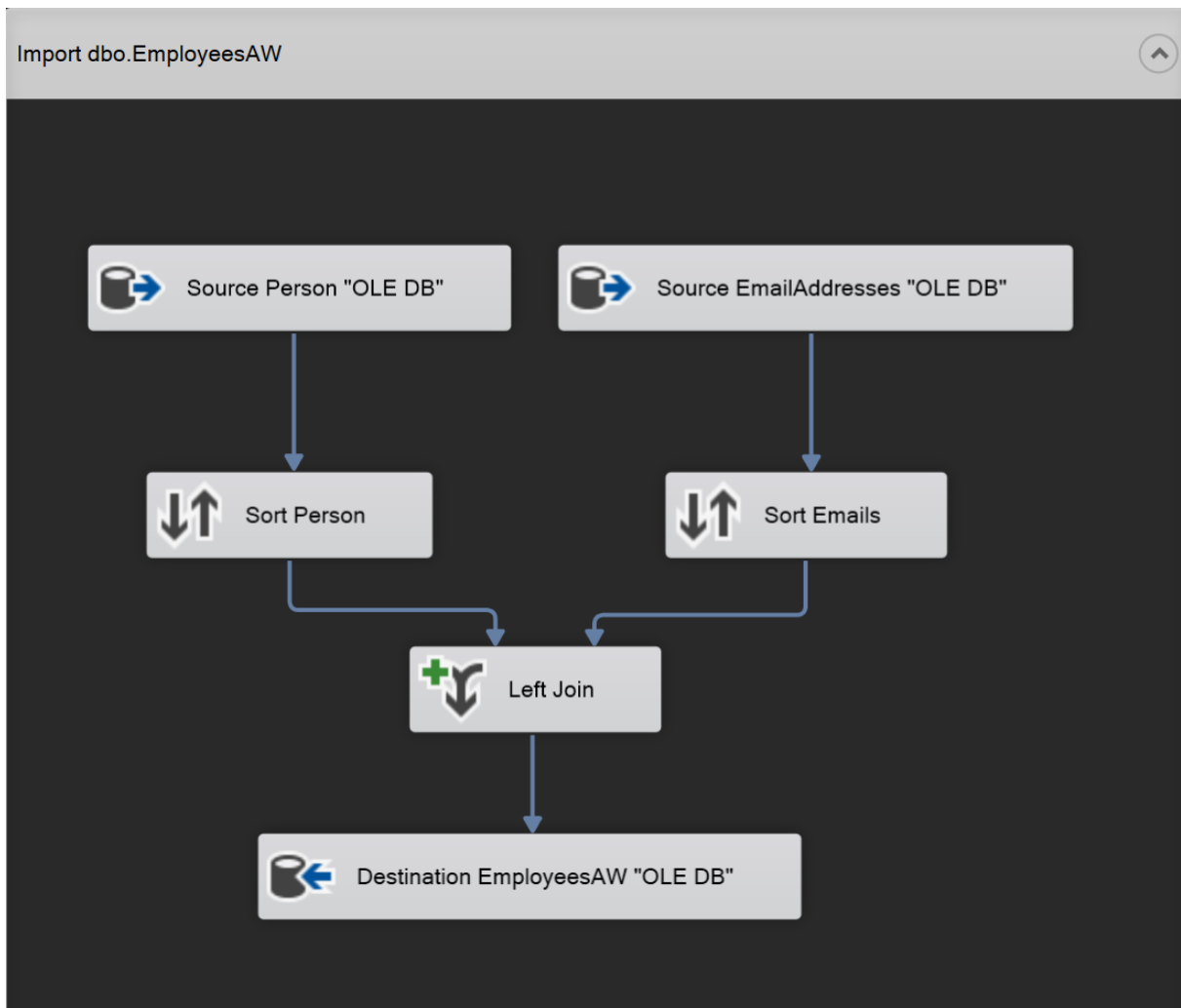
- **Data Import Into EmailAddressesAW**



- **Data Import Into EmployeesAW**

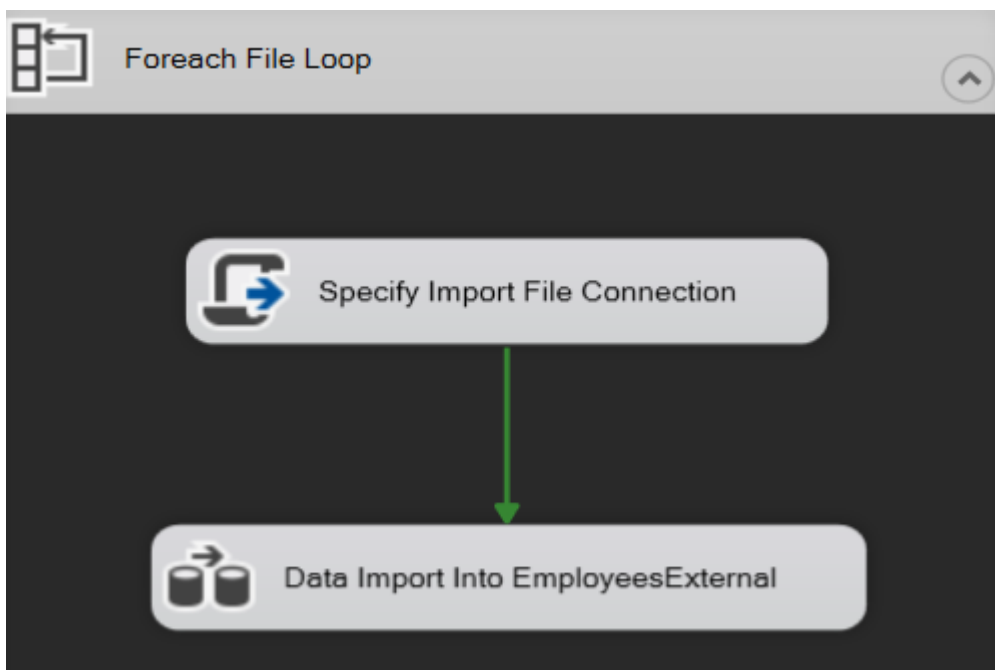
Here we use Left Join to merge two source tables. It was nessasary to use sort, cause I receive the following error:





- **Data Import Into EmployeesAW**

As we can see the process is based on looping through source directory, on each iteration we identify source file name:



I decided to write short script to configure Input Flat File connection dynamically:

```
public void Main()
{
    Dts.Connections["Import File Connection"].ConnectionString = Dts.Variables["User::VFilePath"].Value.ToString();

    Dts.TaskResult = (int)ScriptResults.Success;
}
```

The Foreach Loop container allows execution iteration over an enumeration.

General
Collection
Variable Mappings
Expressions

Enumerator
> Expressions

Expressions
A collection of expressions. The evaluation result of each expression is assigned to a property and replaces the value of the property.

Enumerator configuration

Folder:
C:\Users\lizam\Documents\GitHub\DataMola\U3.SSIS\U3M3\Sources

Files:
.

Retrieve file name
☐ Name and extension ☒ Fully qualified ☐ Name only

☐ Traverse subfolders

OK Cancel Help

Foreach Loop Editor

The Foreach Loop container allows execution iteration over an enumeration.

General

Collection

Variable Mappings

Expressions

Select variables to map to the collection value.

Variable	Index
User::VFilePath	0

Delete

OK

Cancel

Help

Flat File Source Editor

Configure the properties used to connect to and obtain data from a text file.

Connection Manager

Columns

Error Output

Available External...

☒ Name

☐ Column 7

☒ Column 8

☐ Column 9

☐ Column 10

☐ Column 11

☒ Column 12

☒ Column 13

☐ Column 14

☒ Column 15

☐ Column 16

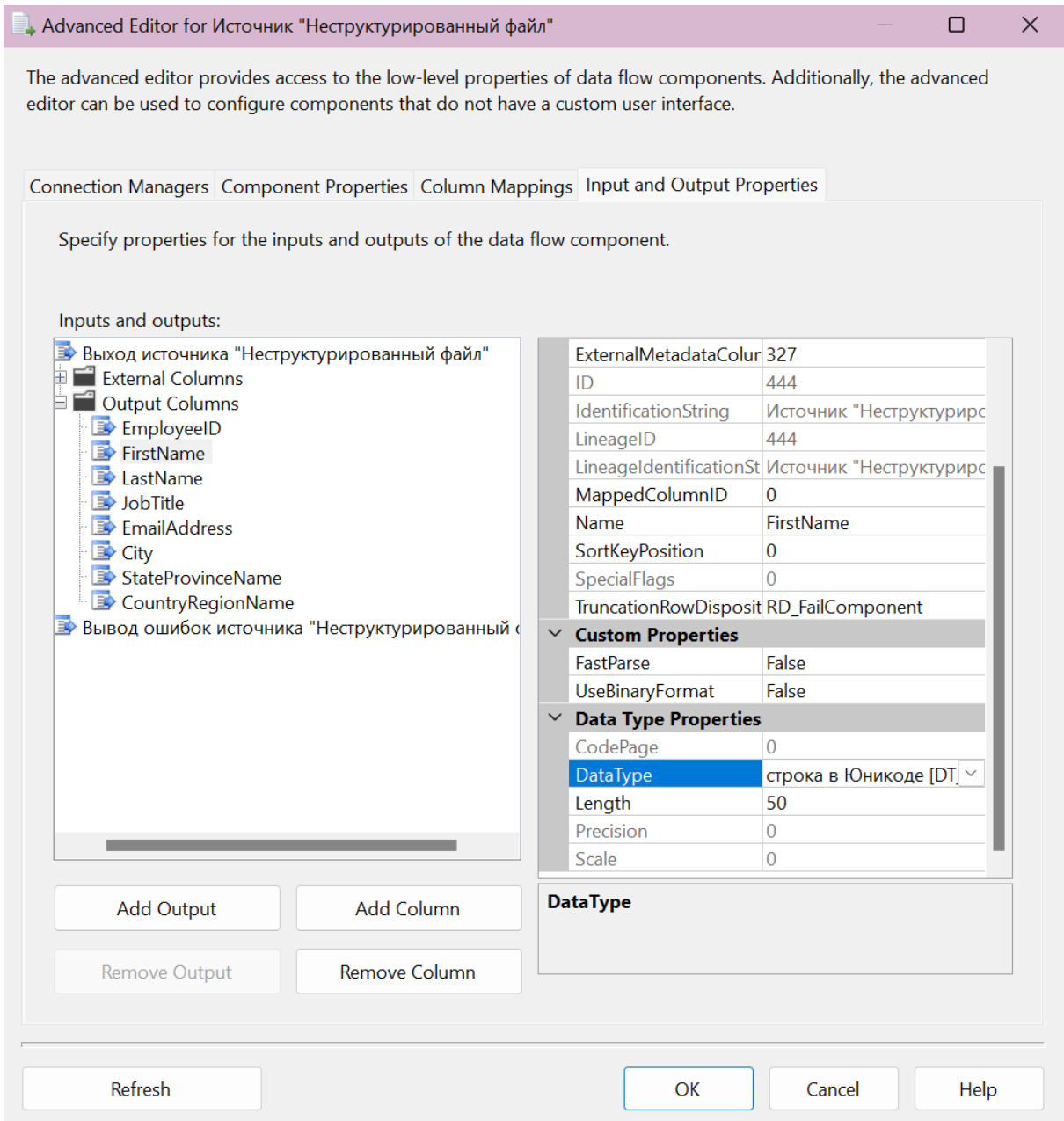
External Column	Output Column
Column 0	EmployeeID
Column 2	FirstName
Column 4	LastName
Column 6	JobTitle
Column 8	EmailAddress
Column 12	City
Column 13	StateProvinceName
Column 15	CountryRegionName

OK

Cancel

Help

It was obligatory to configure `DataType` of each column to avoid encoding error:



Then we config Destination Table in DB:

OLE DB Destination Editor

Configure the properties used to insert data into a relational database using an OLE DB provider.

Connection Manager

Mappings

Error Output

Specify an OLE DB connection manager, a data source, or a data source view, and select the data access mode. If using the SQL command access mode, specify the SQL command either by typing the query or by using Query Builder. For fast-load data access, set the table update options.

OLE DB connection manager:
localhost.HumanResources

New...

Data access mode:
Table or view - fast load

Name of the table or the view:
[dbo].[EmployeesExternal]

New...

☐ Keep identity

☒ Table lock

☐ Keep nulls

☒ Check constraints

Rows per batch:
2147483647

Maximum insert commit size:
2147483647

View Existing

OK

Cancel

Help

OLE DB Destination Editor

Configure the properties used to insert data into a relational database using an OLE DB provider.

Connection Manager

Mappings

Error Output

Available Input...

Available Desti...

Input Column	Destination Column
[EmployeeID]	EmployeeID
[FirstName]	FirstName
LastName	LastName
[JobTitle]	JobTitle
[EmailAddress]	EmailAddress
[City]	City
[StateProvinceName]	StateProvinceName
[CountryRegionName]	CountryRegionName

OK

Cancel

Help

Script to send email:

```
namespace ST_3945d178ee86465fb74bccc1aec550c1
{
    [Microsoft.SqlServer.Dts.Tasks.ScriptTask.SSISScriptTaskEntryPointAttribute]
    0 references
    public partial class ScriptMain : Microsoft.SqlServer.Dts.Tasks.ScriptTask.VSTARTScriptObjectModelBase
    {
        0 references
        public void Main()
        {
            String SendMailFrom = Dts.Variables["User::EmailSendFrom"].Value.ToString();
            String SendMailTo = Dts.Variables["User::EmailSendFrom"].Value.ToString();
            String SendMailSubject = Dts.Variables["User::EmailSuccessfulSubject"].Value.ToString();
            String SendMailAppPassword = Dts.Variables["User::EmailAppPassword"].Value.ToString();
            String SendMailBody = Dts.Variables["User::EmailSuccessfulBody"].Value.ToString();

            try
            {
                SmtplibClient SmtplibServer = new SmtplibClient("smtp.gmail.com", 587);
                SmtplibServer.DeliveryMethod = SmtplibDeliveryMethod.Network;
                MailMessage email = new MailMessage();
                // START
                email.From = new MailAddress(SendMailFrom);
                email.To.Add(SendMailTo);
                email.CC.Add(SendMailFrom);
                email.Subject = SendMailSubject;
                email.Body = SendMailBody;
                //END
                SmtplibServer.Timeout = 5000;
                SmtplibServer.EnableSsl = true;
                SmtplibServer.UseDefaultCredentials = false;
                SmtplibServer.Credentials = new NetworkCredential(SendMailFrom, SendMailAppPassword);
                SmtplibServer.Send(email);
            }
            catch (Exception ex)
            {
                MessageBox.Show(ex.ToString());
            }

            Dts.TaskResult = (int)ScriptResults.Success;
        }

        ScriptResults declaration
    }
}
```

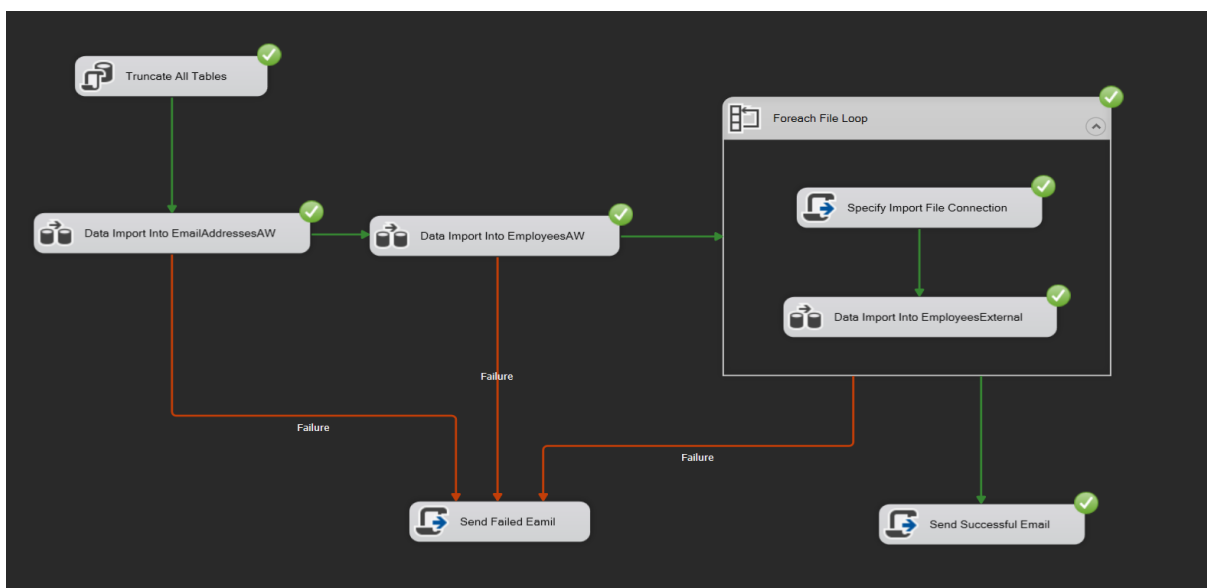
Results:



liza.mastykina@gmail.com

KOMY: MHE ▼

Employees have been imported successfully



/***** Script for SelectTopNRows command from SSMS *****/
 SELECT TOP (1000) [EmployeeID]
 , [FirstName]
 , [LastName]
 , [JobTitle]
 , [EmailAddress]
 , [City]
 , [StateProvinceName]
 , [CountryRegionName]
 FROM [HumanResources].[dbo].[EmployeesExternal]

100 %

Results Messages

	EmployeeID	FirstName	LastName	JobTitle	EmailAddress	City	StateProvinceName	CountryRegionName
1	1	Guy	Gilbert	Production Technician - WC60	guy1@adventure-works.com	Monroe	Washington	United States
2	2	Kevin	Brown	Marketing Assistant	kevin0@adventure-works.com	Everett	Washington	United States
3	3	Roberto	Tamburello	Engineering Manager	roberto0@adventure-works.com	Redmond	Washington	United States
4	4	Rob	Walters	Senior Tool Designer	rob0@adventure-works.com	Minneapolis	Minnesota	United States
5	5	Thierry	D'Hers	Tool Designer	thierry0@adventure-works.com	Bothell	Washington	United States
6	6	David	Bradley	Marketing Manager	david0@adventure-works.com	Redmond	Washington	United States
7	7	JoLynn	Dobney	Production Supervisor - WC60	jolynn0@adventure-works.com	Seattle	Washington	United States
8	8	Ruth	Ellerbrock	Production Technician - WC10	ruth0@adventure-works.com	Everett	Washington	United States
9	9	Gail	Erickson	Design Engineer	gail0@adventure-works.com	Bellevue	Washington	United States
10	10	Barry	Johnson	Production Technician - WC10	barry0@adventure-works.com	Snohomish	Washington	United States
11	11	Jossef	Goldberg	Design Engineer	jossef0@adventure-works.com	Renton	Washington	United States
12	12	Terri	Duffy	Vice President of Engineering	terri0@adventure-works.com	Renton	Washington	United States
13	13	Sidney	Higa	Production Technician - WC10	sidney0@adventure-works.com	Edmonds	Washington	United States
14	14	Taylor	Maxwell	Production Supervisor - WC50	taylor0@adventure-works.com	Edmonds	Washington	United States
15	15	Jeffrey	Ford	Production Technician - WC10	jeffrey0@adventure-works.com	Monroe	Washington	United States
16	16	Jo	Brown	Production Supervisor - WC60	jo0@adventure-works.com	Duvall	Washington	United States
17	17	Doris	Hartwig	Production Technician - WC10	doris0@adventure-works.com	Kenmore	Washington	United States
18	18	John	Campbell	Production Supervisor - WC60	john0@adventure-works.com	Seattle	Washington	United States
19	19	Diane	Glimp	Production Technician - WC10	diane0@adventure-works.com	Redmond	Washington	United States
20	20	Steven	Selkoff	Production Technician - WC30	steven0@adventure-works.com	Everett	Washington	United States

SELECT TOP (1000) [BusinessEntityID]
 , [FirstName]
 , [LastName]
 , [JobTitle]
 FROM [HumanResources].[dbo].[EmployeesAW]

100 %

Results Messages

	BusinessEntityID	FirstName	LastName	JobTitle
1	1	Ken	Sánchez	Chief Executive Officer
2	2	Terri	Duffy	Vice President of Engineering
3	3	Roberto	Tamburello	Engineering Manager
4	4	Rob	Walters	Senior Tool Designer
5	5	Gail	Erickson	Design Engineer
6	6	Jossef	Goldberg	Design Engineer
7	7	Dylan	Miller	Research and Development Manager
8	8	Diane	Margheim	Research and Development Engineer
9	9	Gigi	Matthew	Research and Development Engineer
10	10	Michael	Raheem	Research and Development Manager
11	11	Ovidiu	Cracium	Senior Tool Designer
12	12	Thierry	D'Hers	Tool Designer
13	13	Janice	Galvin	Tool Designer
14	14	Michael	Sullivan	Senior Design Engineer
15	15	Sharon	Salavaria	Design Engineer
16	16	David	Bradley	Marketing Manager
17	17	Kevin	Brown	Marketing Assistant
18	18	John	Wood	Marketing Specialist
19	19	Mary	Dempsey	Marketing Assistant
20	20	Wanida	Benshoof	Marketing Assistant

```

SELECT TOP (1000) [EmailAddressId]
      ,[BusinessEntityID]
      ,[EmailAddress]
FROM [HumanResources].[dbo].[EmailAddressesAW]

```

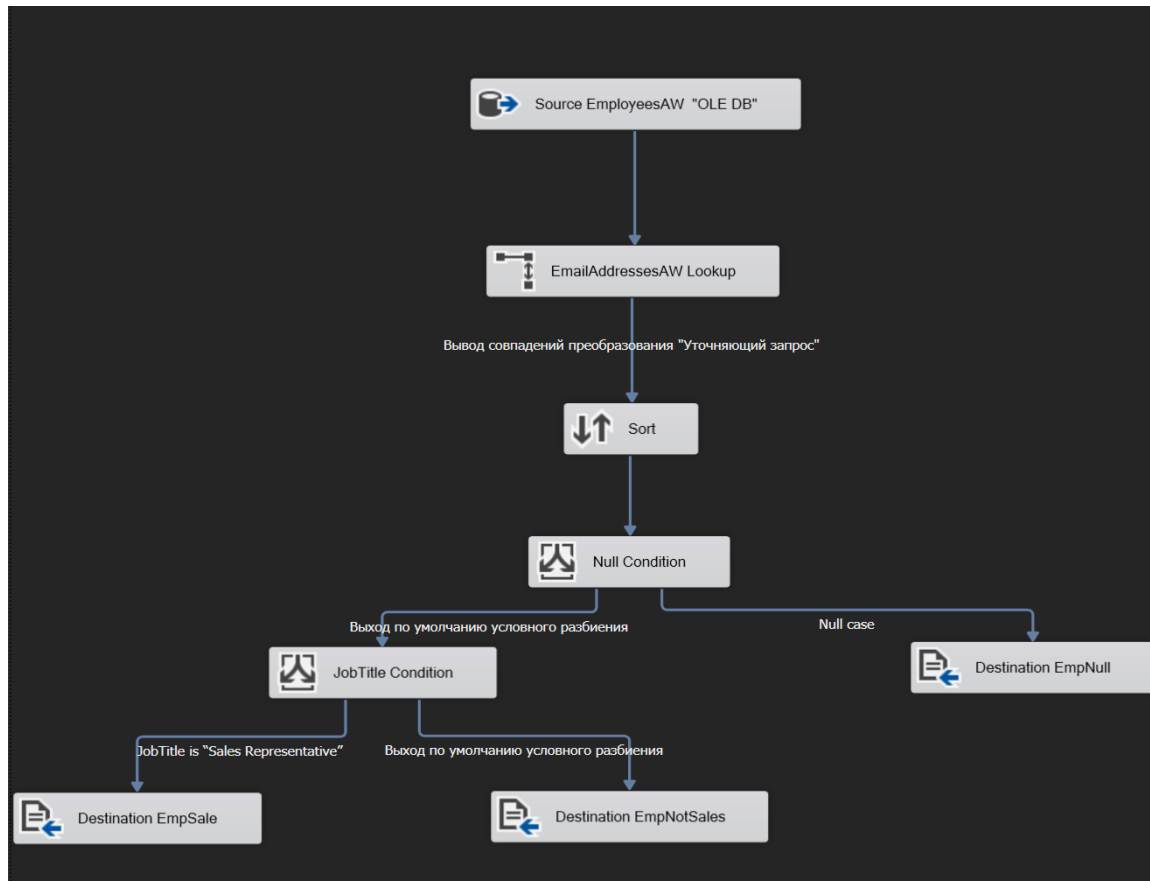
100 %

Results Messages

	EmailAddressId	BusinessEntityID	EmailAddress
1	1	1	ken0@adventure-works.com
2	2	2	terri0@adventure-works.com
3	3	3	roberto0@adventure-works.com
4	4	4	rob0@adventure-works.com
5	5	5	gail0@adventure-works.com
6	6	6	jossef0@adventure-works.com
7	7	7	dylan0@adventure-works.com
8	8	8	diane1@adventure-works.com
9	9	9	gigi0@adventure-works.com
10	10	10	michael6@adventure-works.com
11	11	11	ovidiu0@adventure-works.com
12	12	12	thierry0@adventure-works.com
13	13	13	janice0@adventure-works.com
14	14	14	michael8@adventure-works.com
15	15	15	sharon0@adventure-works.com
16	16	16	david0@adventure-works.com
17	17	17	kevin0@adventure-works.com
18	18	18	john5@adventure-works.com
19	19	19	mary2@adventure-works.com
20	20	20	wanida0@adventure-works.com

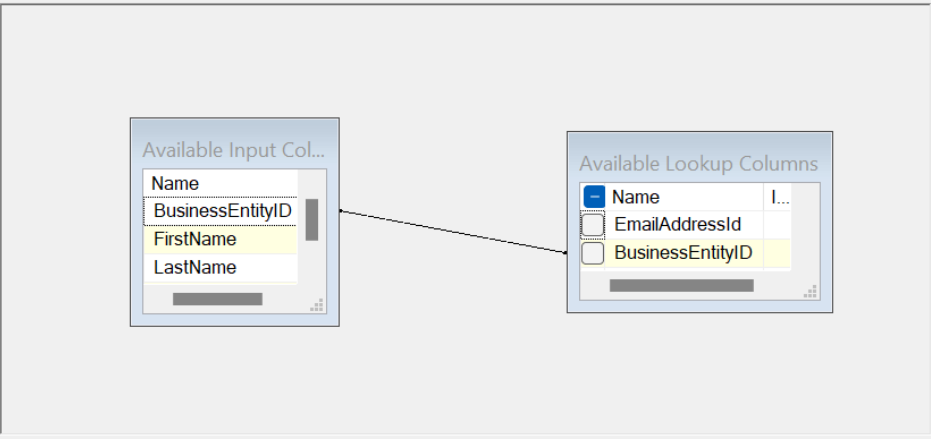
3. Exercise 3: Creating ETL solution to export the data from HumanResourcesdb

Here I decided to use additional Null Condition, cause In Source Table Its acceptable to have JobTitle as Null value. We load such records in file EmpNull.txt.



This transform enables the performance of simple equi-joins between the input and a reference data set.

- General
- Connection
- Columns
- Advanced
- Error Output



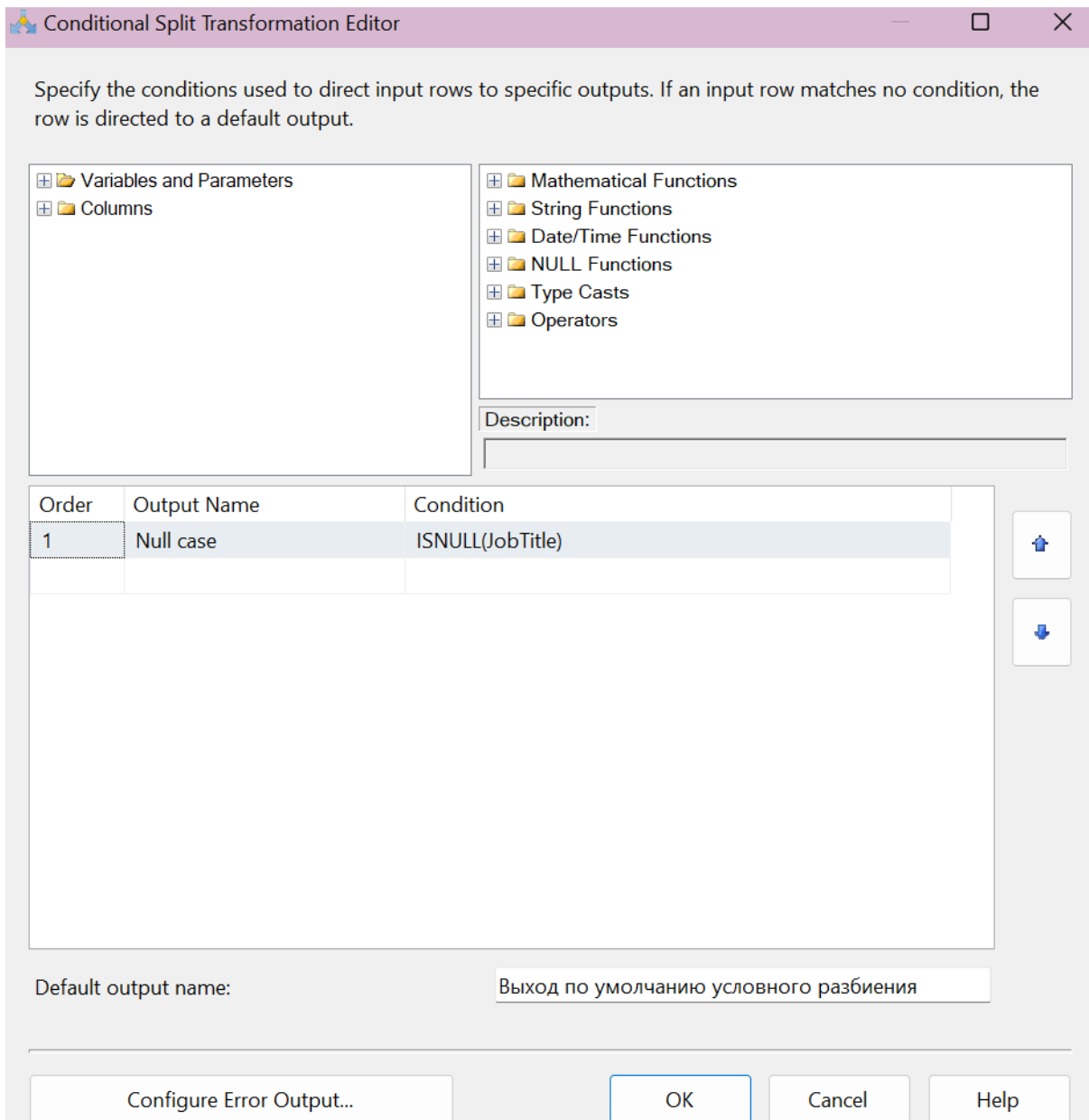
Lookup Column	Lookup Operation	Output Alias
EmailAddress	<add as new column>	EmailAddress

Specify the columns to sort, and set their sort type and their sort order. All nonselected columns are copied unchanged.

Available Input Columns

<input checked="" type="checkbox"/>	Name	Pass T...
<input type="checkbox"/>	BusinessEntityID	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>	FirstName	<input type="checkbox"/>
<input checked="" type="checkbox"/>	LastName	<input type="checkbox"/>
<input type="checkbox"/>	JobTitle	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>	EmailAddress	<input type="checkbox"/>

Input Column	Output Alias	Sort Type	Sort Order	Com
FirstName	FirstName	ascending	2	
LastName	LastName	ascending	1	
EmailAddress	EmailAddress	ascending	3	





Conditional Split Transformation Editor

Specify the conditions used to direct input rows to specific outputs. If an input row matches no condition, the row is directed to a default output.

The screenshot shows the SQL Server Enterprise Manager interface. On the left, the 'Variables and Parameters' folder is expanded under the 'Server' node. On the right, the 'Mathematical Functions' folder is expanded under the 'Functions' node. The 'Description:' tab is selected in the right pane.

Order	Output Name	Condition
1	JobTitle is "Sales Represen...	JobTitle == "Sales Representative"
2	Null case	ISNULL(JobTitle)

Default output name: Выход по умолчанию условного разбиения

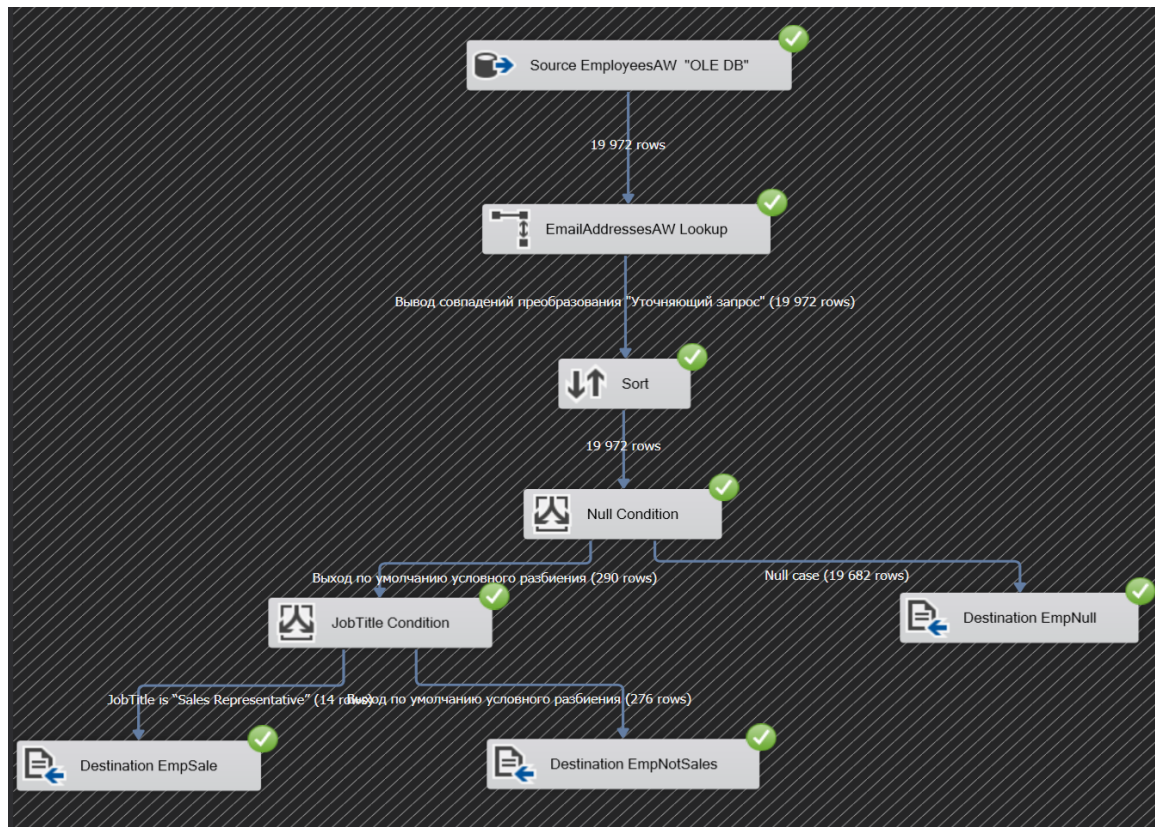
Configure Error Output...

OK

Cancel

Help

Results:



EmpSales.txt – Блокнот

Файл Изменить Просмотр

```
BusinessEntityID,FirstName,LastName,JobTitle,EmailAddress
,Pamela,Ansman-Wolfe,,pamela0@adventure-works.com
,Michael,Blythe,,michael19@adventure-works.com
,David,Campbell,,david8@adventure-works.com
,Jillian,Carson,,jillian0@adventure-works.com
,Shu,Ito,,shu0@adventure-works.com
,Tete,Mensa-Annan,,tete0@adventure-works.com
,Linda,Mitchell,,linda3@adventure-works.com
,Jae,Pak,,jae0@adventure-works.com
,Tsvi,Reiter,,tsvi0@adventure-works.com
,Jose,Saraiva,,jose1@adventure-works.com
,Lynn,Tsoflias,,lynn0@adventure-works.com
,Rachel,Valdez,,rachel0@adventure-works.com
,Garrett,Vargas,,garrett1@adventure-works.com
,Ranjit,Varkey Chudukatil,,ranjit0@adventure-works.com
```

Строка 1, столбец 1 100% Windows (CRLF) UTF-8



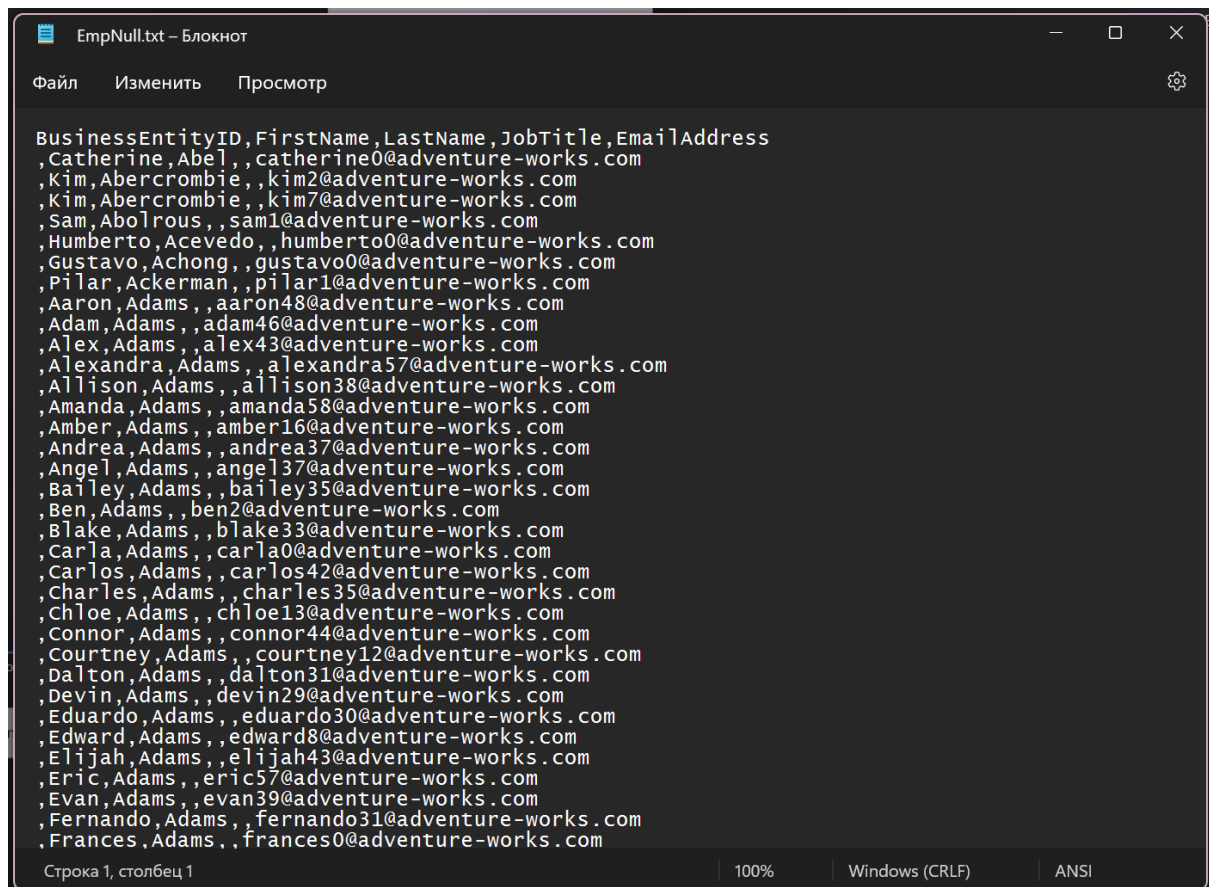
Файл

Изменить

Просмотр

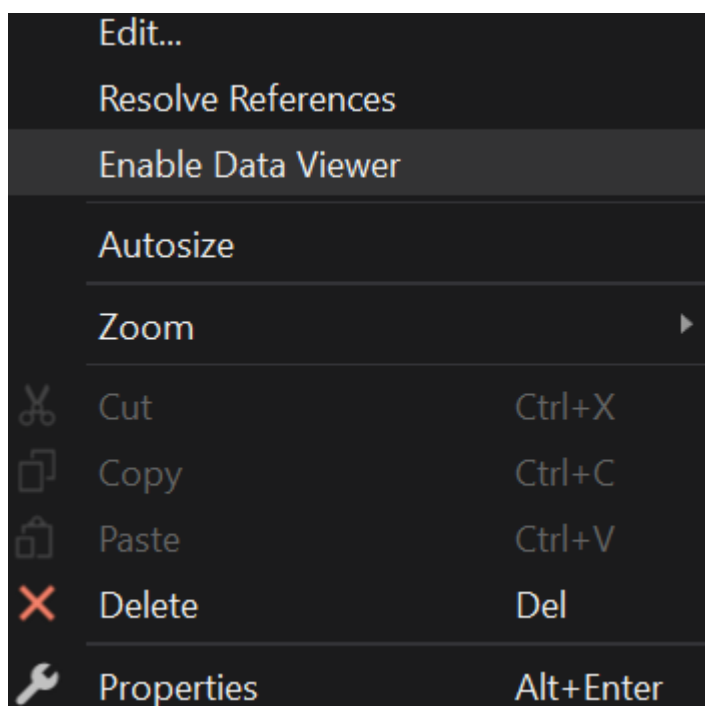


```
FirstName,LastName,EmailAddress
Syed,Abbas,syed0@adventure-works.com
Kim,Abercrombie,kim1@adventure-works.com
Hazem,AboIrous,hazem0@adventure-works.com
Pilar,Ackerman,pilar0@adventure-works.com
Jay,Adams,jay0@adventure-works.com
Francois,Ajenstat,francois0@adventure-works.com
Amy,Alberts,amy0@adventure-works.com
Greg,Alderson,greg0@adventure-works.com
Sean,Alexander,sean0@adventure-works.com
Gary,Altman,gary1@adventure-works.com
Nancy,Anderson,nancy0@adventure-works.com
Zainal,Arifin,zaina10@adventure-works.com
Dan,Bacon,dan0@adventure-works.com
Bryan,Baker,bryan0@adventure-works.com
Mary,Baker,mary1@adventure-works.com
Angela,Barbario1,angela0@adventure-works.com
David,Barber,david5@adventure-works.com
Paula,Barreto de Mattos,paula0@adventure-works.com
Wanida,Benshoof,wanida0@adventure-works.com
Karen,Berg,karen1@adventure-works.com
Karen,Berge,karen0@adventure-works.com
Andreas,Berglund,andreas0@adventure-works.com
Matthias,Berndt,matthias0@adventure-works.com
Jo,Berry,jo1@adventure-works.com
Jimmy,Bischoff,jimmy0@adventure-works.com
David,Bradley,david0@adventure-works.com
Alan,Brewer,alan0@adventure-works.com
Eric,Brown,eric1@adventure-works.com
Jo,Brown,jo0@adventure-works.com
Kevin,Brown,kevin0@adventure-works.com
Janaina,Bueno,janaina0@adventure-works.com
John,Campbell,john0@adventure-works.com
Jun.Cao.iun0@adventure-works.com
```



```
BusinessEntityID,FirstName,LastName,JobTitle,EmailAddress
,Catherine,Abel,,catherine0@adventure-works.com
,Kim,Abercrombie,,kim2@adventure-works.com
,Kim,Abercrombie,,kim7@adventure-works.com
,Sam,Abolrous,,sam1@adventure-works.com
,Humberto,Acevedo,,humberto0@adventure-works.com
,Gustavo,Achong,,gustavo0@adventure-works.com
,Pilar,Ackerman,,pilar1@adventure-works.com
,Aaron,Adams,,aaron48@adventure-works.com
,Adam,Adams,,adam46@adventure-works.com
,Alex,Adams,,alex43@adventure-works.com
,Alexandra,Adams,,alexandra57@adventure-works.com
,Allison,Adams,,allison38@adventure-works.com
,Amanda,Adams,,amanda58@adventure-works.com
,Amber,Adams,,amber16@adventure-works.com
,Andrea,Adams,,andrea37@adventure-works.com
,Angel,Adams,,angel37@adventure-works.com
,Bailey,Adams,,bailey35@adventure-works.com
,Ben,Adams,,ben2@adventure-works.com
,Blake,Adams,,blake33@adventure-works.com
,Carla,Adams,,carla0@adventure-works.com
,Carlos,Adams,,carlos42@adventure-works.com
,Charles,Adams,,charles35@adventure-works.com
,Chloe,Adams,,chloe13@adventure-works.com
,Connor,Adams,,connor44@adventure-works.com
,Courtney,Adams,,courtney12@adventure-works.com
,Dalton,Adams,,dalton31@adventure-works.com
,Devin,Adams,,devin29@adventure-works.com
,Eduardo,Adams,,eduardo30@adventure-works.com
,Edward,Adams,,edward8@adventure-works.com
,Elijah,Adams,,elijah43@adventure-works.com
,Eric,Adams,,eric57@adventure-works.com
,Evan,Adams,,evan39@adventure-works.com
,Fernando,Adams,,fernando31@adventure-works.com
,Frances,Adams,,frances0@adventure-works.com
```

4. Exercise 4: Using Data Viewers



Data Flow Path Editor

View and edit path properties, view column metadata, and add or remove data viewers from the path.

General

Metadata

Data Viewer

☒ Enable data viewer

Columns to display

Unused columns:

Column Name

Displayed columns:

Column Name
BusinessEntityID
FirstName
LastName
JobTitle
EmailAddress

>>

>

<

<<

OK

Cancel

Help

JobTitle is "Sales Representative" Data Viewer at Задача потока данных

▶

Detach

Copy Data

Busi...	FirstName	LastName	JobTitle	EmailAddress
280	Pamela	Ansman-Wolfe	Sales Representative	pamela0@adventure-works....
275	Michael	Blythe	Sales Representative	michael9@adventure-works....
283	David	Campbell	Sales Representative	david8@adventure-works.com
277	Jillian	Carson	Sales Representative	jillian0@adventure-works.com
281	Shu	Ito	Sales Representative	shu0@adventure-works.com

Edit...

Resolve References

Disable Data Viewer

Autosize

Zoom ▶

✂

 Cut Ctrl+X

📄

 Copy Ctrl+C

📄

 Paste Ctrl+V

✖

 Delete Del

🔧

 Properties Alt+Enter