Cloud Dataprep Demo: Inconsistent company names

Standardising values in a text column

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Post, GitHub repository.

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Introduction

This demo shows how to remove inconsistent data in a CSV file and load it to BigQuery. The source file has company names in a column. Their values are inconsistent (VANILLA Ltd, *** VANILLA LTD ***, vanilla ltd, vanila ltd, Vanilla Ltd., etc.). We are going to standardise the company names before uploading them to the target table.

There is no one single technique to achieve this task. We are going to use several out-of-the-box solutions implemented in Cloud Dataprep (by Trifacta), including clustering of values based on fuzzy matching.

This demo was done on June 13th, 2020, with the Generally Available features on the different services used for this exercise.

Prepare demo environment

Source file in Cloud Storage

Create a Cloud Storage bucket for the demo. Upload to the bucket the source file.

Target BigQuery table

Create the BigQuery dataset and table as shown below.

```
bq --location EU mk \
--dataset \
[PROJECT ID]:vanilla

bq mk \
--table \
[PROJECT ID]:vanilla.companies \
company_name:STRING,company_id1:STRING,company_id2:STRING,company_id3:STRI
NG,company_id4:STRING,country:STRING,town:STRING,zipcode:STRING
```

Enable and setup Cloud Dataprep

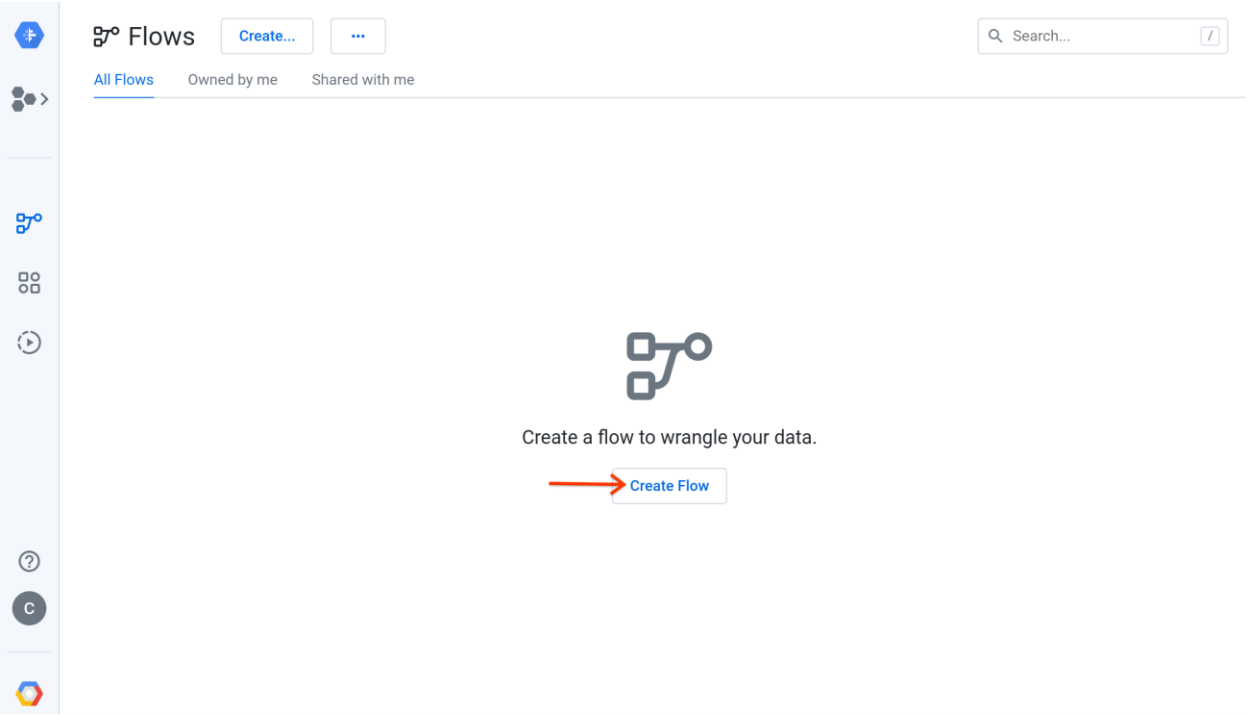
If we want to use Cloud Dataprep, we need our account to grant permissions to any of these roles: project editor, project owner or dataprep.user.

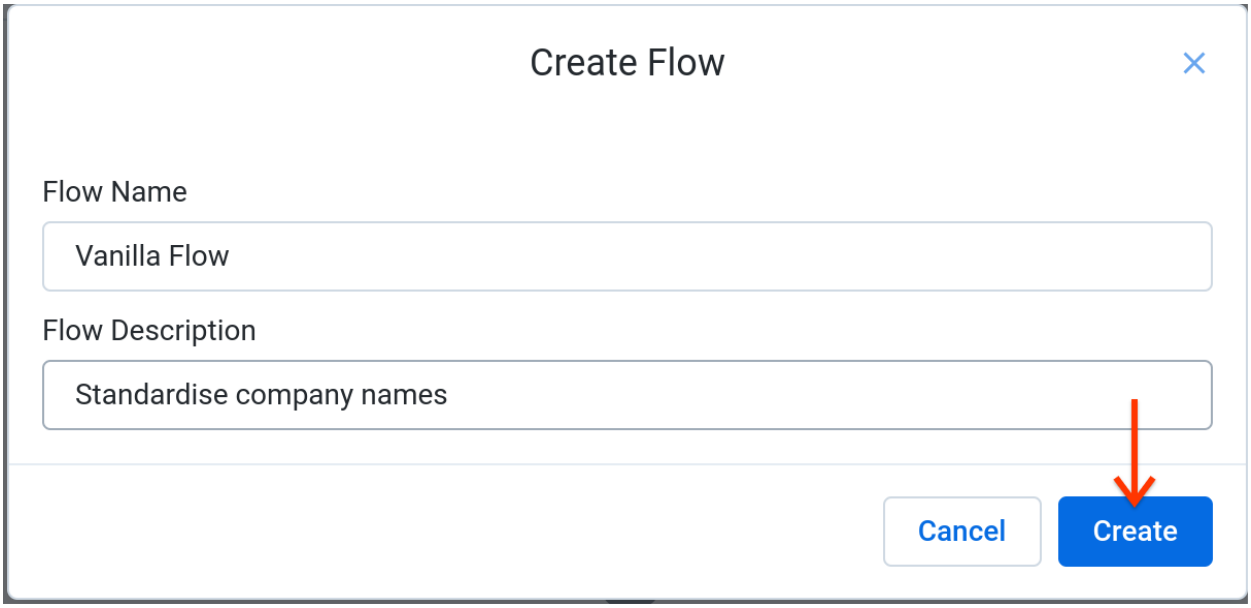
Then we need to enable Cloud Dataprep and set it up. If you are running your ecosystem outside the US, and you have requirements to be in a certain region, make sure that the Cloud Storage buckets Cloud Dataprep are set up according to your requirements.

Remove inconsistent values

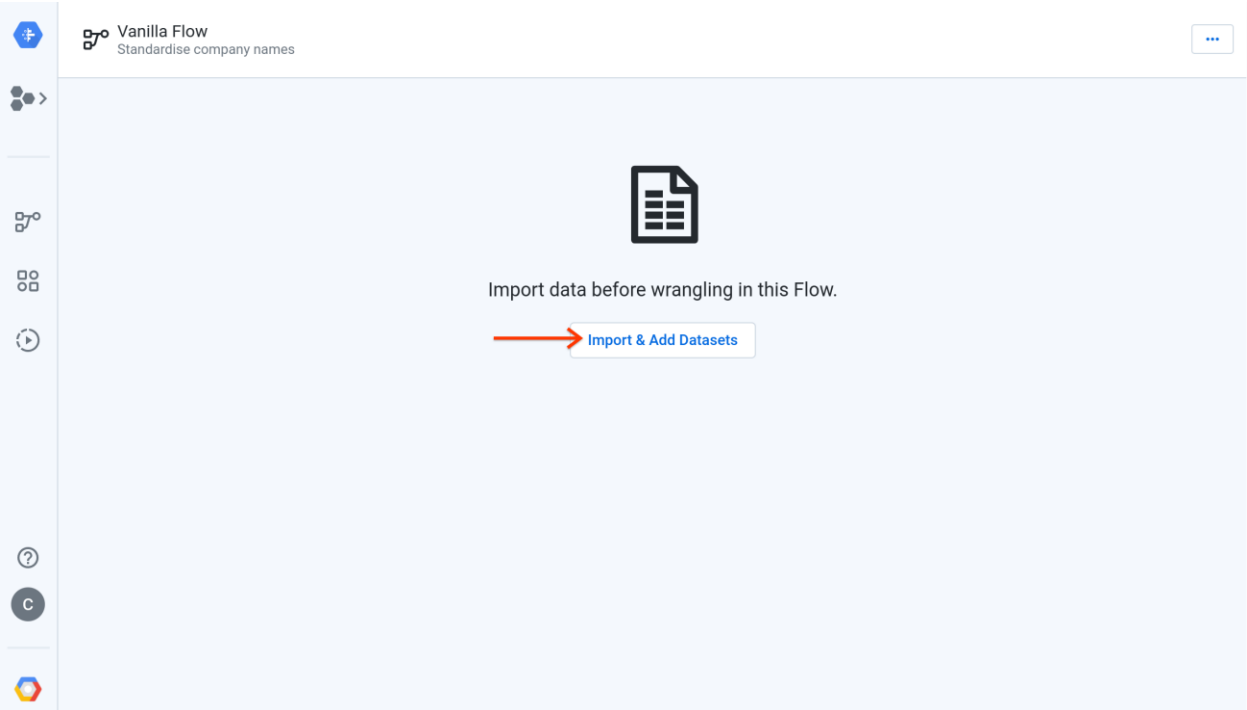
Standardise company names

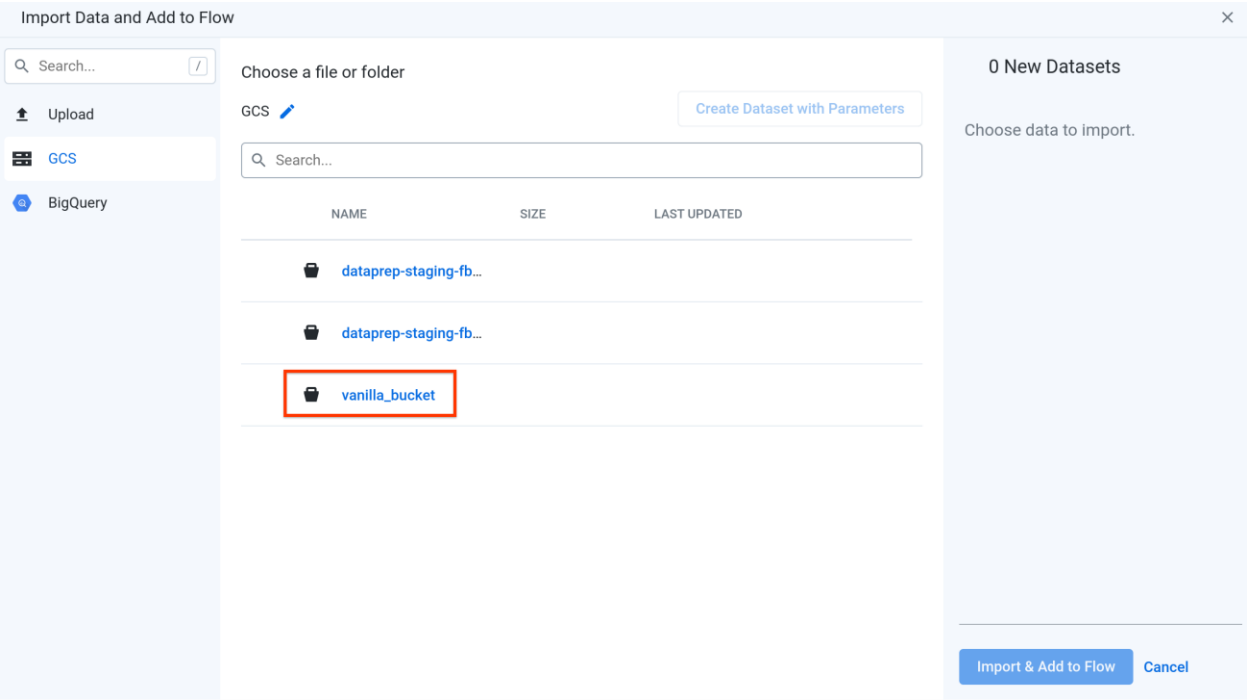
Once we have enabled and set up Cloud Dataprep, we create a flow.

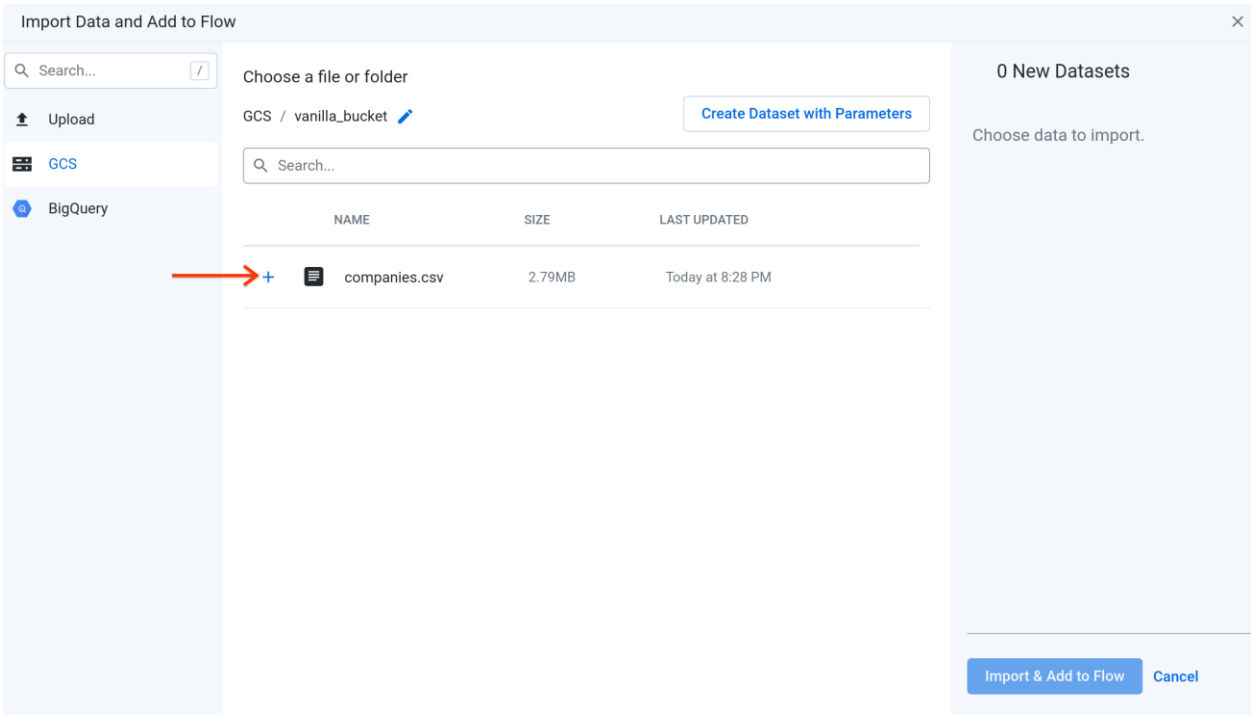


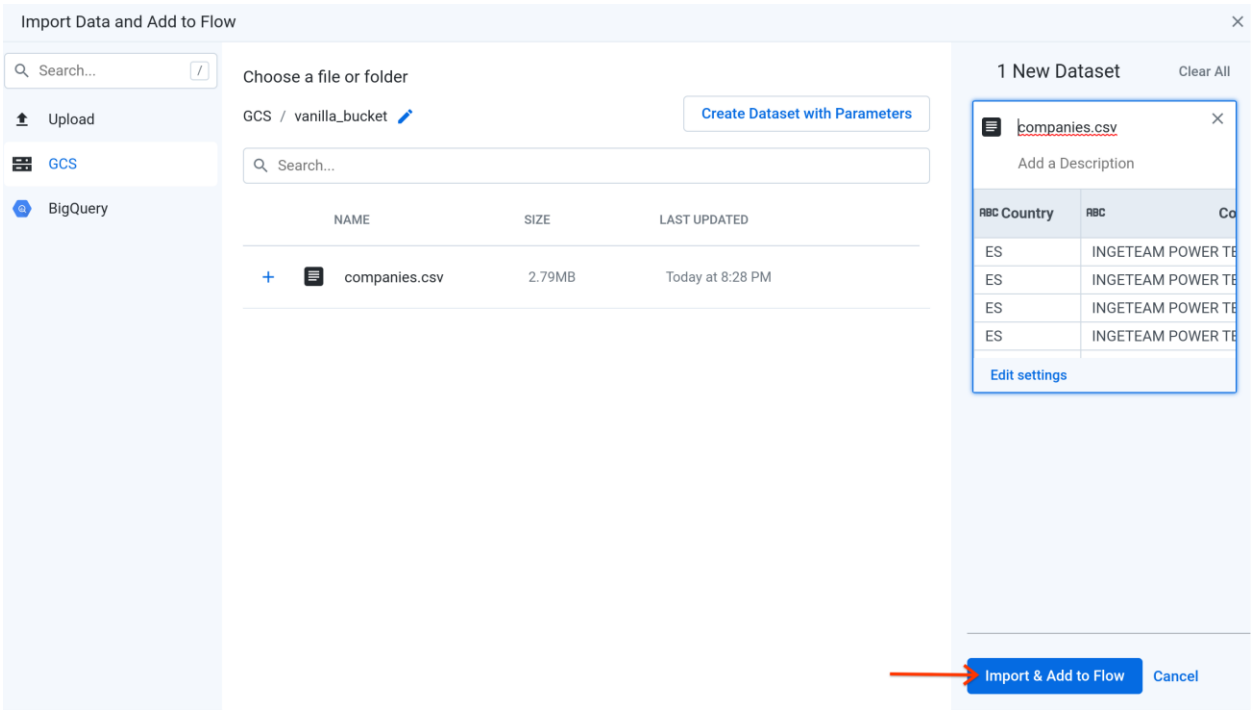


Then we add the companies.csv file as a dataset.

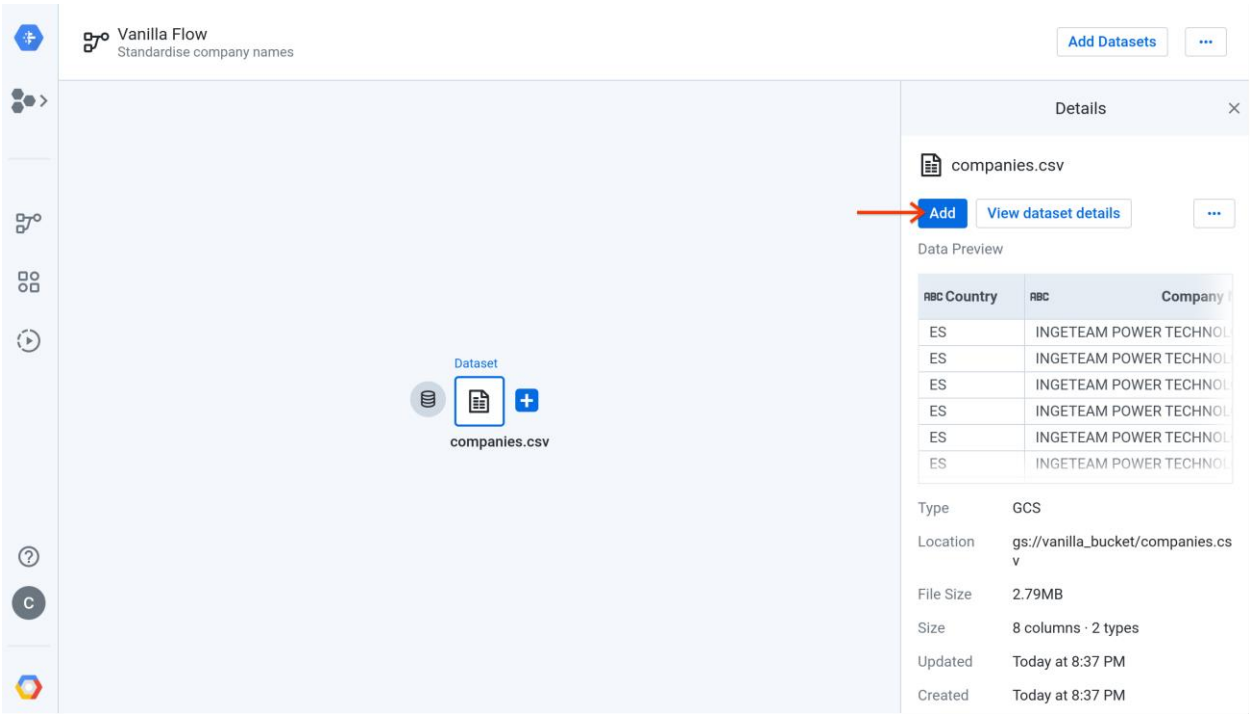

Vanilla Flow
Standardise company names
Import data before wrangling in this Flow.
Import & Add Datasets

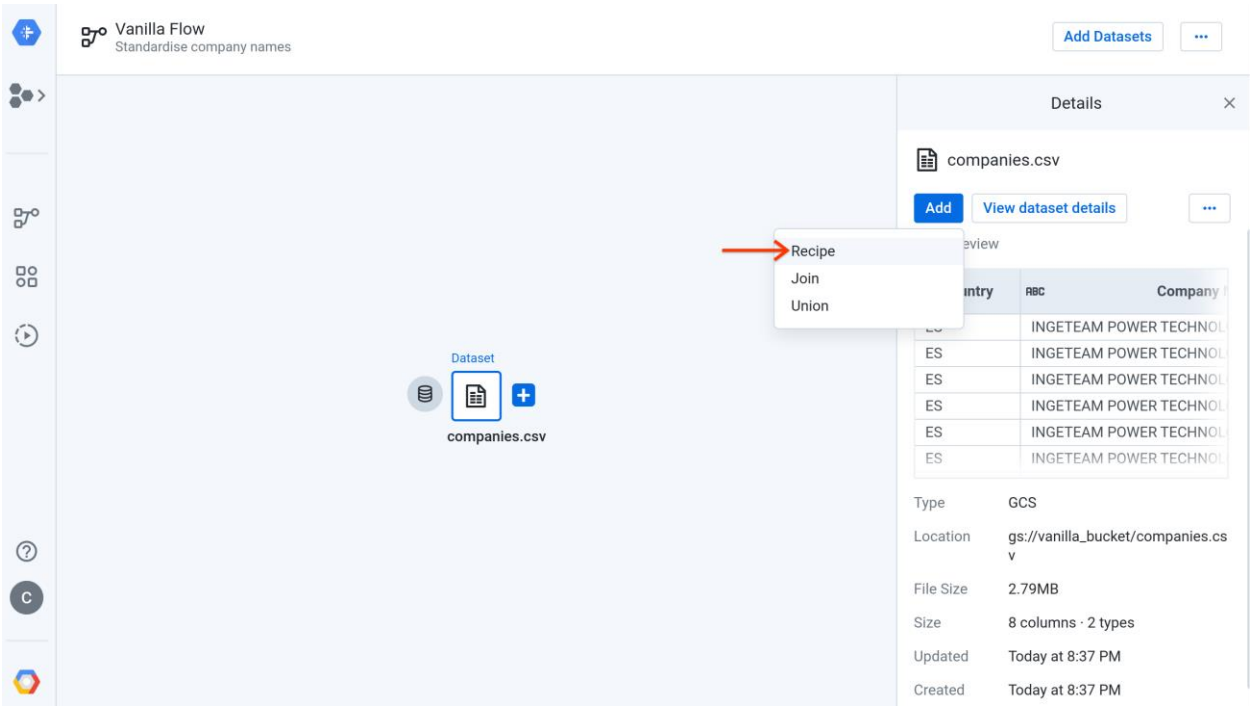

Import Data and Add to Flow
Search...
Upload
GCS
BigQuery
Choose a file or folder
GCS
Create Dataset with Parameters
Search...
NAME
SIZE
LAST UPDATED
dataprep-staging-fb...
dataprep-staging-fb...
vanilla_bucket
0 New Datasets
Choose data to import.
Import & Add to Flow
Cancel

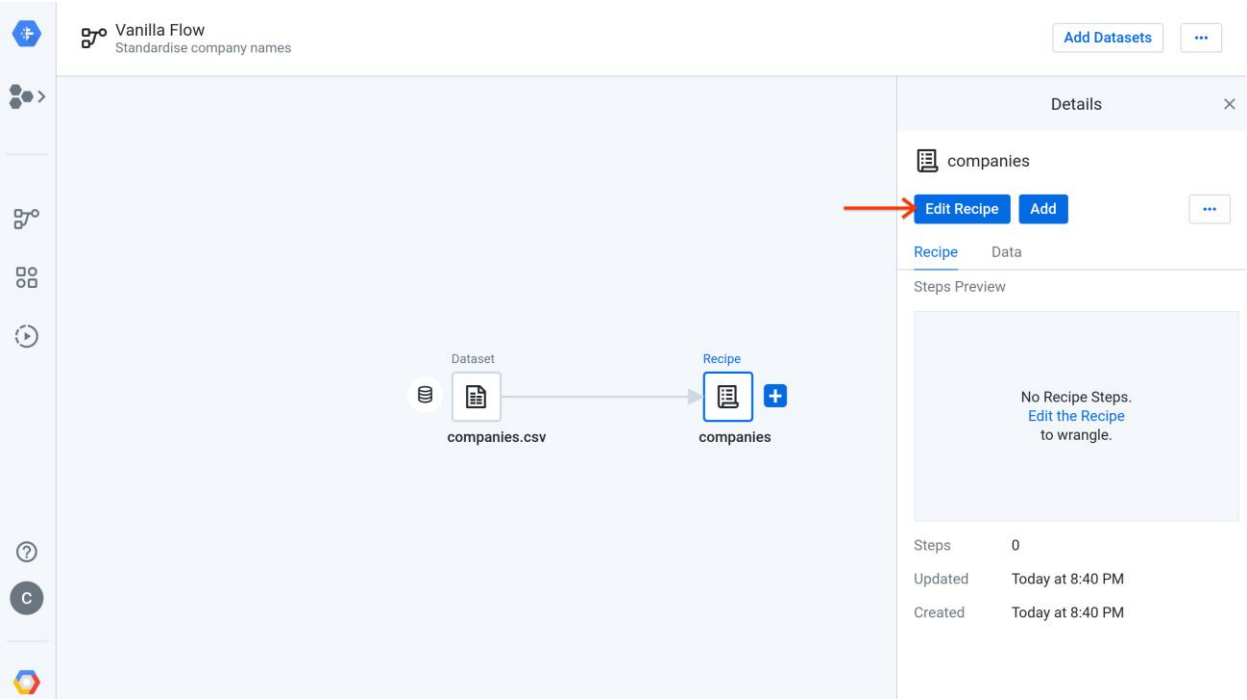




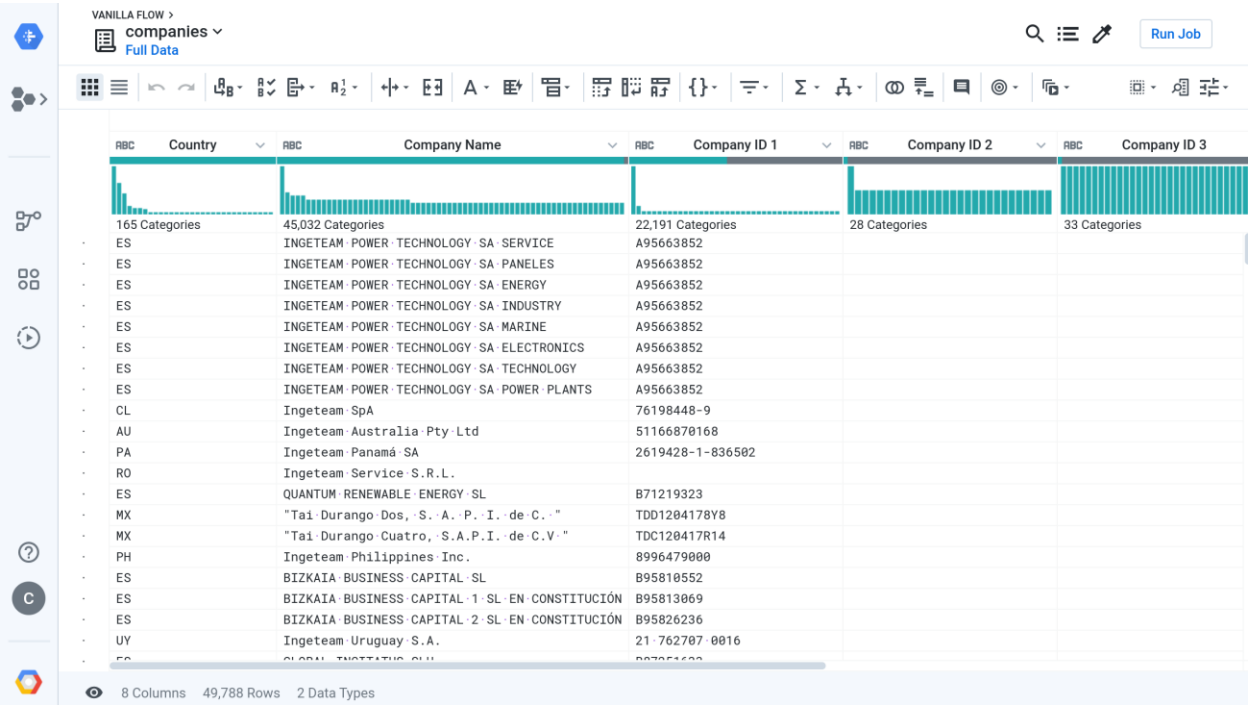
We must create a recipe to clean and prepare the data in companies.csv to upload it to BigQuery.


Vanilla Flow
Standardise company names
Add Datasets
Details
companies.csv
Add
View dataset details
Data Preview
Country
Company
ES
INGETEAM POWER TECHNOL
Dataset
companies.csv
Type
GCS
Location
gs://vanilla_bucket/companies.csv
File Size
2.79MB
Size
8 columns · 2 types
Updated
Today at 8:37 PM
Created
Today at 8:37 PM


Vanilla Flow
Standardise company names
Add Datasets
Details
companies.csv
Add
View dataset details
Recipe
Join
Union
Company
ES
INGETEAM POWER TECHNOL
Dataset
companies.csv
Type
GCS
Location
gs://vanilla_bucket/companies.csv
File Size
2.79MB
Size
8 columns · 2 types
Updated
Today at 8:37 PM
Created
Today at 8:37 PM

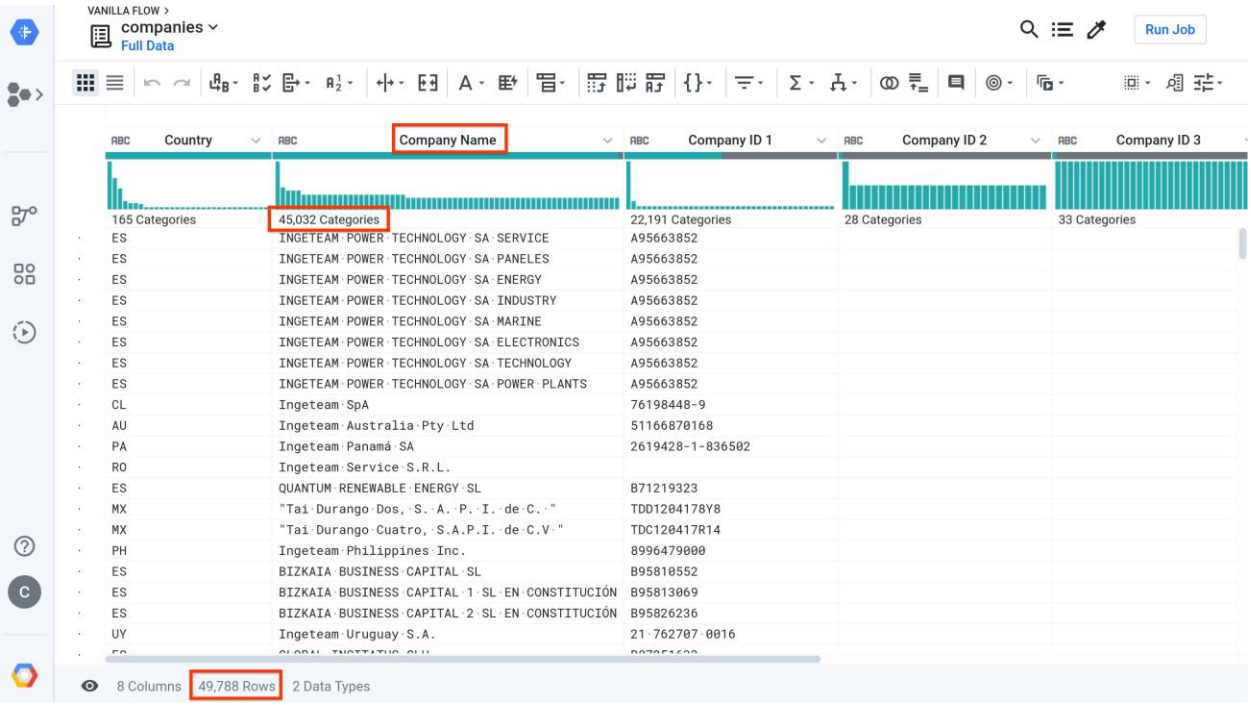


When we edit the recipe for the first time, it shows us the data in the CSV file. Dataprep allows to quickly analyse the data and add the transformations easily.

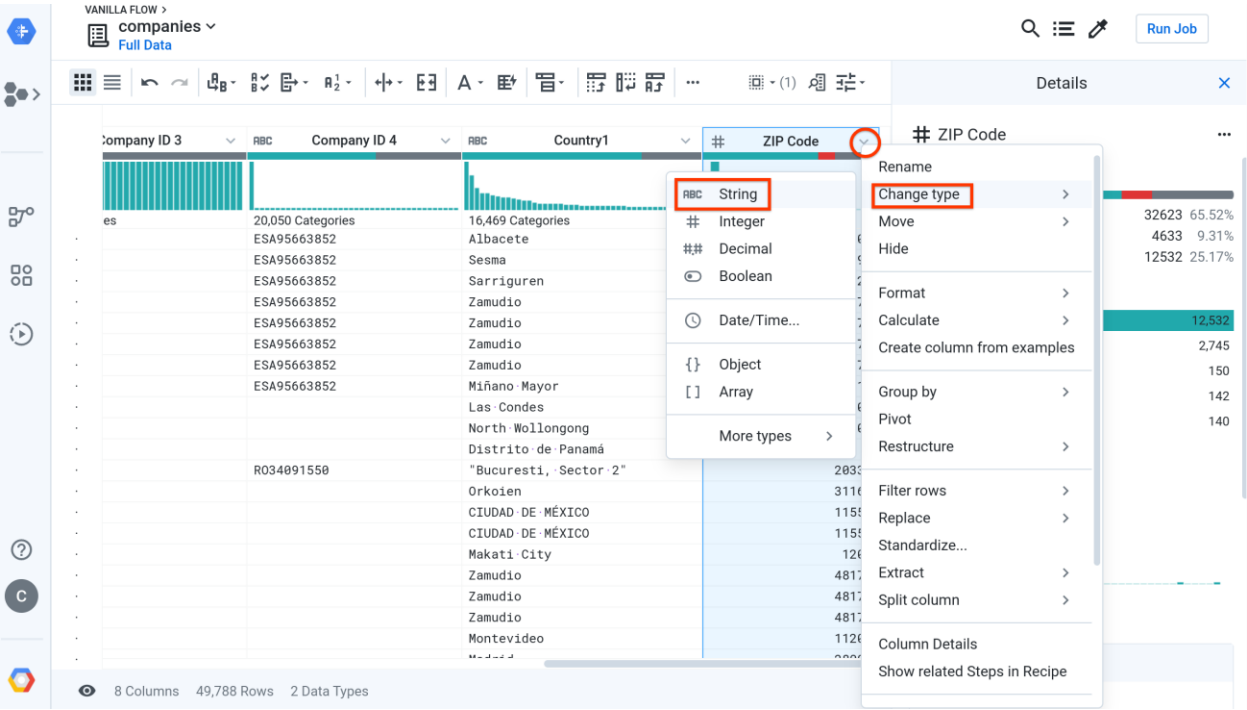


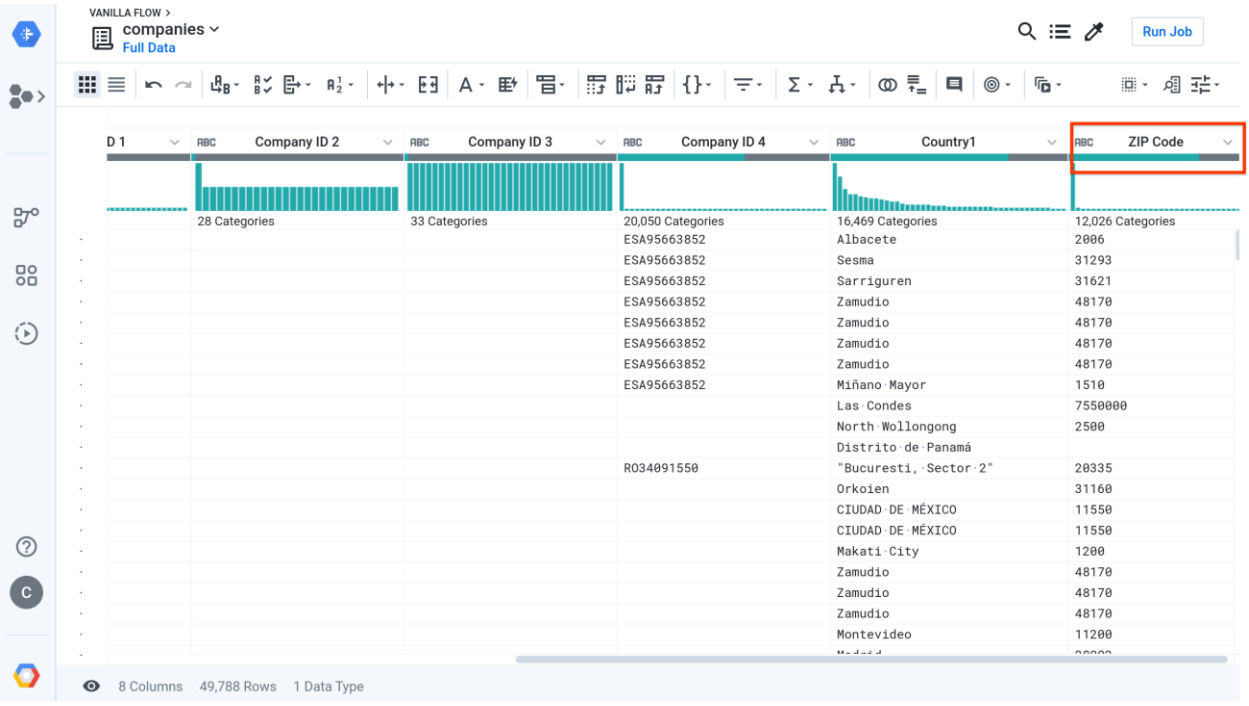
In this demo, we are going to clean and prepare three fields, but we are going to focus on the company name (Vanilla in companies.csv). See that when we open the CSV file before

standardising the companies, there are 49,788 rows in the file and 45,032 different company names.

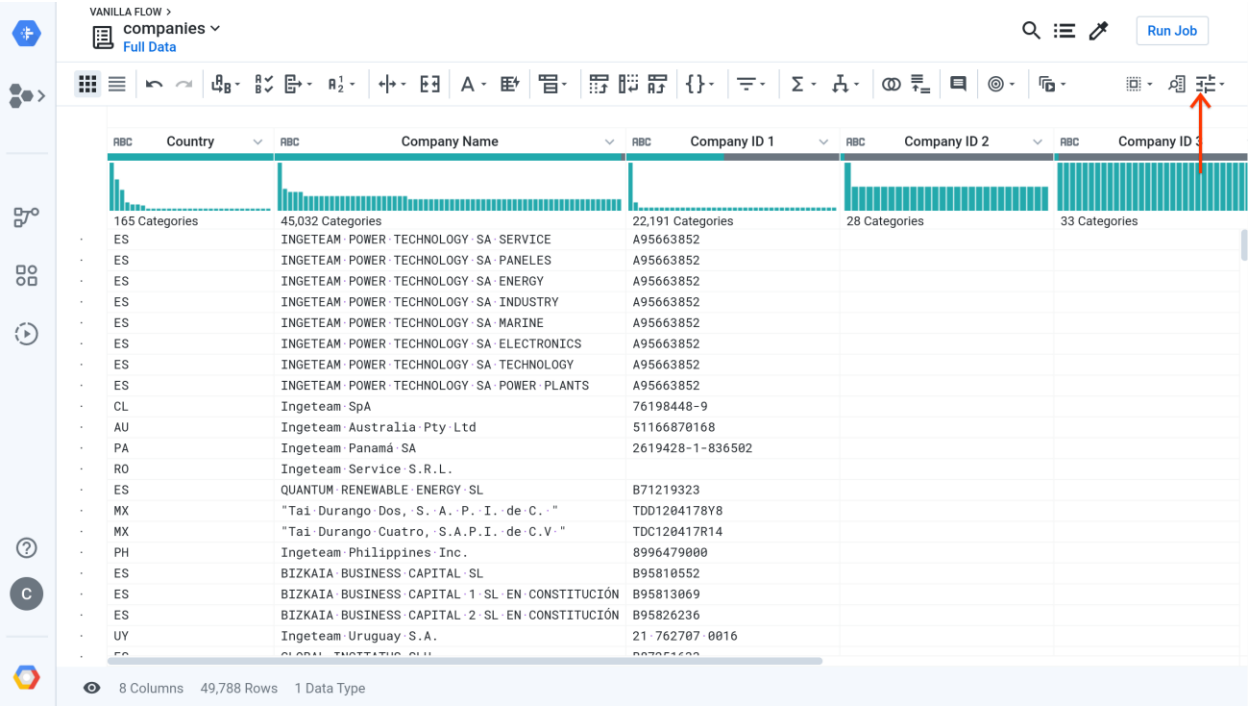


If we scroll right, we see that the quality bar for the ZIP code shows mismatched values. This is due to the fact that most of the ZIP codes in this file are Spanish, which means they are made of 5 digits. However, some companies are outside Spain and the ZIP codes may be alphanumeric. So we change the data type to string.

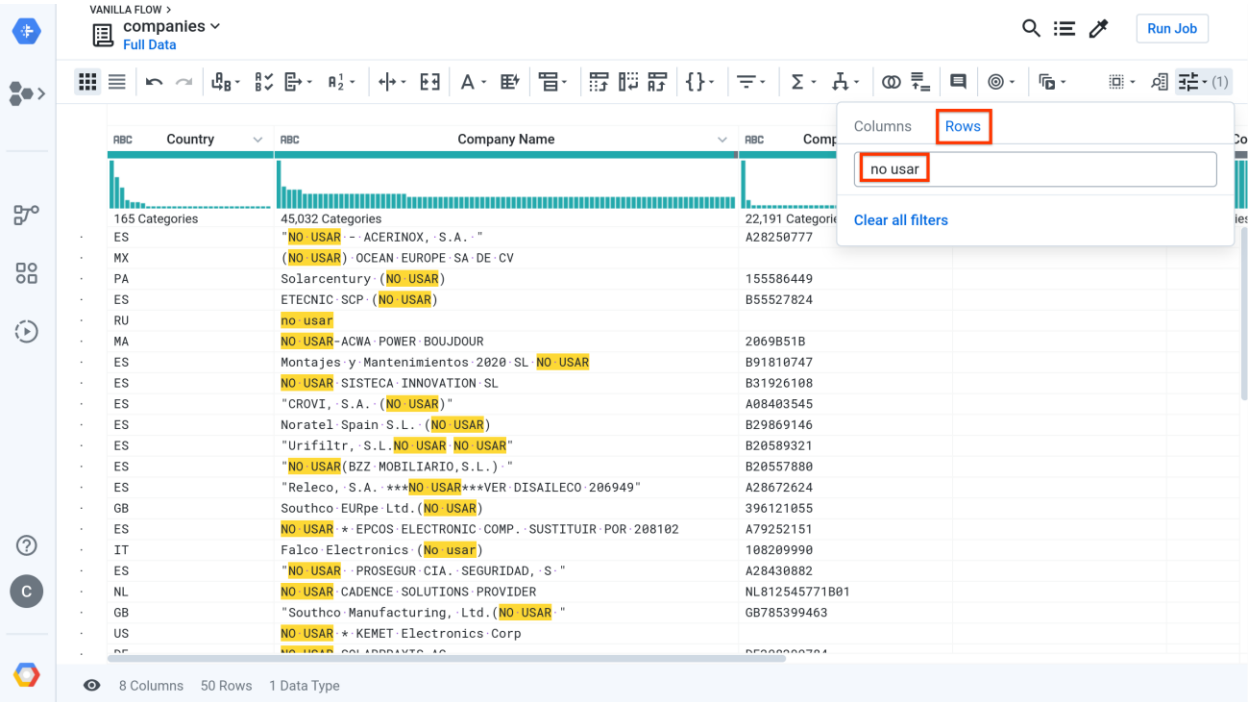




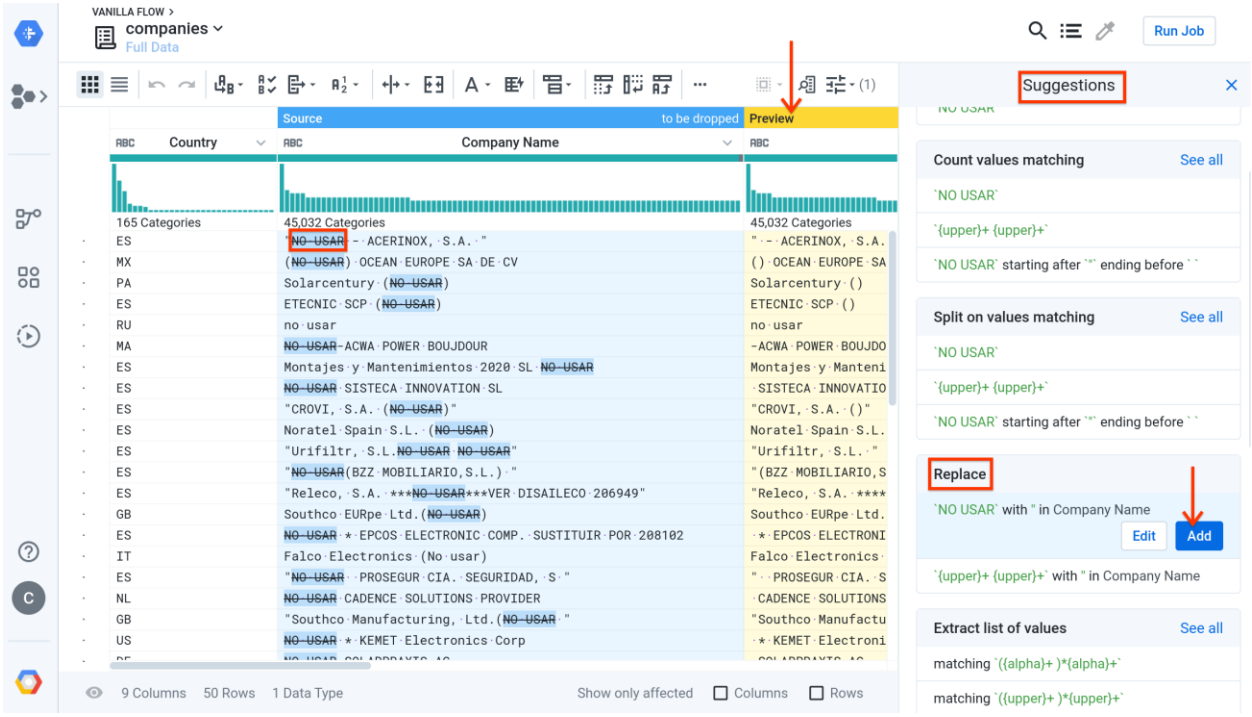
In the source application when someone wanted to indicate that a company name shouldn't be used, they have written "do not use" in Spanish and Italian within the company name. We are going to remove all those strings as the company names are valid in our historical information and we should use an end date to mark the validity of a company. First we look for those rows.

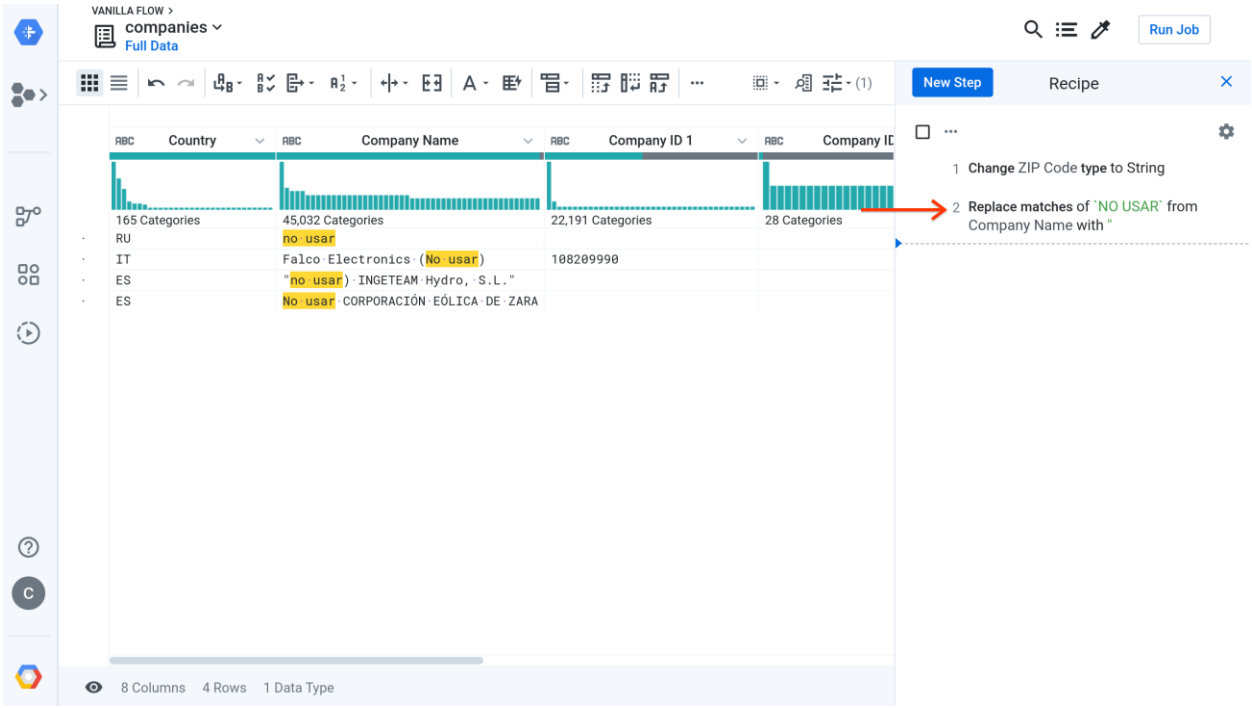


We search for “no usar” (do not use).

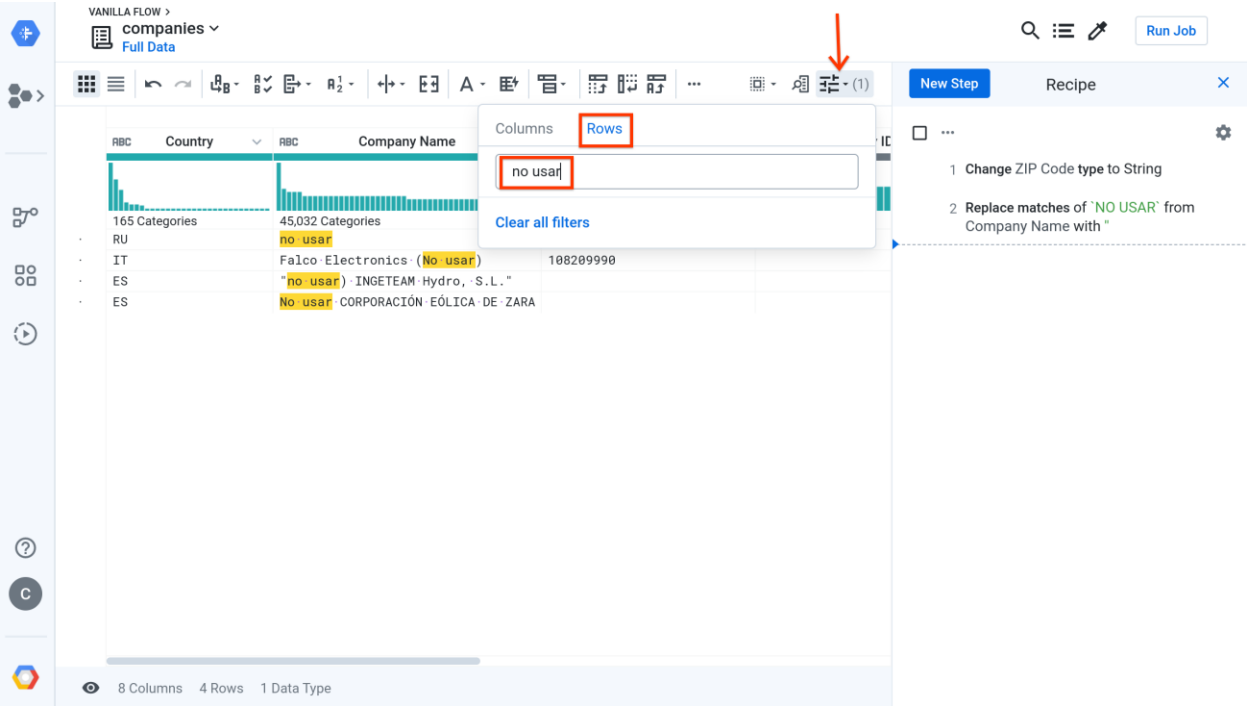


We highlight one of the “no usar” occurrences. A Suggestions wizard shows on the right. We choose Replace with ‘’. A yellow column appears which shows how the company names will look after the replacement. We click on “add”.

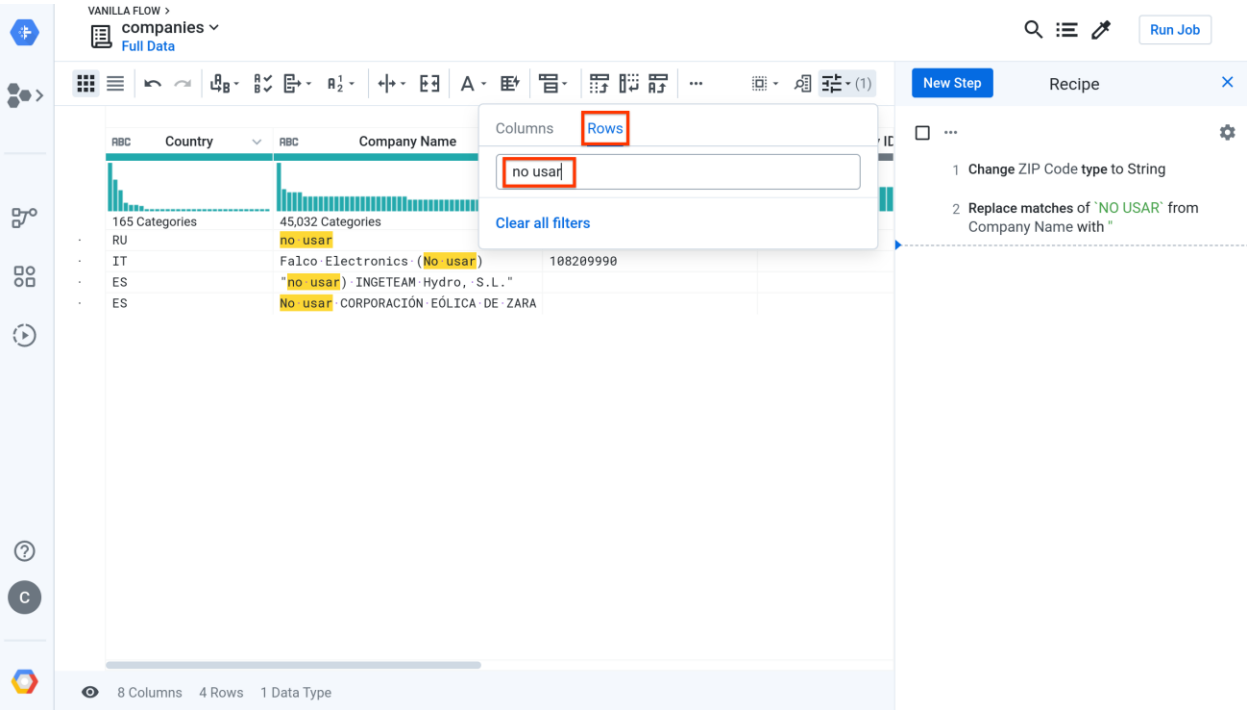


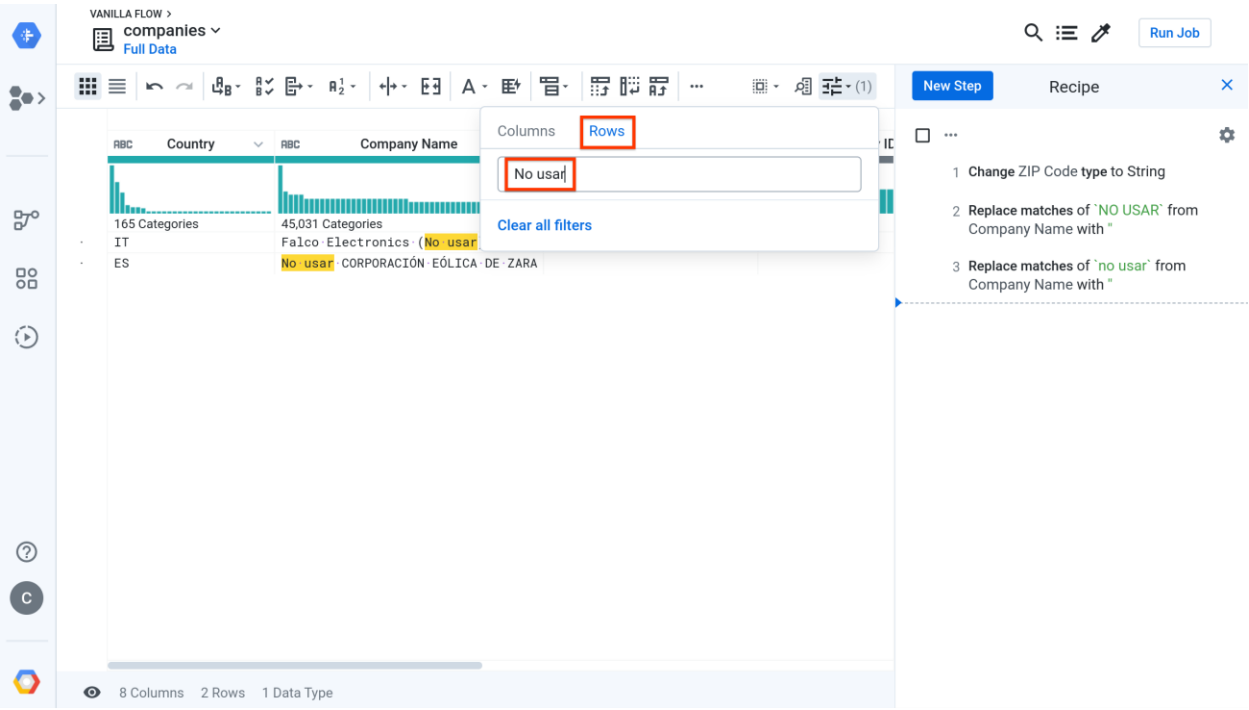


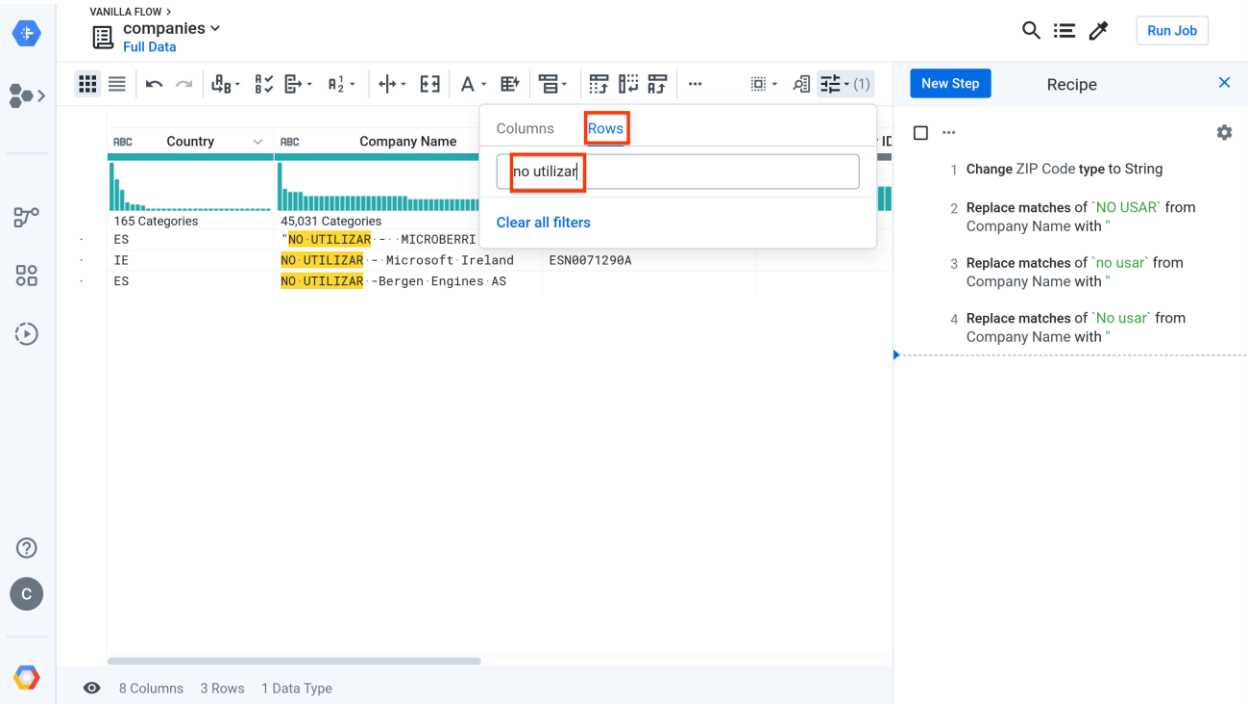
We click on the filter again and on “Clear all filters”.

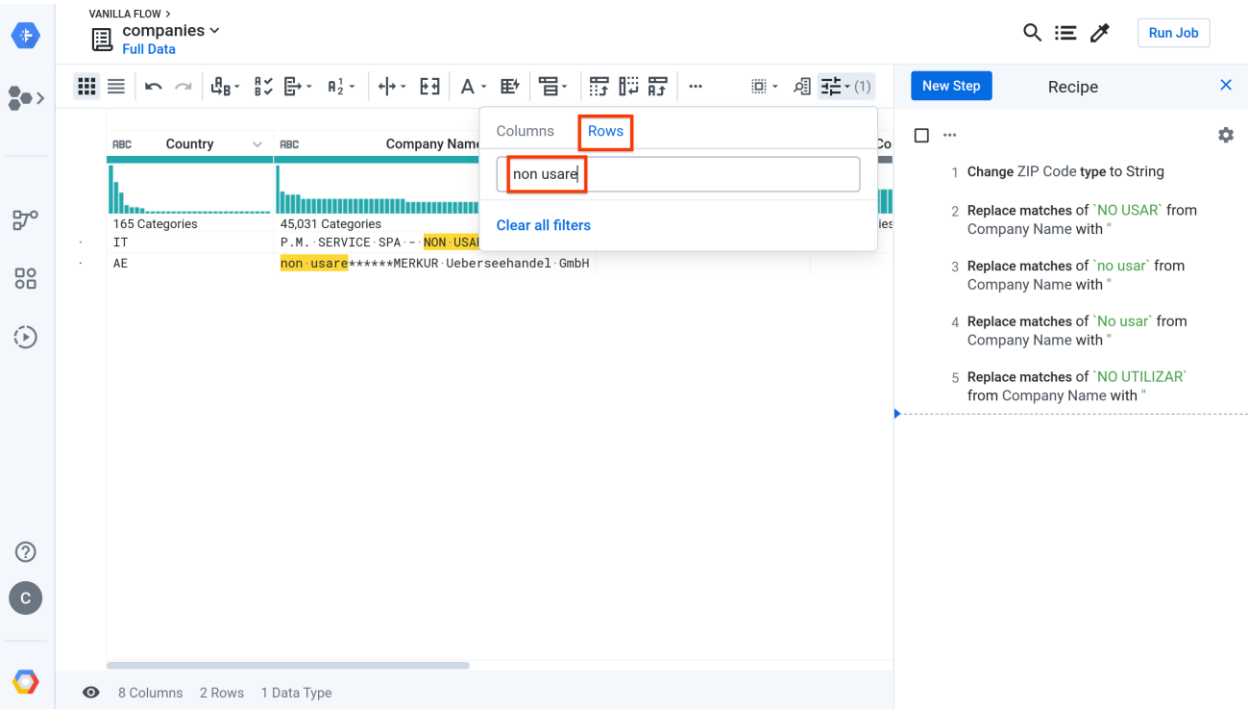


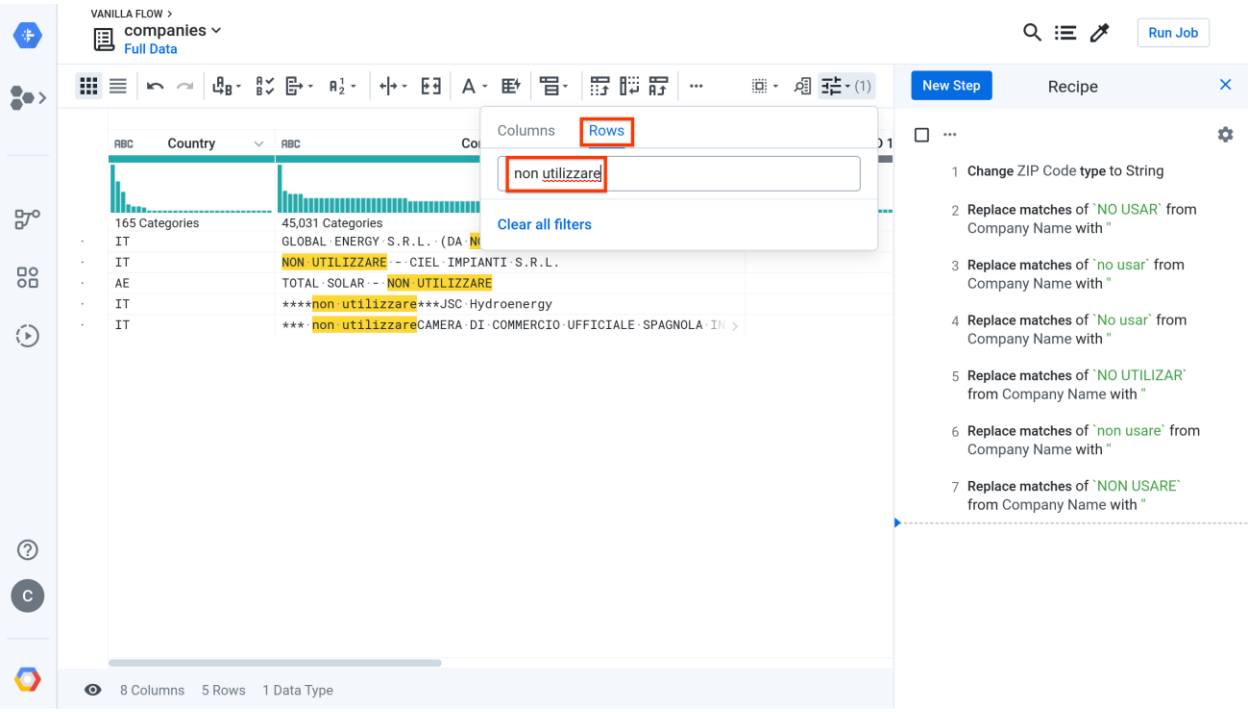
We continue searching for the “do not use” tags within the company name, and we remove them as done with “no usar”. Note that Cloud Dataprep is sensitive to capitalization. If we search for “do not use”, we find the records which have “DO NOT USE” and “do not use”. We must highlight and remove the occurrence in capital letters and the one in lowercase as well.



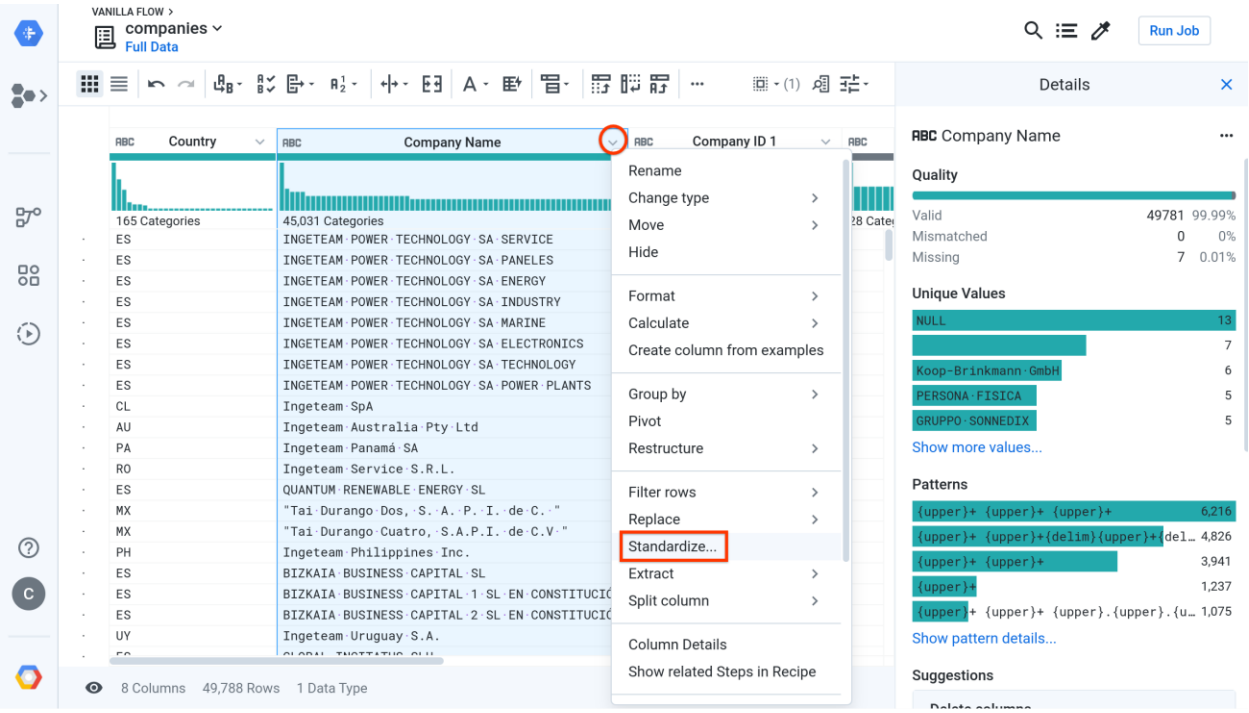

VANILLA FLOW
companies
Full Data
Run Job
New Step
Recipe
Columns
Rows
No usar
Clear all filters
Country
Company Name
165 Categories
45,031 Categories
IT
Falco Electronics (No usar
ES
No usar CORPORACIÓN EÓLICA DE ZARA
1 Change ZIP Code type to String
2 Replace matches of `NO USAR` from Company Name with ''
3 Replace matches of `no usar` from Company Name with ''
8 Columns 2 Rows 1 Data Type


VANILLA FLOW
companies
Full Data
Run Job
New Step
Recipe
Columns
Rows
no utilizar
Clear all filters
Country
Company Name
165 Categories
45,031 Categories
ES
"NO UTILIZAR - - MICROBERRI
IE
NO UTILIZAR - Microsoft Ireland ESN0071290A
ES
NO UTILIZAR -Bergen Engines AS
1 Change ZIP Code type to String
2 Replace matches of `NO USAR` from Company Name with ''
3 Replace matches of `no usar` from Company Name with ''
4 Replace matches of `No usar` from Company Name with ''
8 Columns 3 Rows 1 Data Type



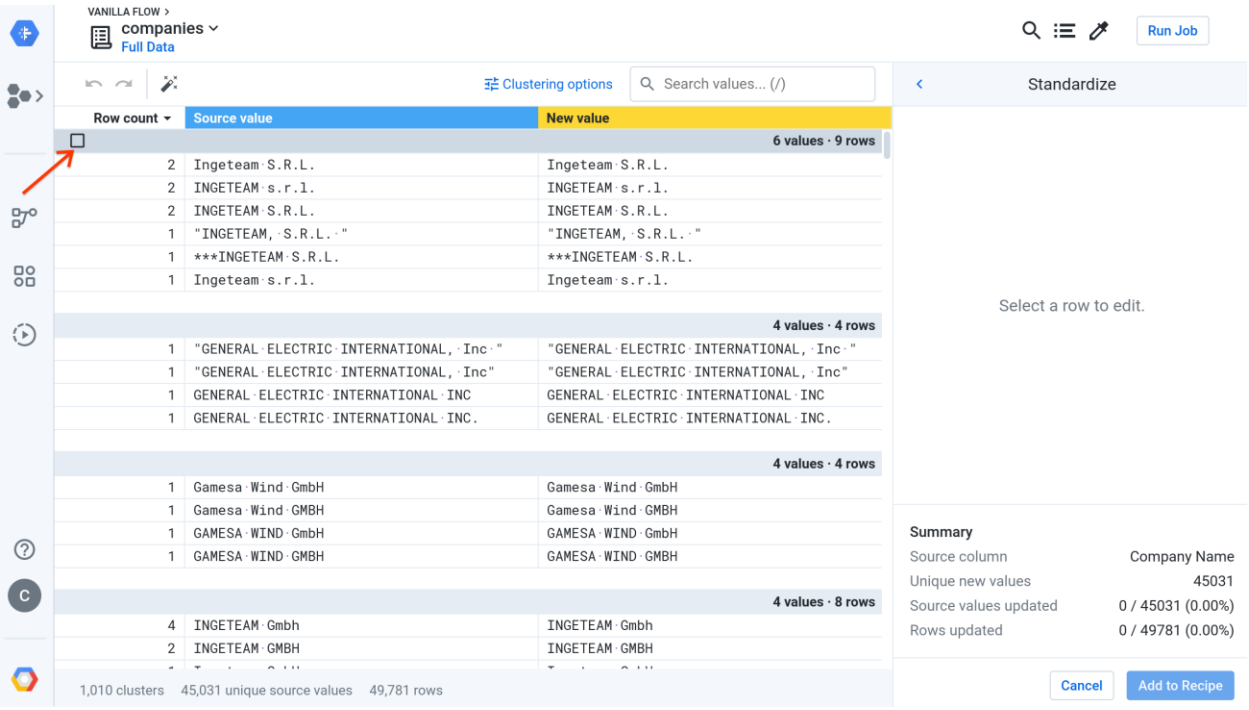


Now we standardise the company names.

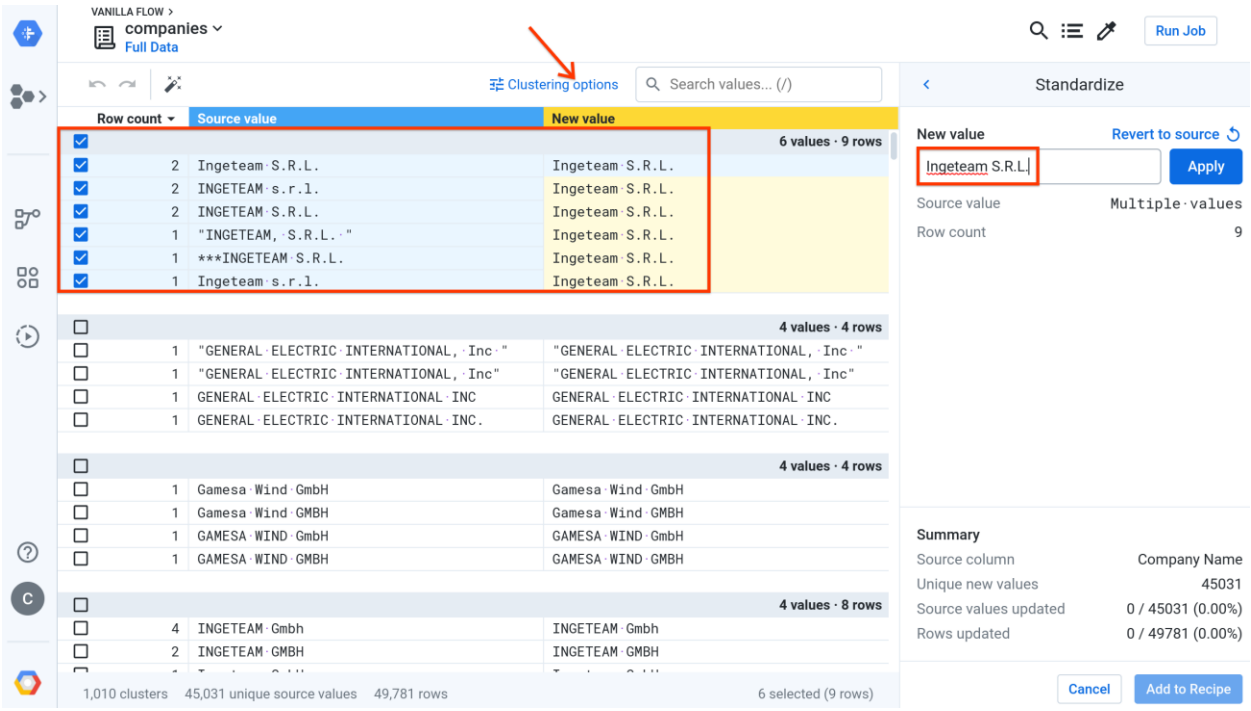


After clicking on “Standardize”, the company names are clustered by similar strings (the values have characters in common). This is a fuzzy matching method, as the company names within a cluster are not necessarily identical.

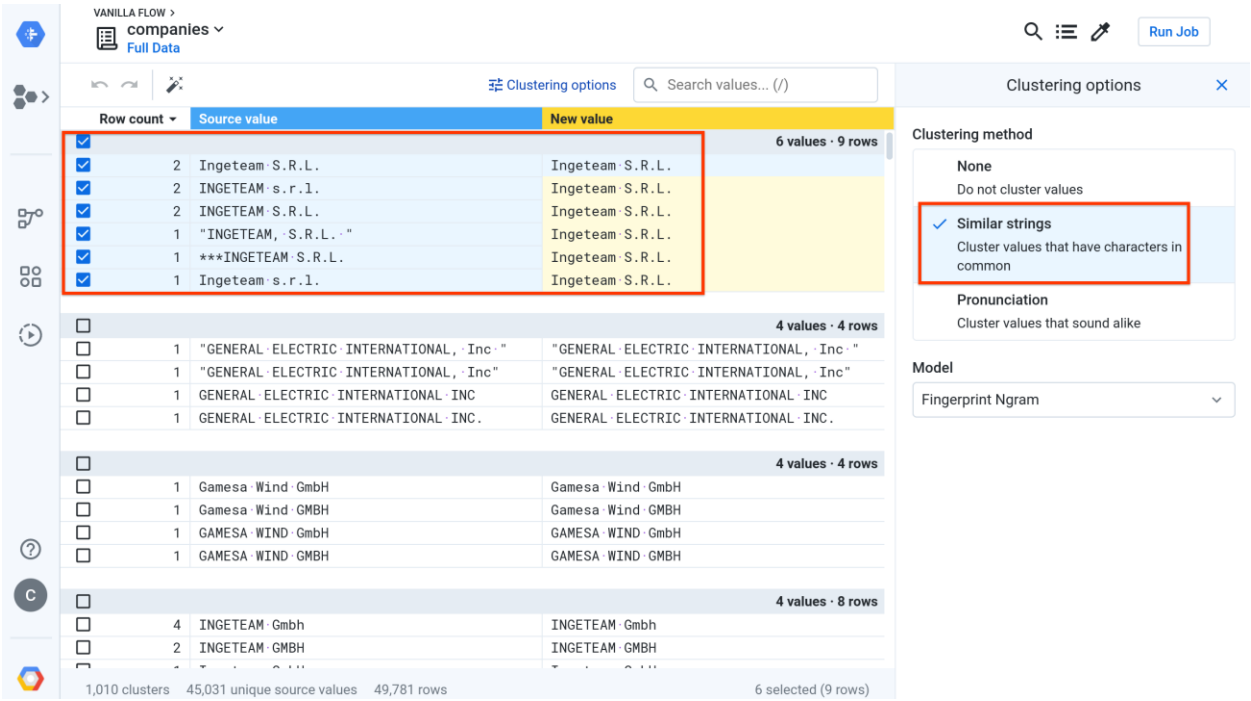
If all values in a cluster should have the same name, we select the cluster.



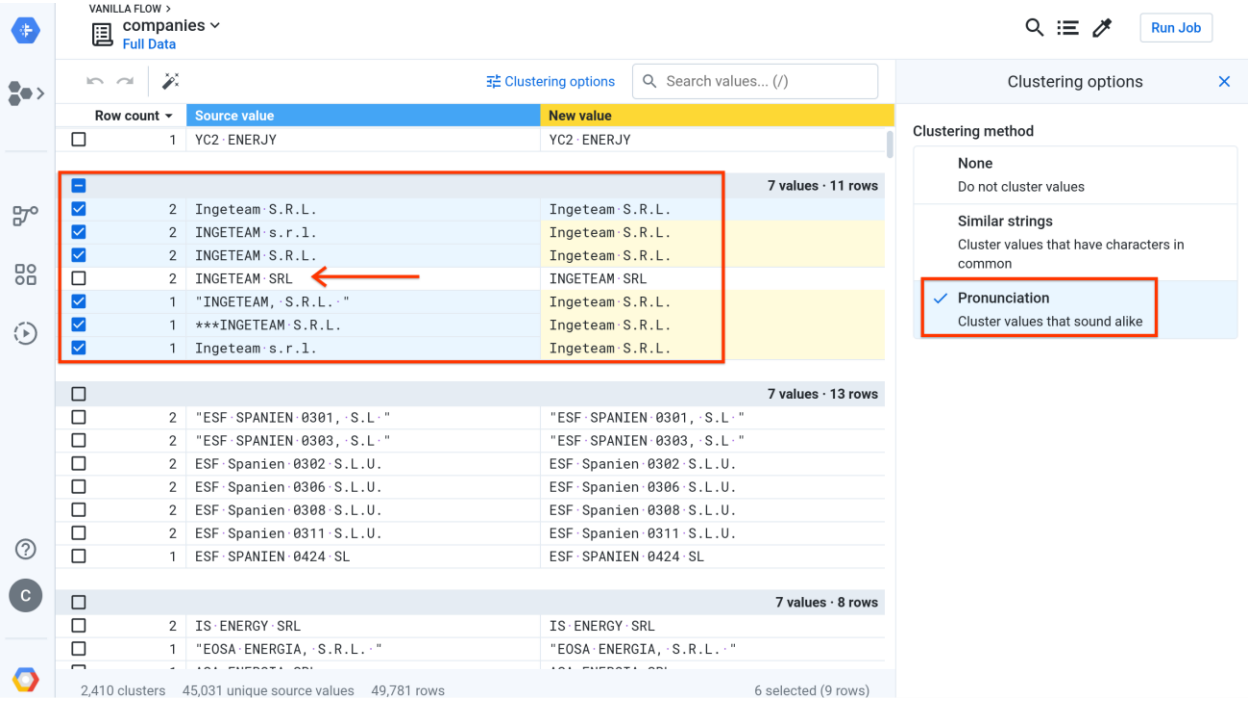
We type the new value all occurrences in the cluster should have. Then we click on “Clustering options”.

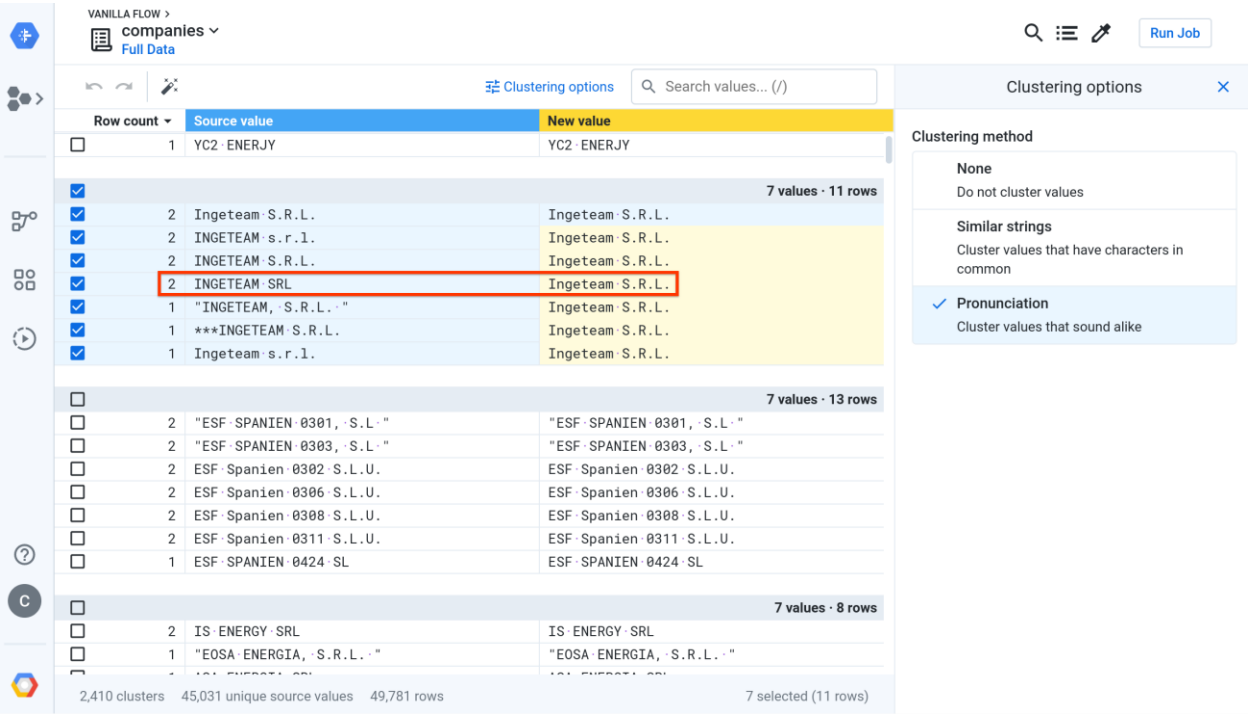


We confirm we were clustering on similar strings.

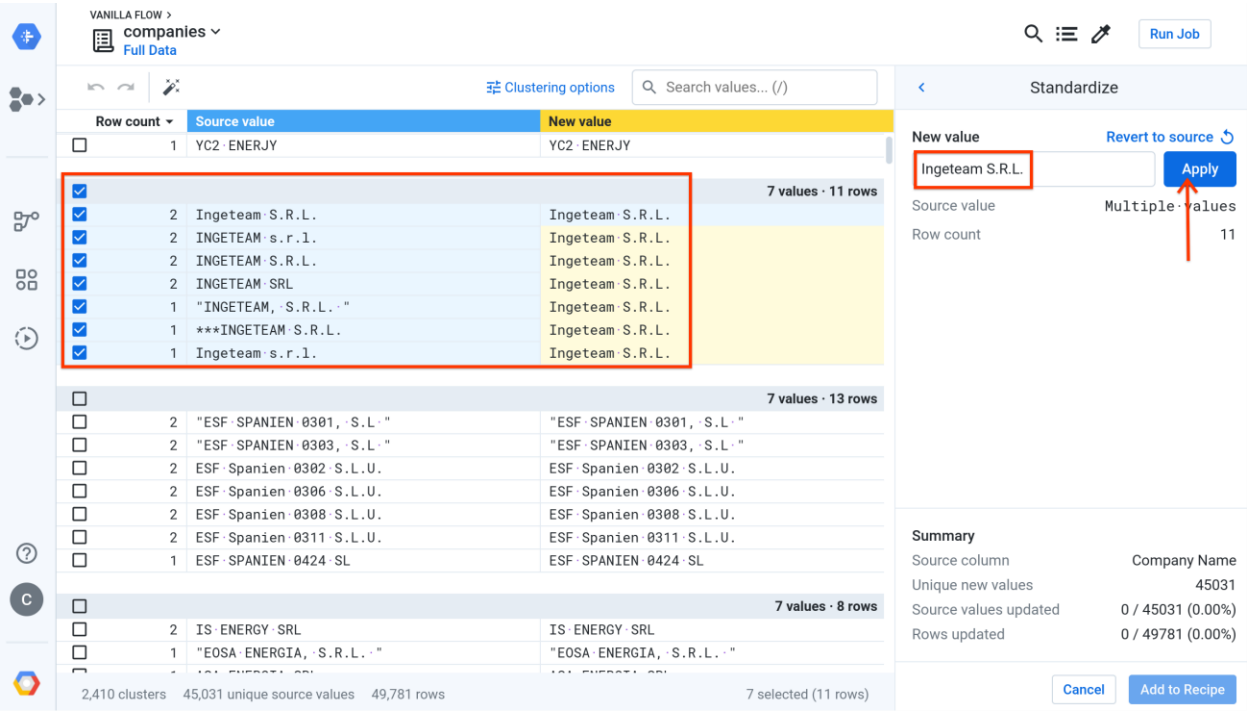


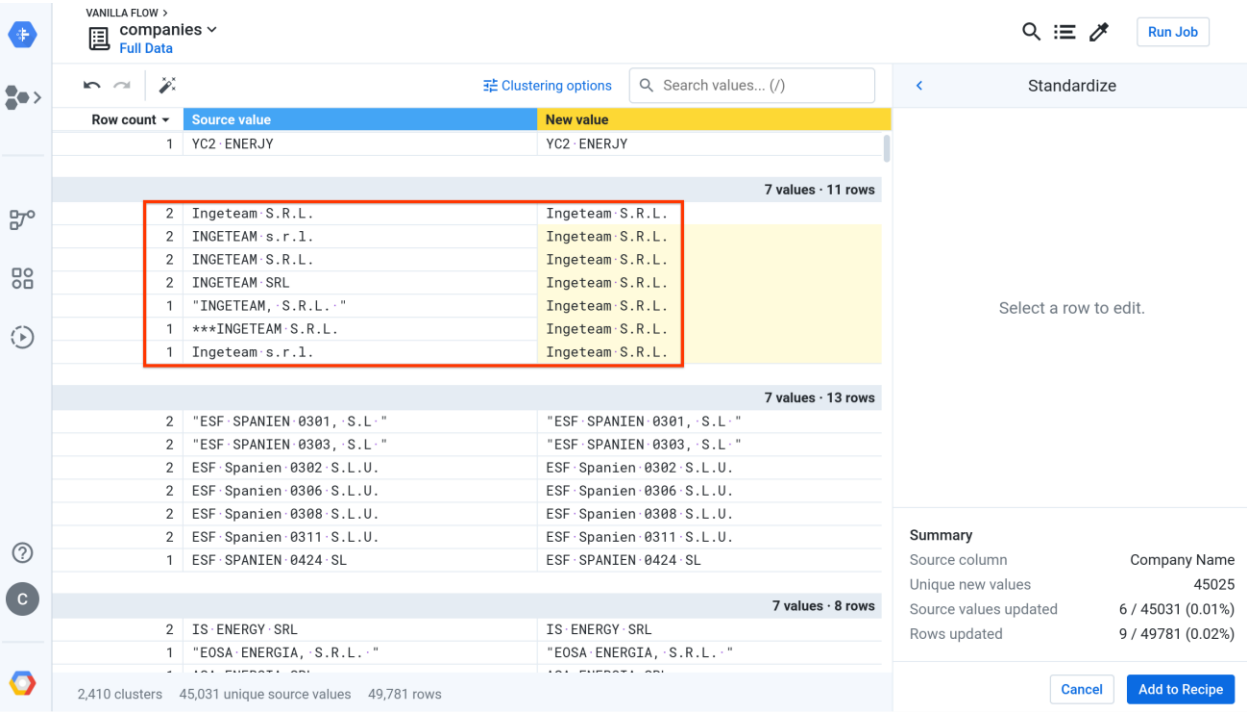
Now we cluster on similar pronunciation, that's to say, the values sound alike. We select uncheck values in the new cluster if they should have the same value as the cluster we have already selected with the similar string.



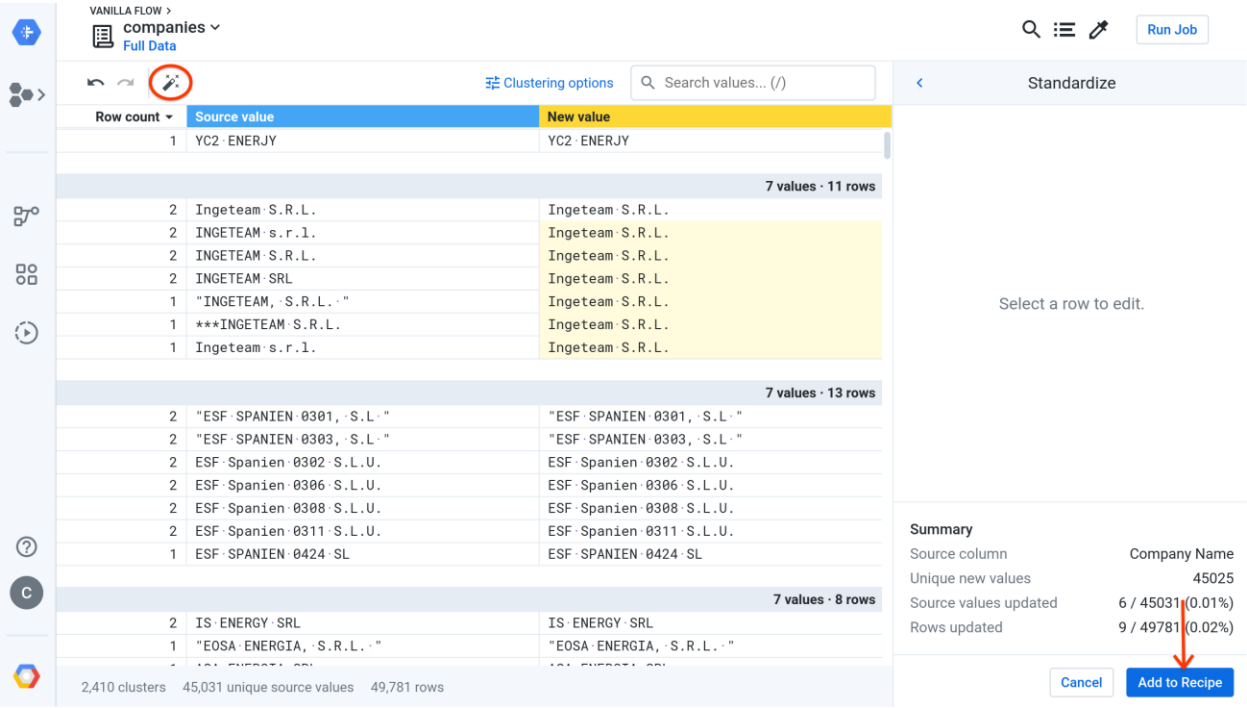


We apply the new value to all the occurrences we selected (similar string or pronunciation). Bear in mind that the Double Metaphone algorithm - used to cluster values with similar phonetics - fails when there is a space among the characters. You should review all possible values for the company names in the CSV file used for this demo.

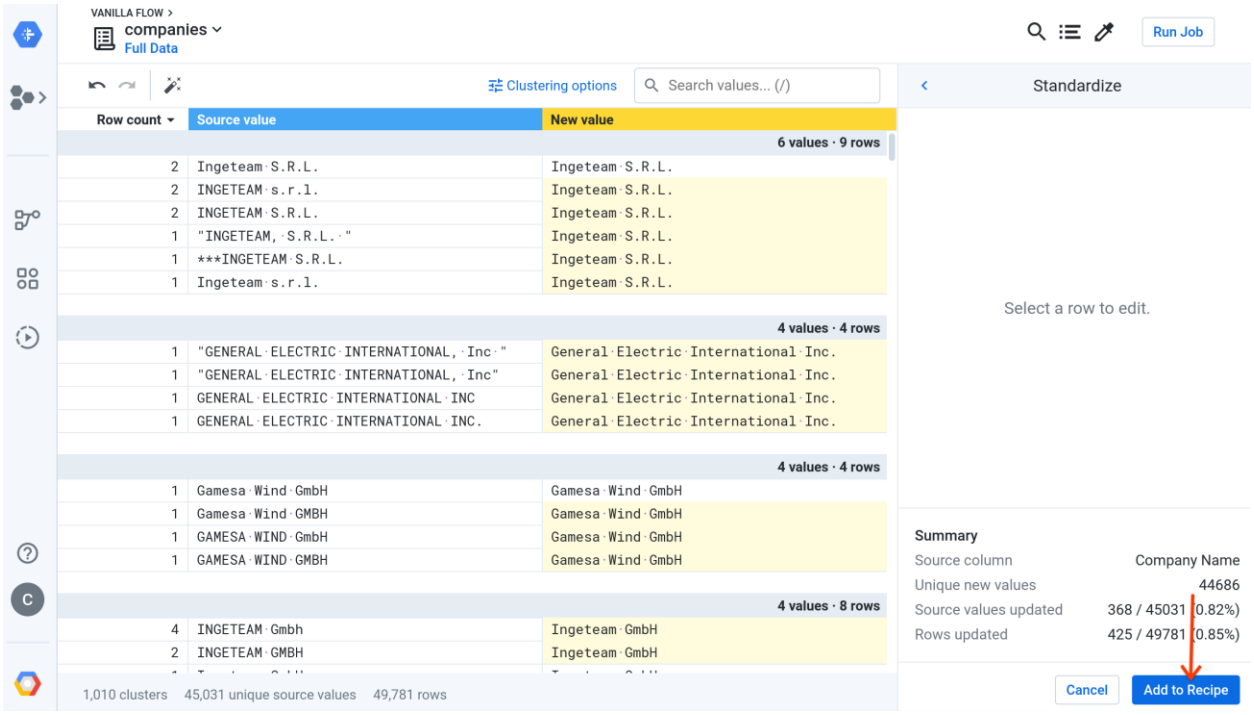


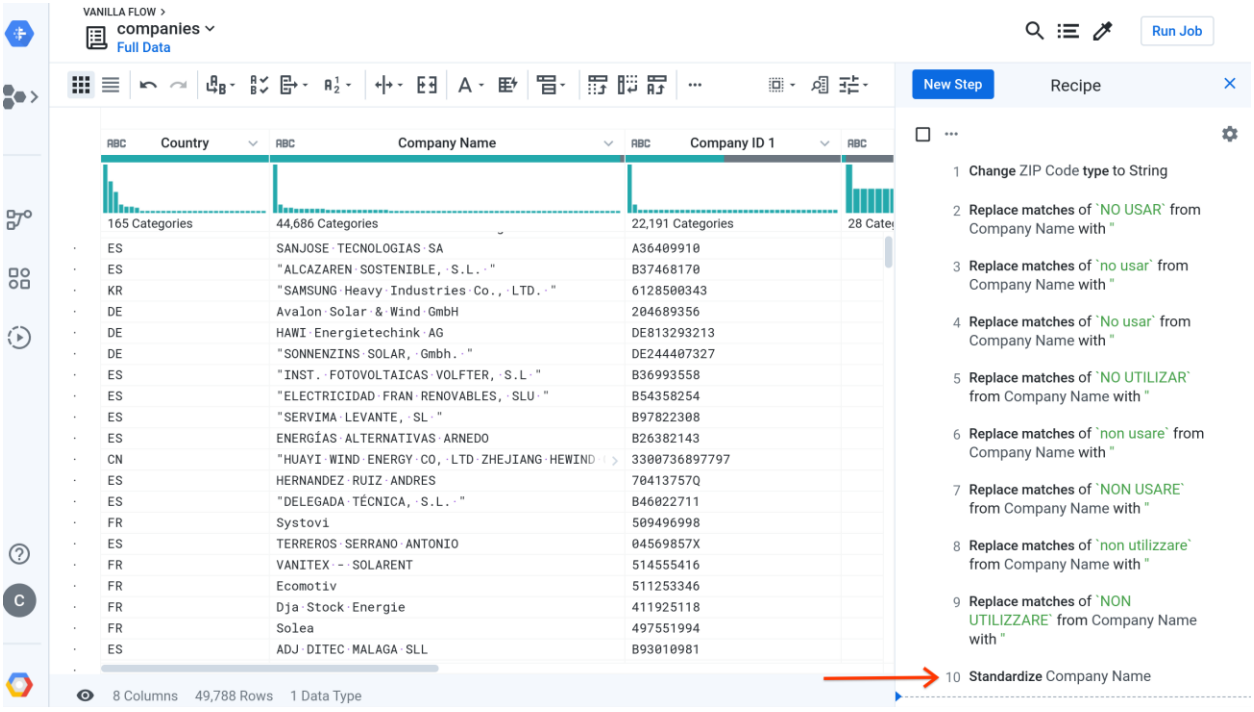


There is also a wizard button which will automatically standardise all values within each cluster to a suggested value based on occurrence frequency. Use it if you are fairly confident Cloud Dataprep will easily detect all changes which need to be done. Then you can review the changes before adding to the recipe.

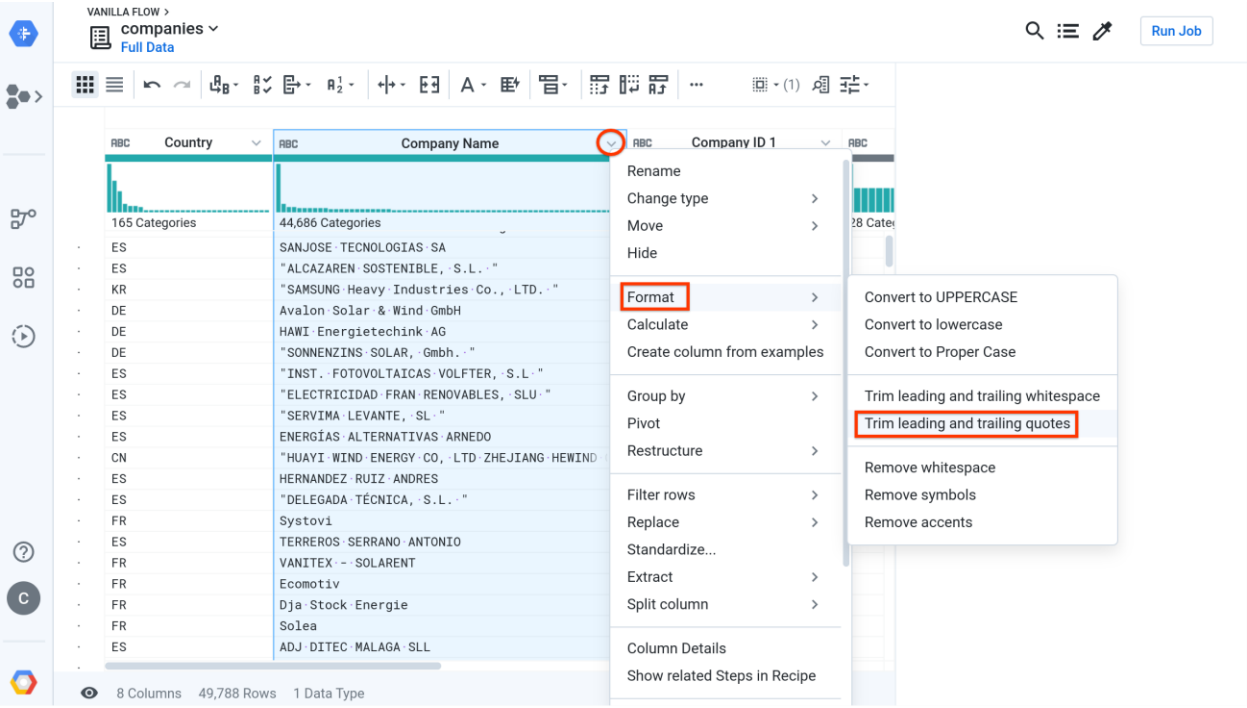


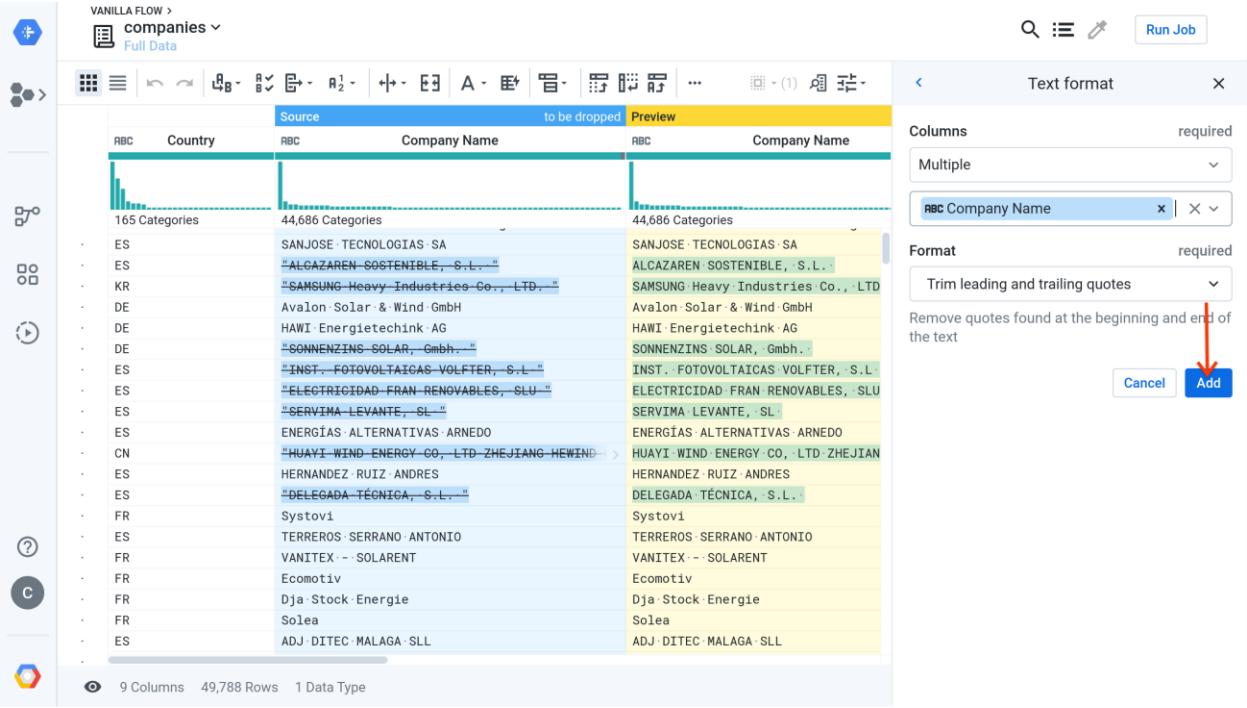
Once you are pleased with all values in the CSV, click on “Save to recipe”.



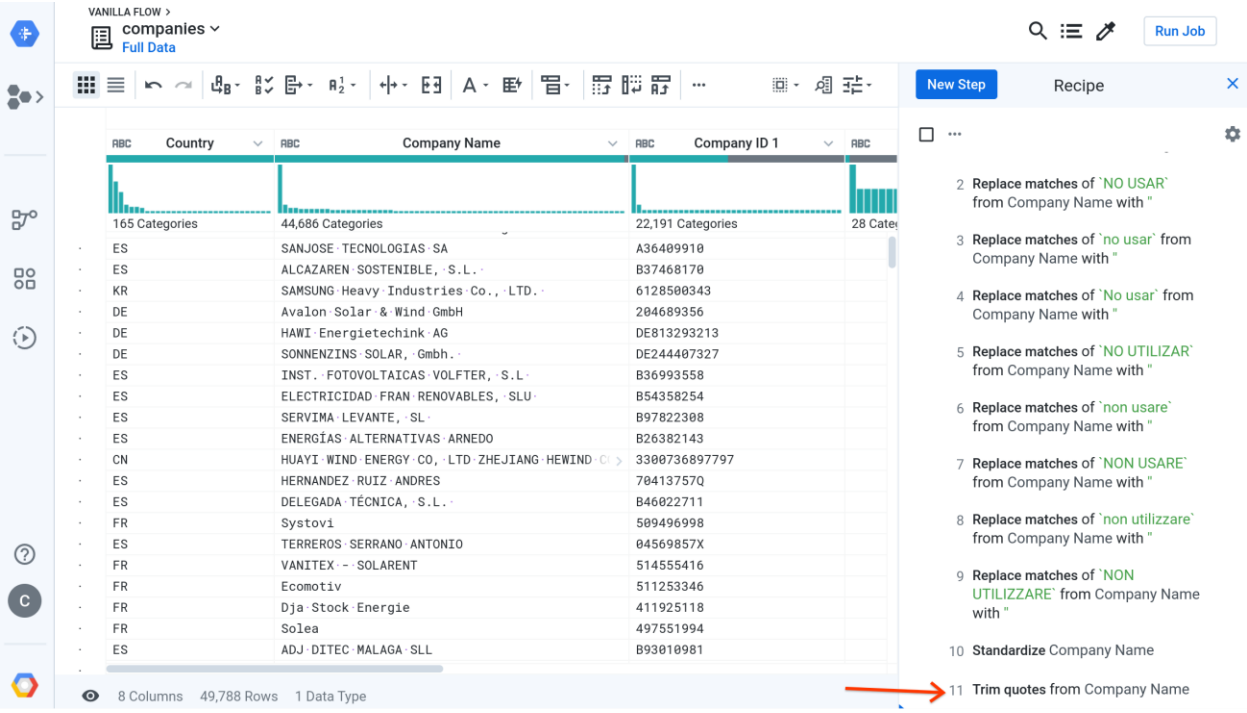


We remove the leading and trailing quotes in the company names.

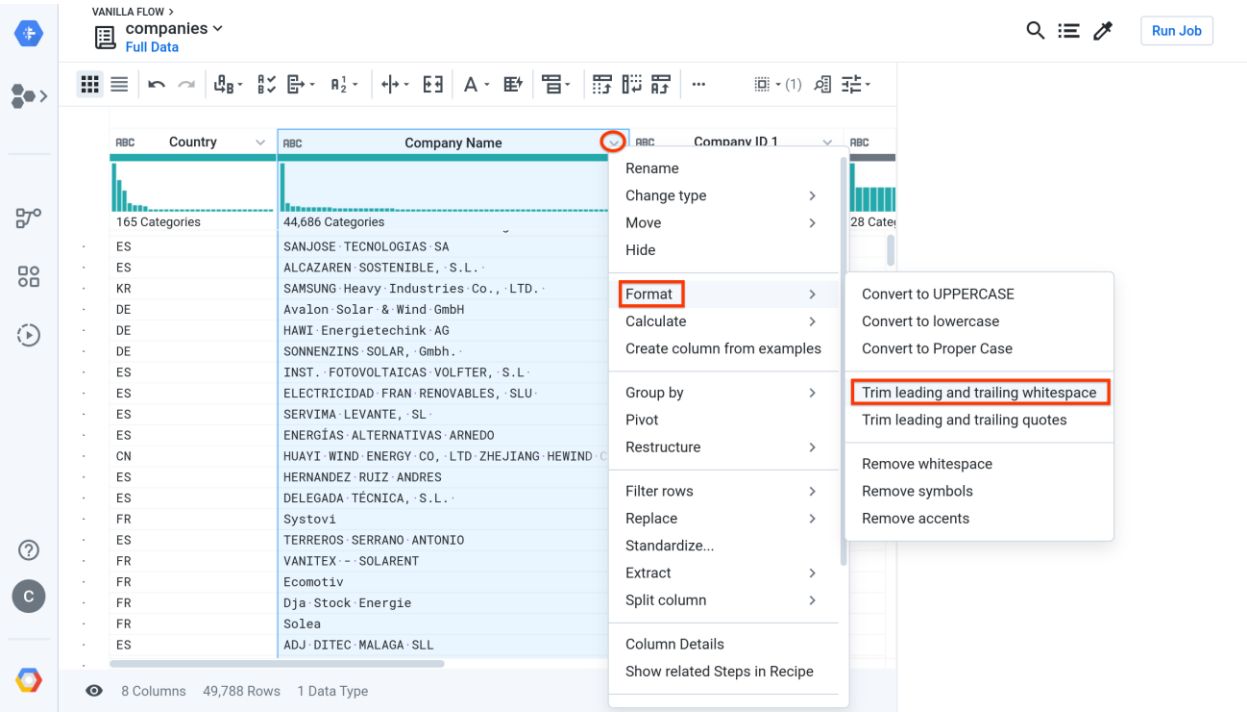

VANILLA FLOW
companies
Full Data
Run Job
Country
Company Name
Company ID 1
165 Categories
44,686 Categories
Rename
Change type
Move
Hide
Format
Calculate
Create column from examples
Group by
Pivot
Restructure
Filter rows
Replace
Standardize...
Extract
Split column
Column Details
Show related Steps in Recipe
Convert to UPPERCASE
Convert to lowercase
Convert to Proper Case
Trim leading and trailing whitespace
Trim leading and trailing quotes
Remove whitespace
Remove symbols
Remove accents
8 Columns
49,788 Rows
1 Data Type

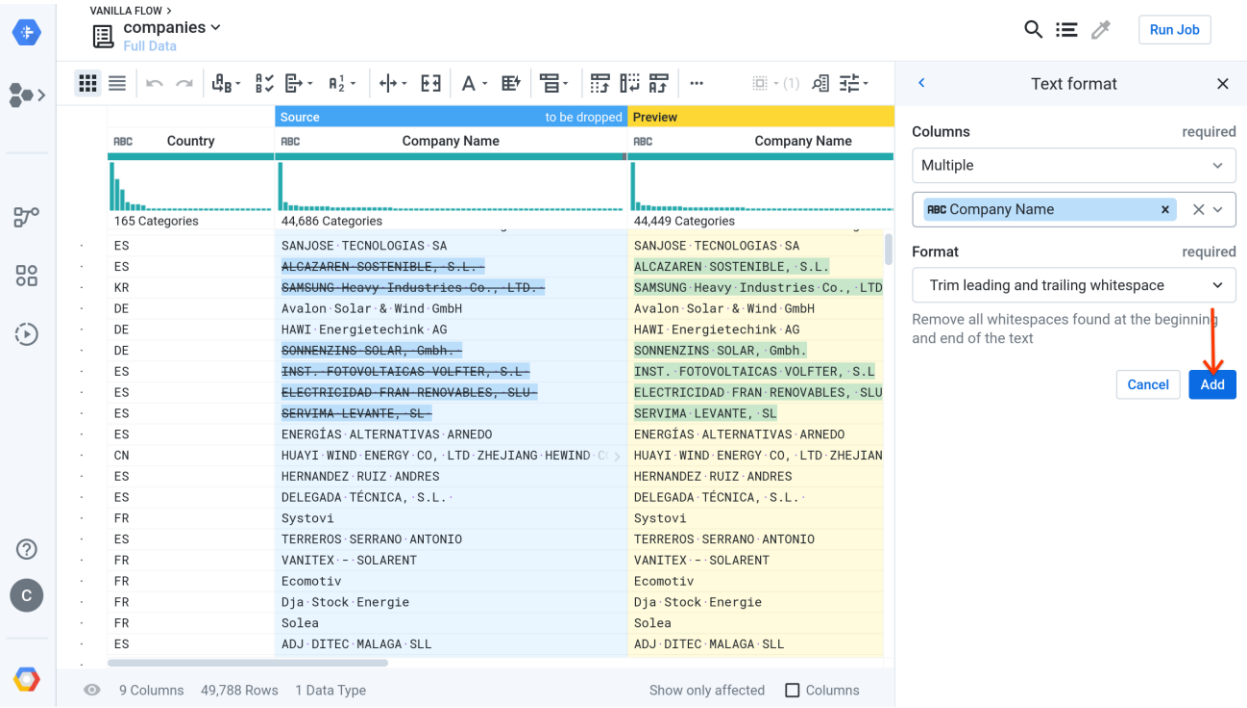

VANILLA FLOW
companies
Full Data
Run Job
Source
to be dropped
Preview
Country
Company Name
Company Name
165 Categories
44,686 Categories
44,686 Categories
Text format
Columns
required
Multiple
Company Name
Format
required
Trim leading and trailing quotes
Remove quotes found at the beginning and end of the text
Cancel
Add
9 Columns
49,788 Rows
1 Data Type

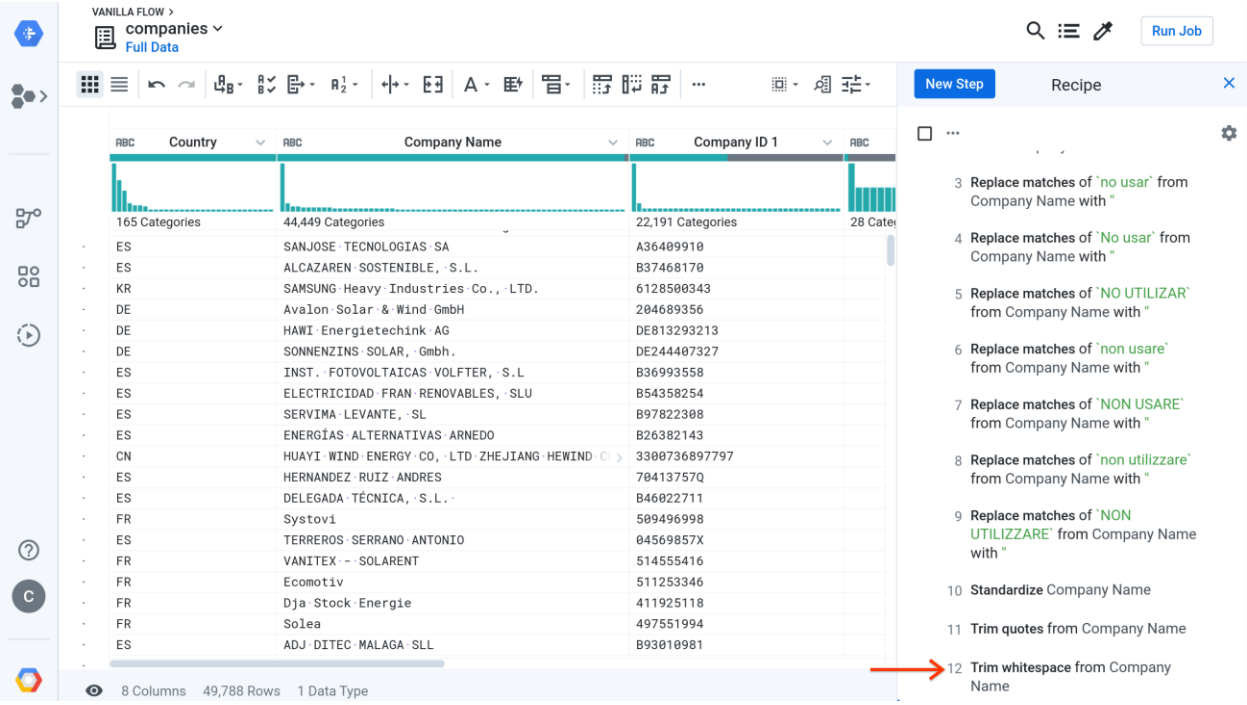
CELIA MURIEL



We remove the leading and trailing white spaces in the company names.

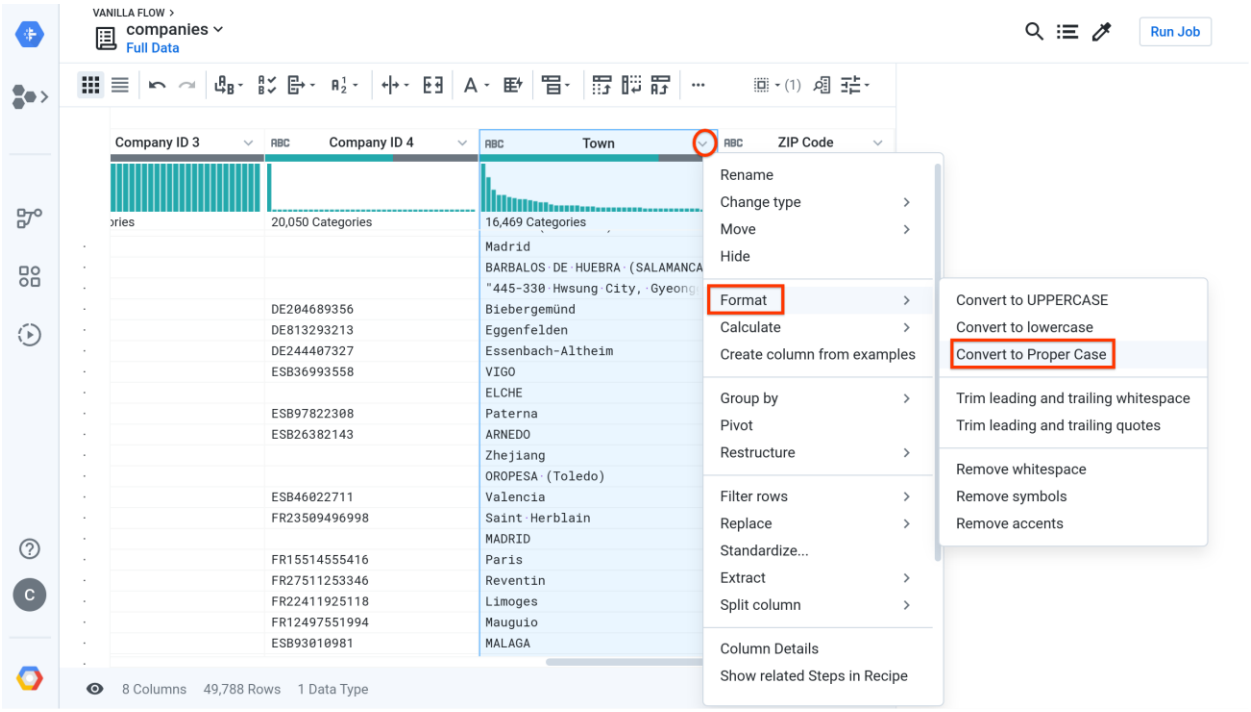


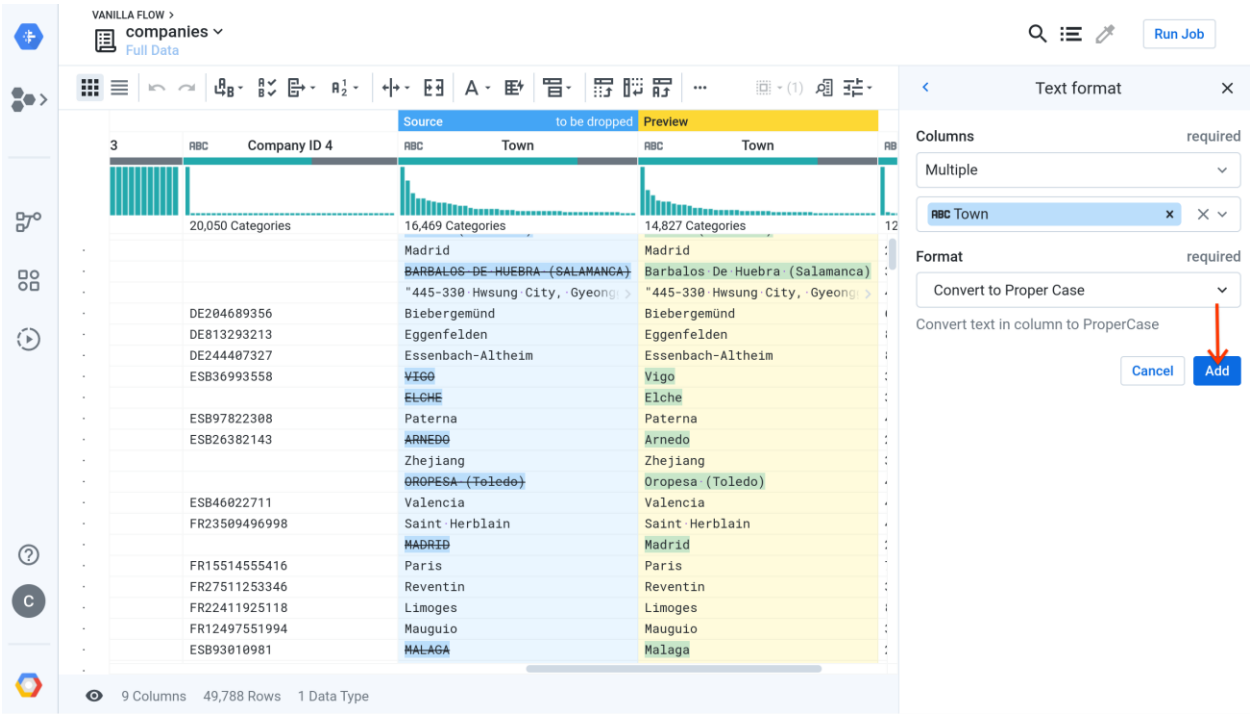


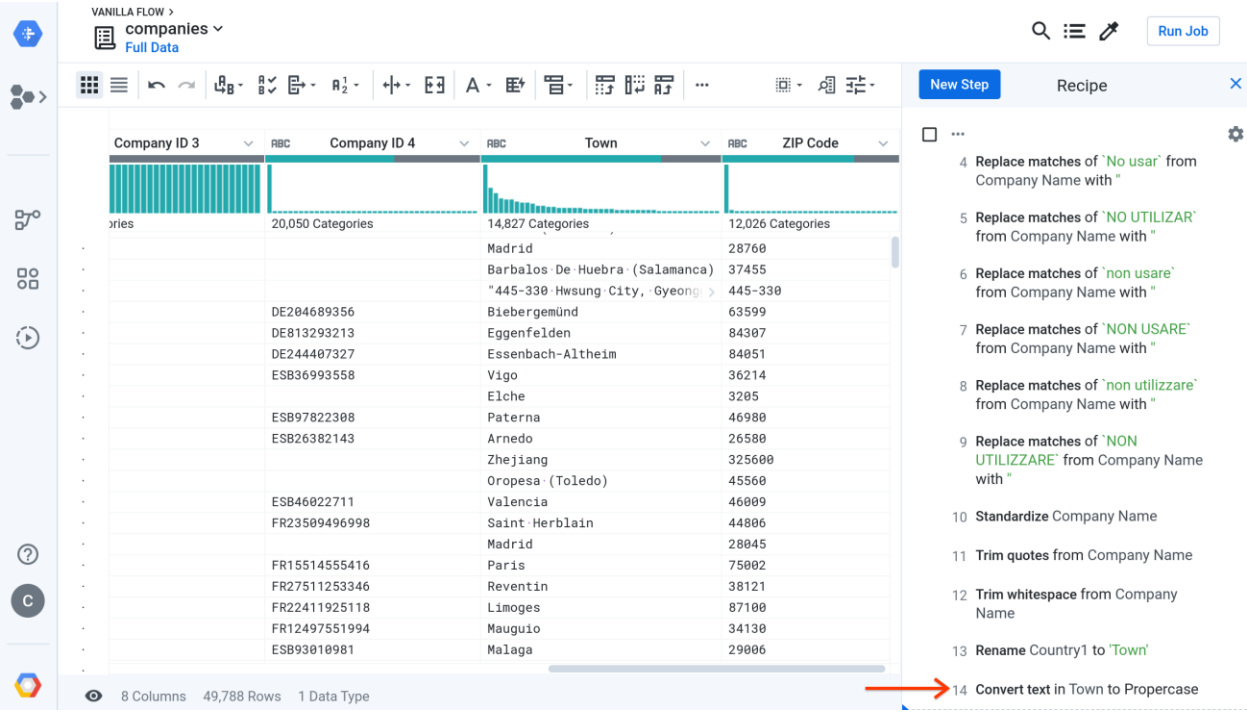


We change the format in the Town field to have the first letter in uppercase and the rest in lowercase.

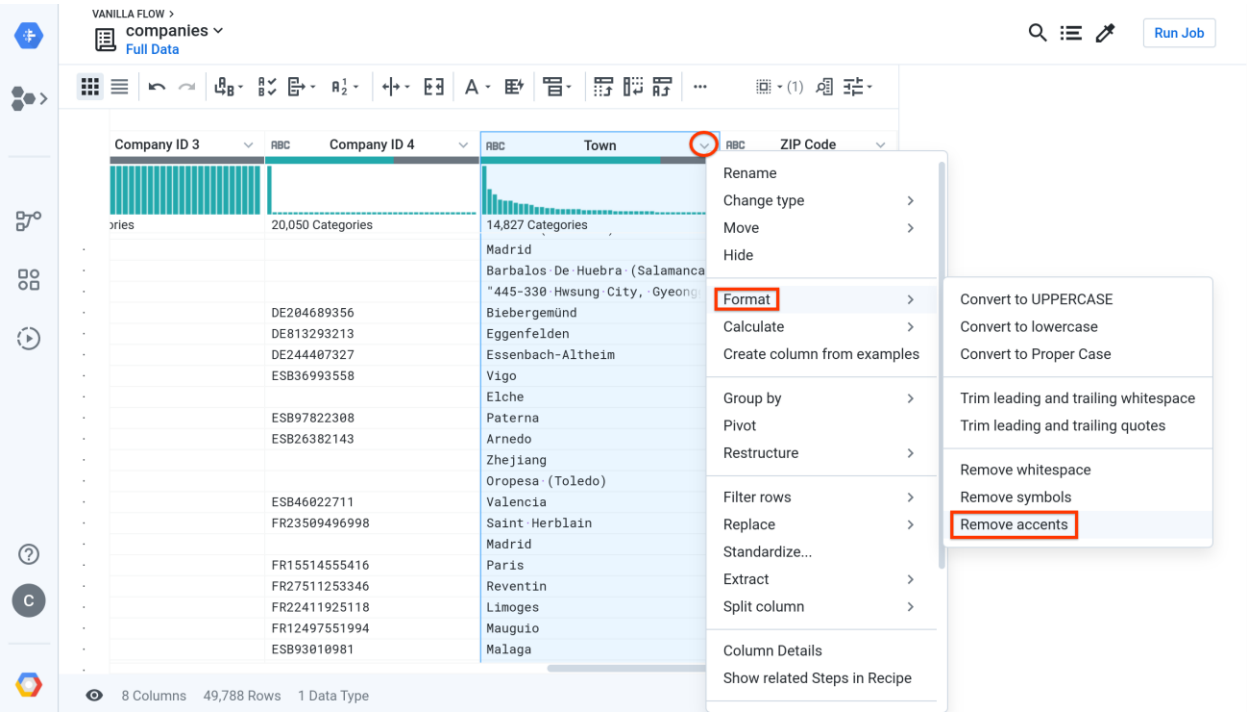
CELIA MURIEL

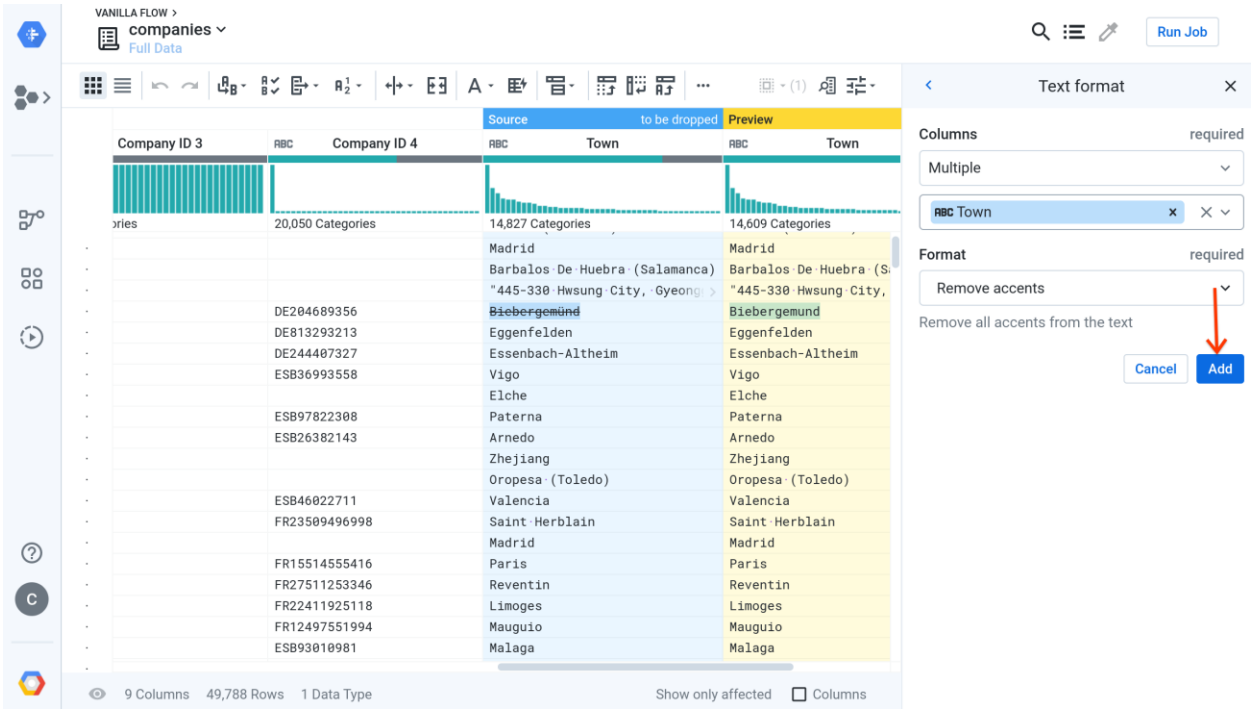


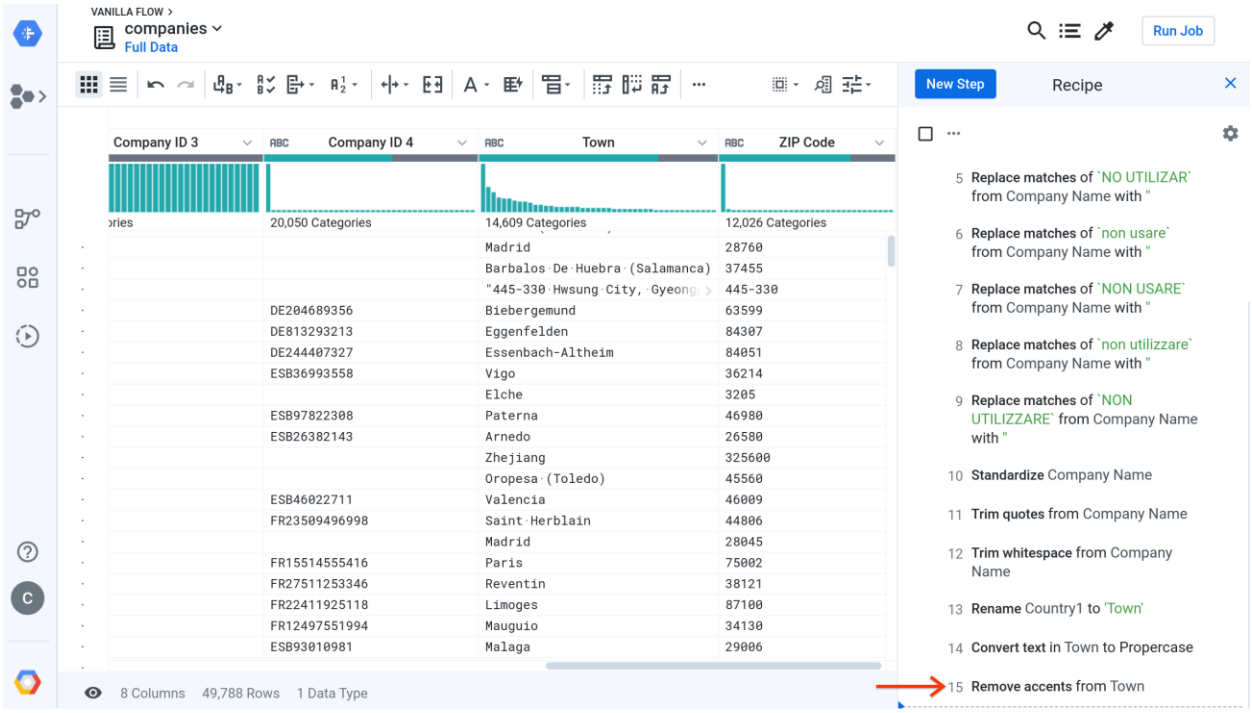




We remove accents.

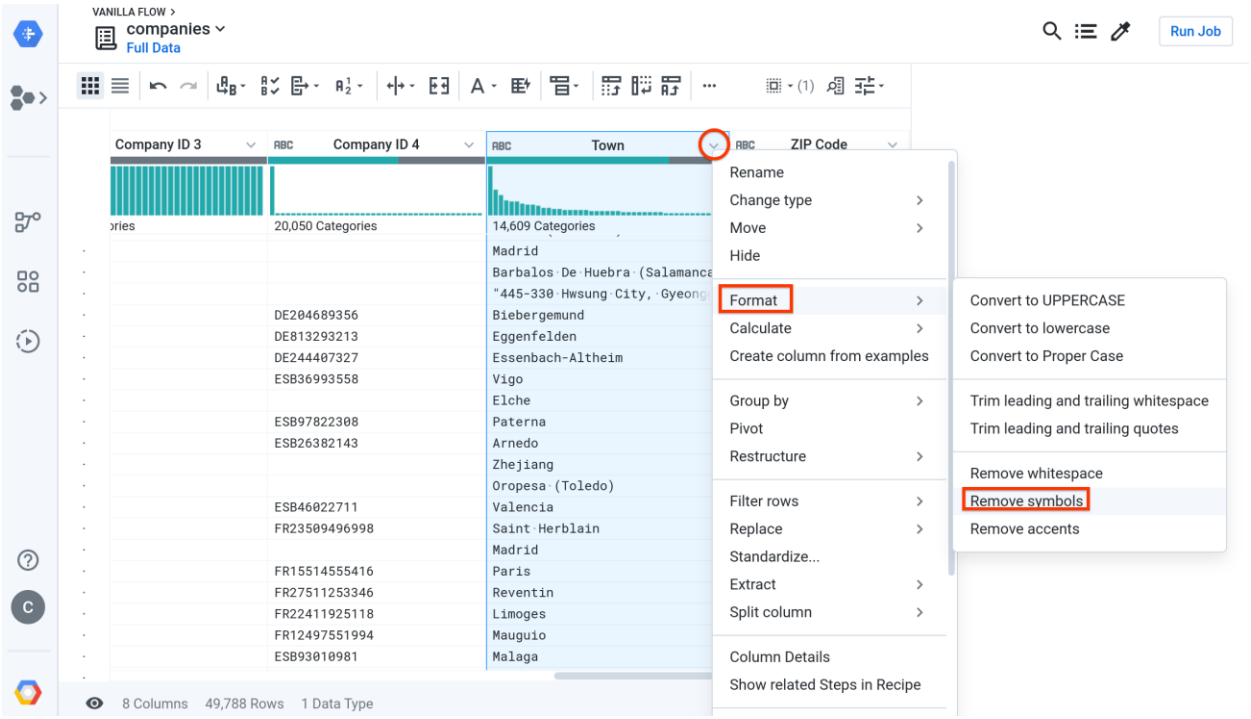


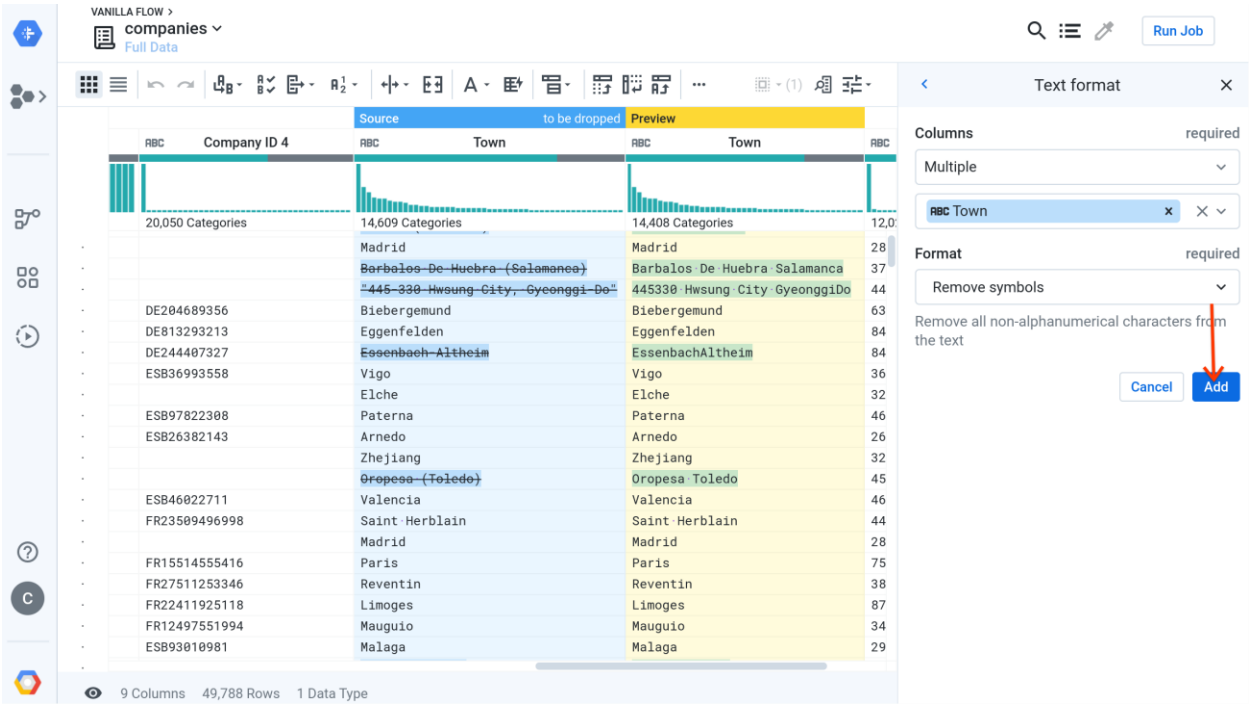


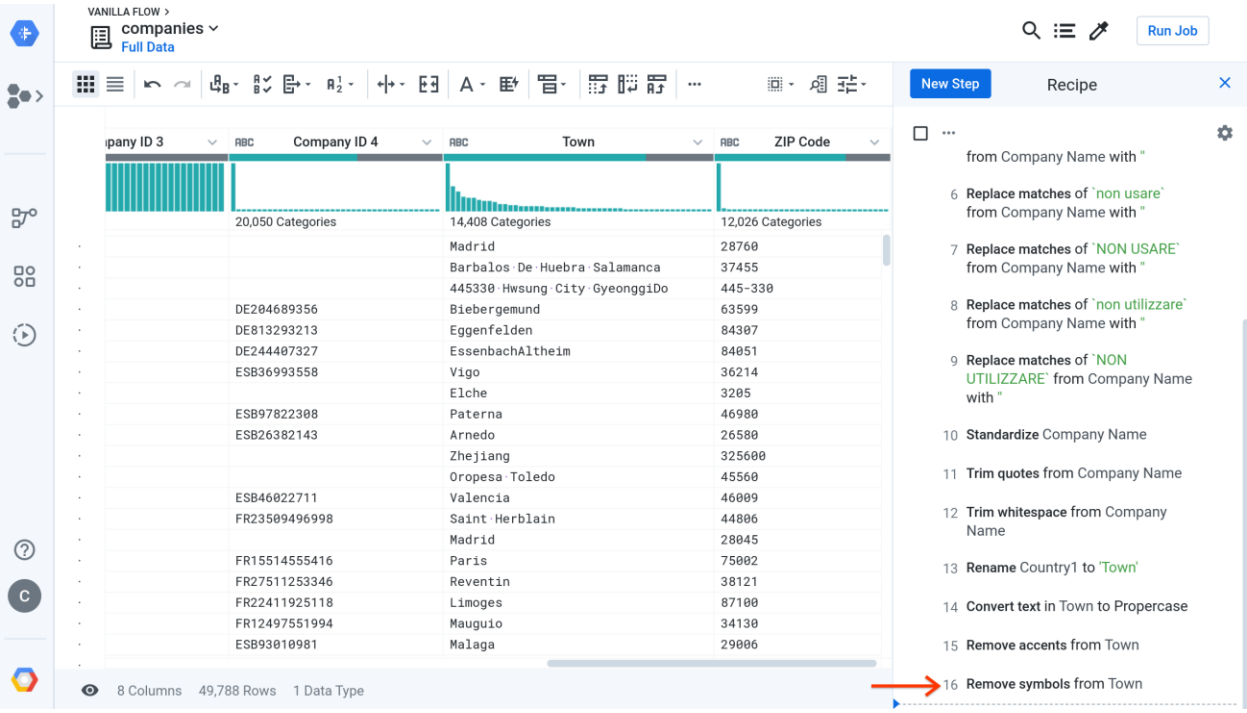


We remove symbols.

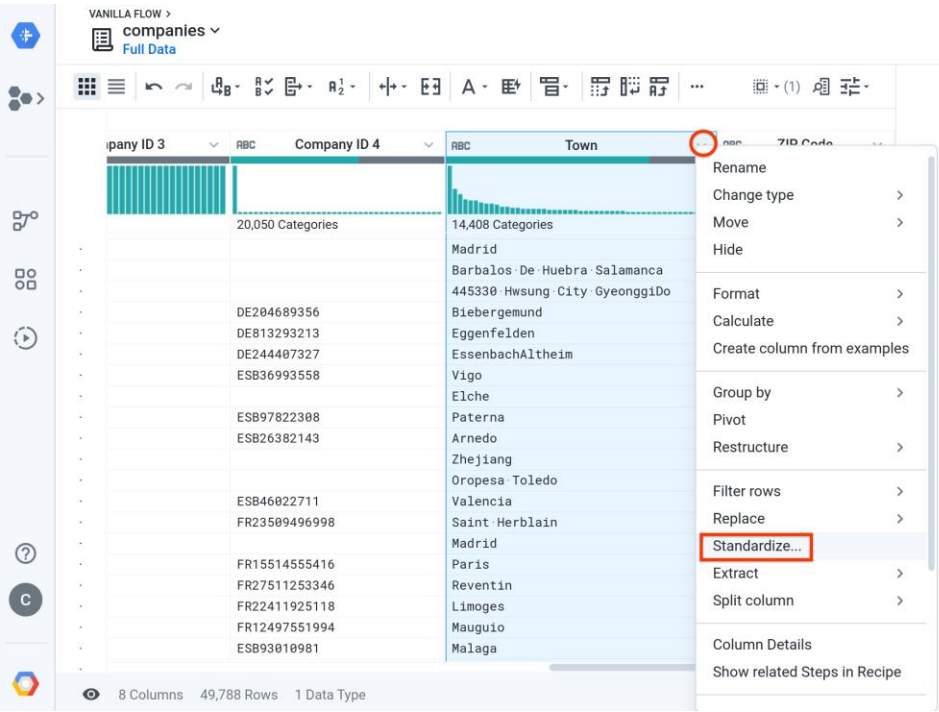
CELIA MURIEL

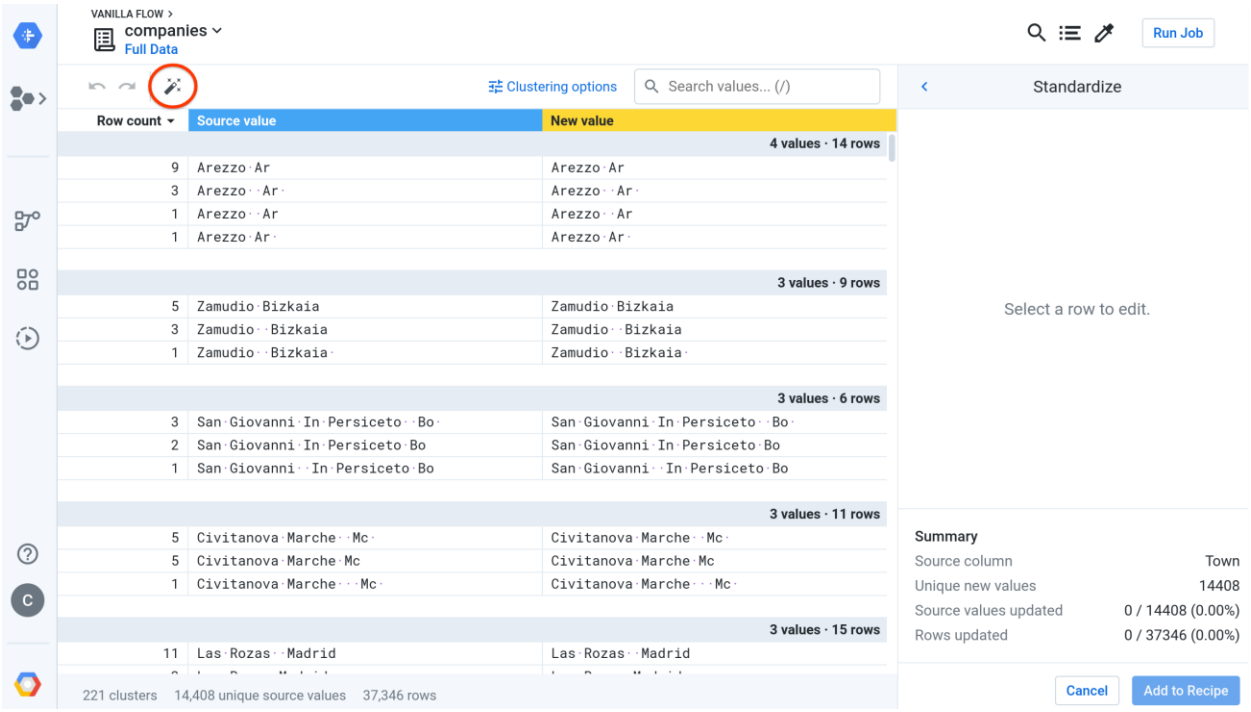


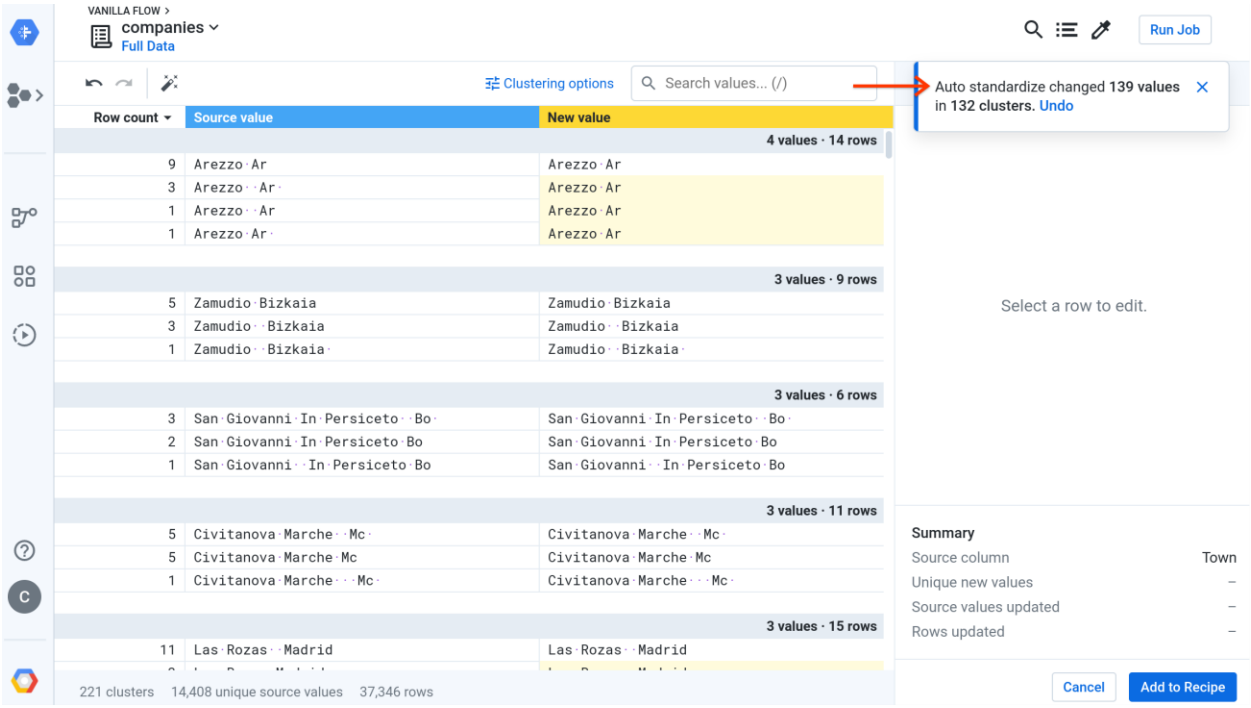




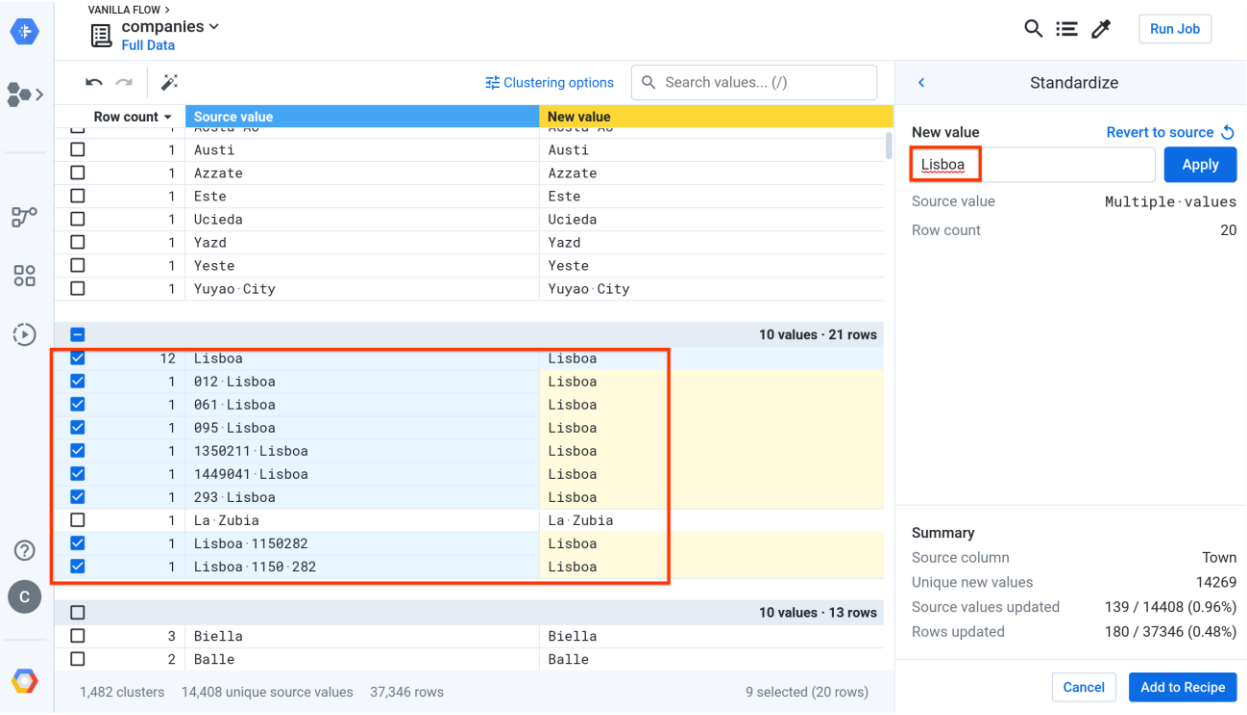
We standardise the Town field with the Wizard.



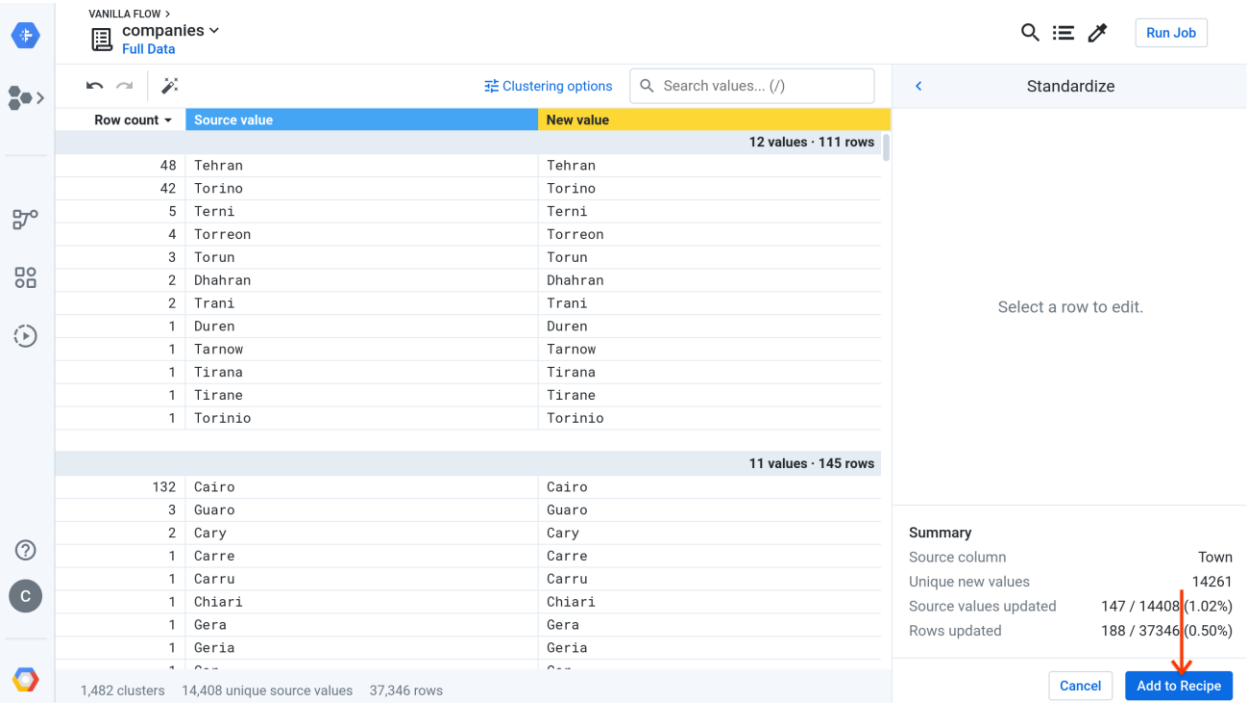




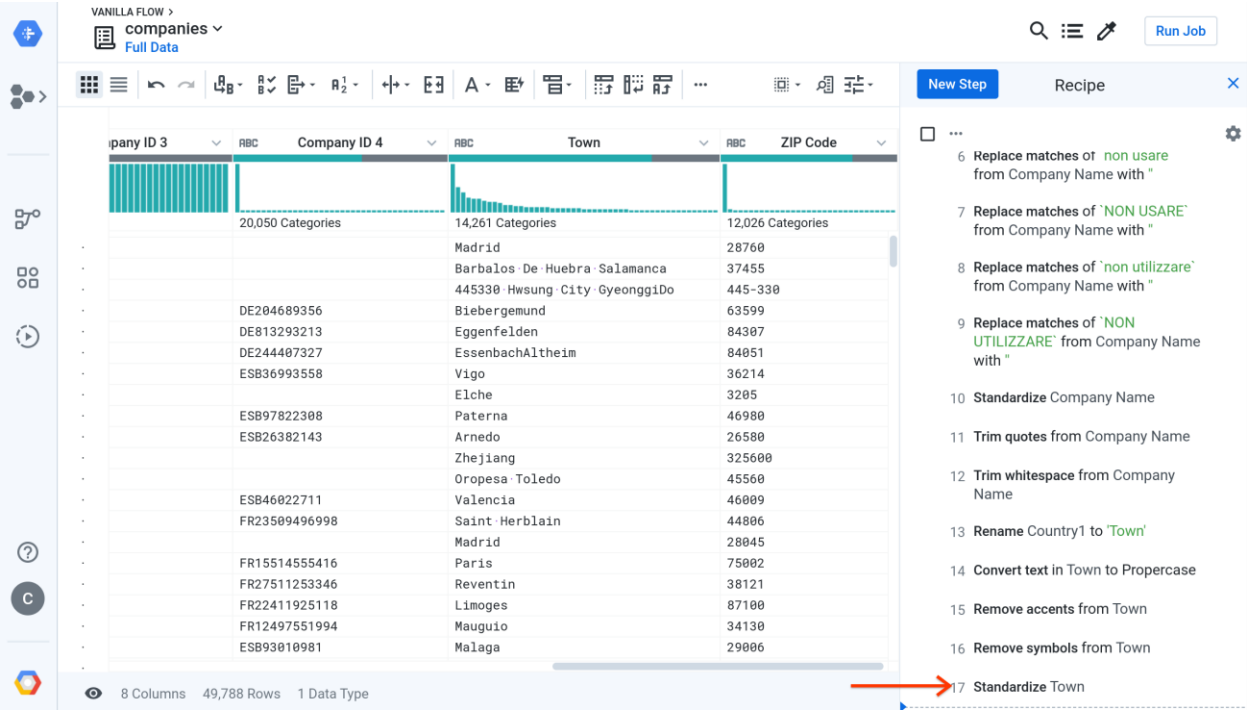
We review the town names after the automatic standardisation, and we manually modify the ones which require further work, relying on the clustering options.



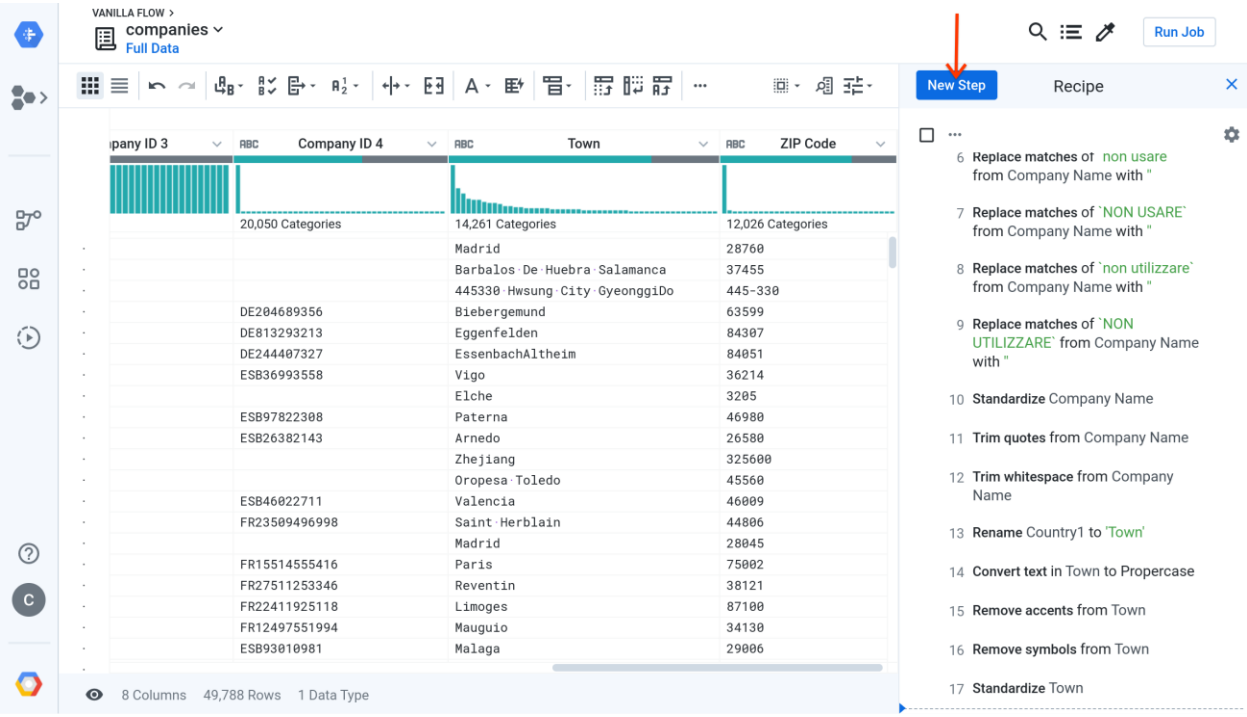
Once we are pleased with the town names, we “Add to Recipe”.

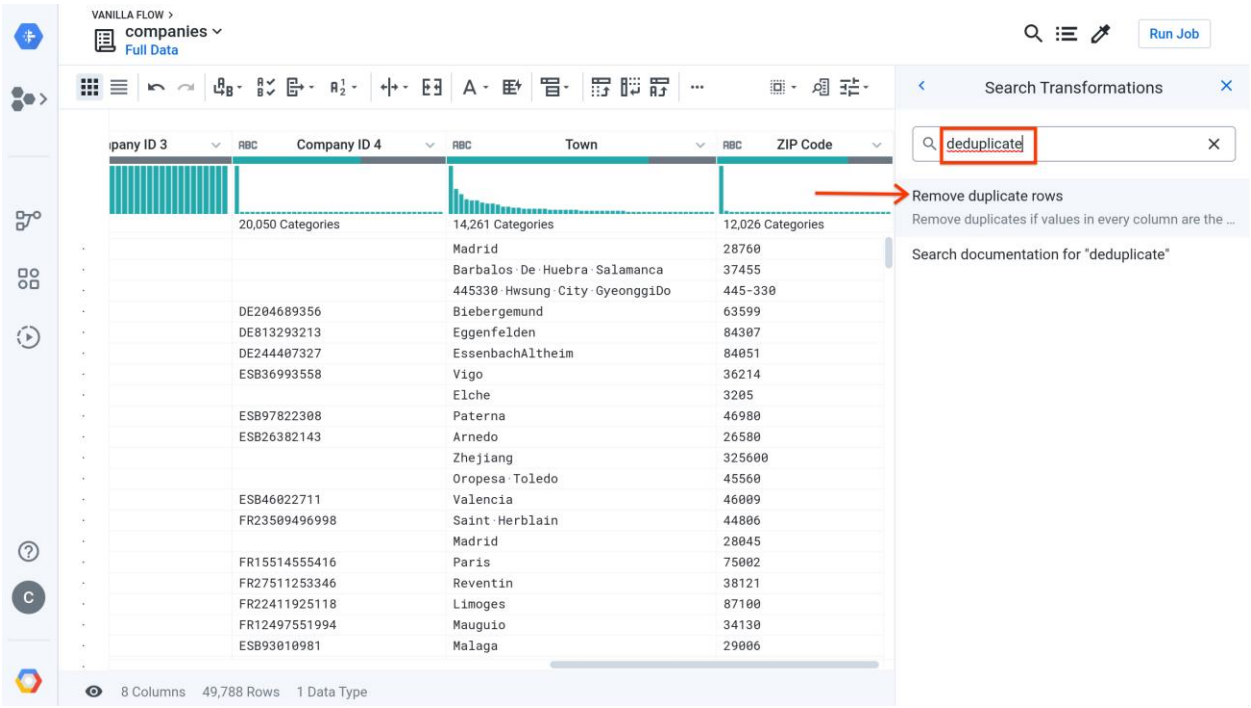


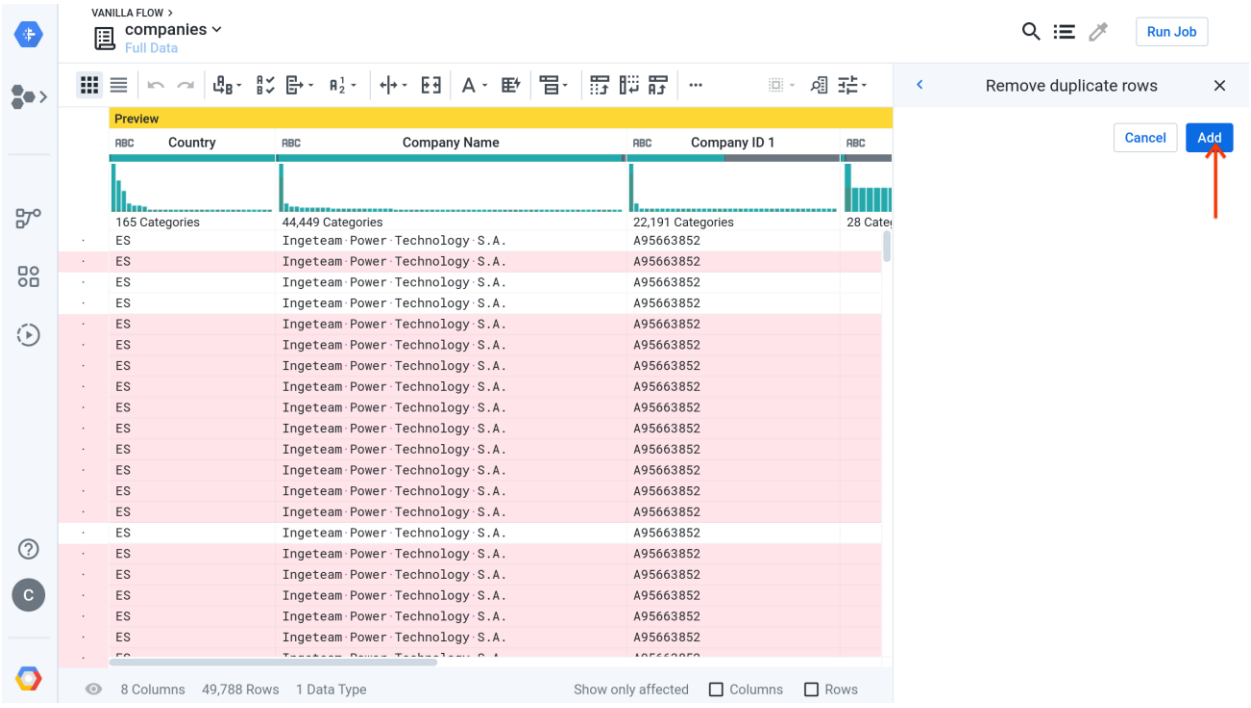
CELIA MURIEL

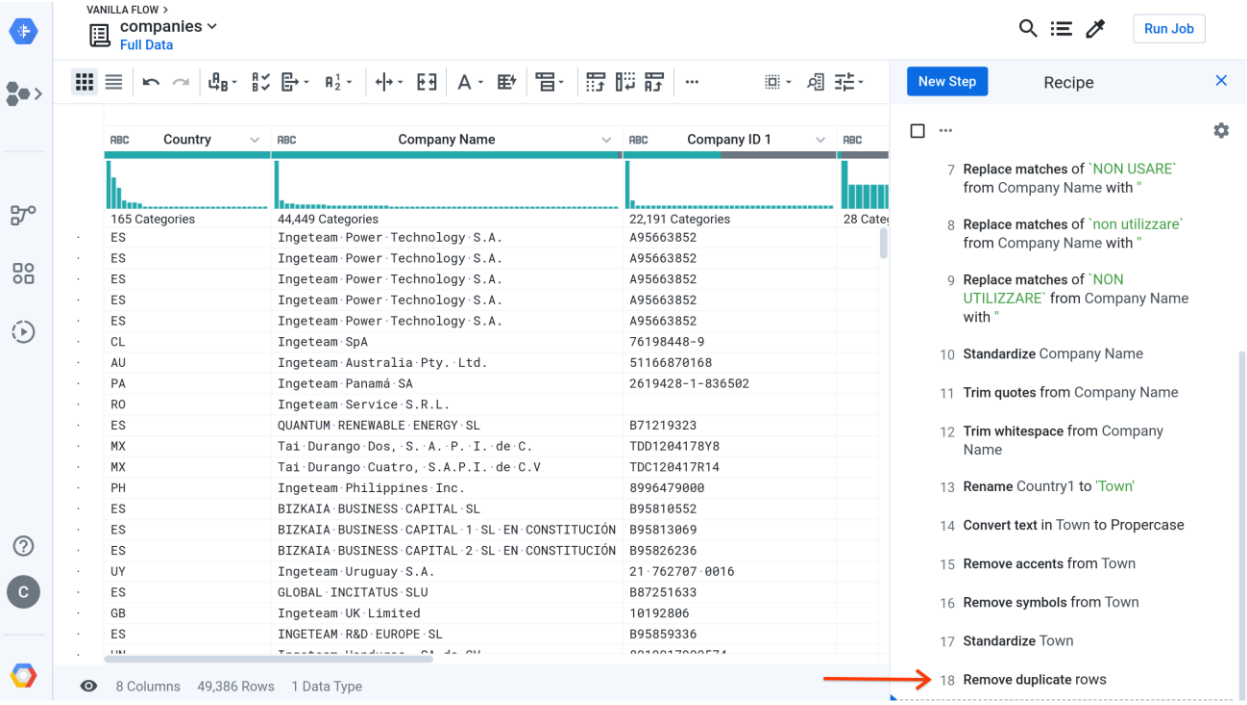


Our file should contain a row per company. We are going to deduplicate the rows if all fields have the same values.

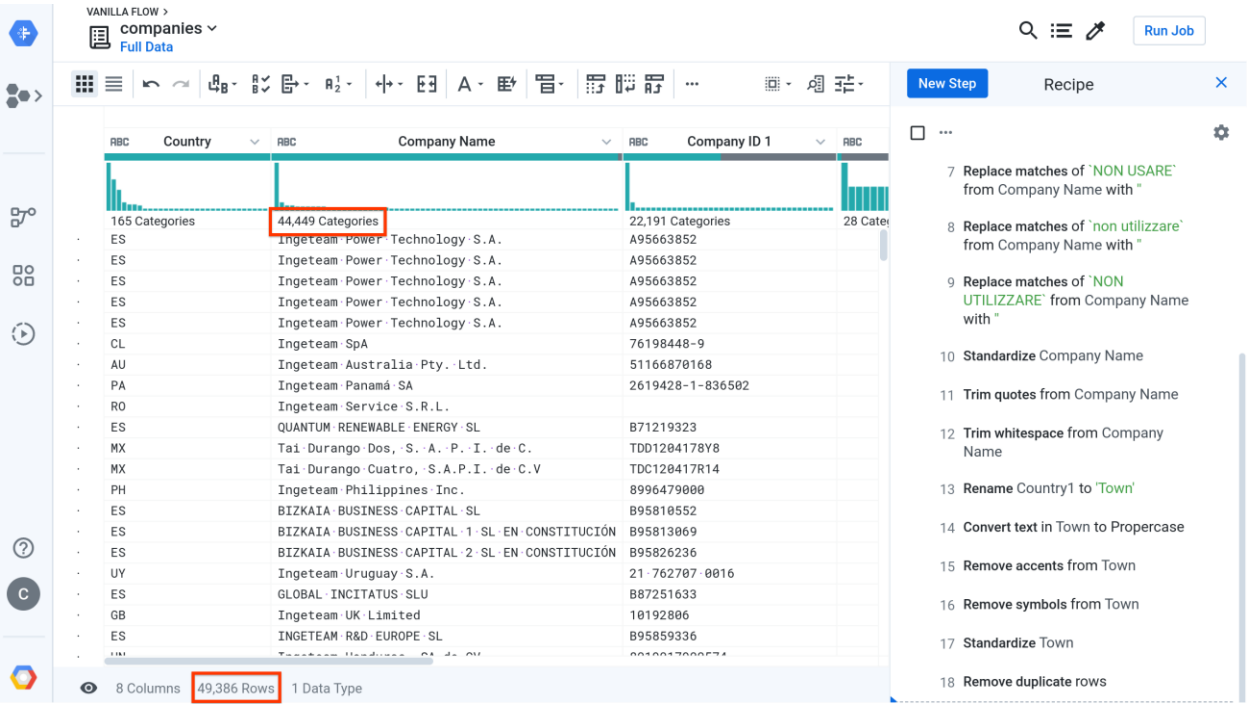



VANILLA FLOW
companies
Full Data
Run Job
Search Transformations
deduplicate
Remove duplicate rows
Remove duplicates if values in every column are the ...
Search documentation for "deduplicate"
Company ID 4
Town
ZIP Code
20,050 Categories
14,261 Categories
12,026 Categories
8 Columns
49,788 Rows
1 Data Type

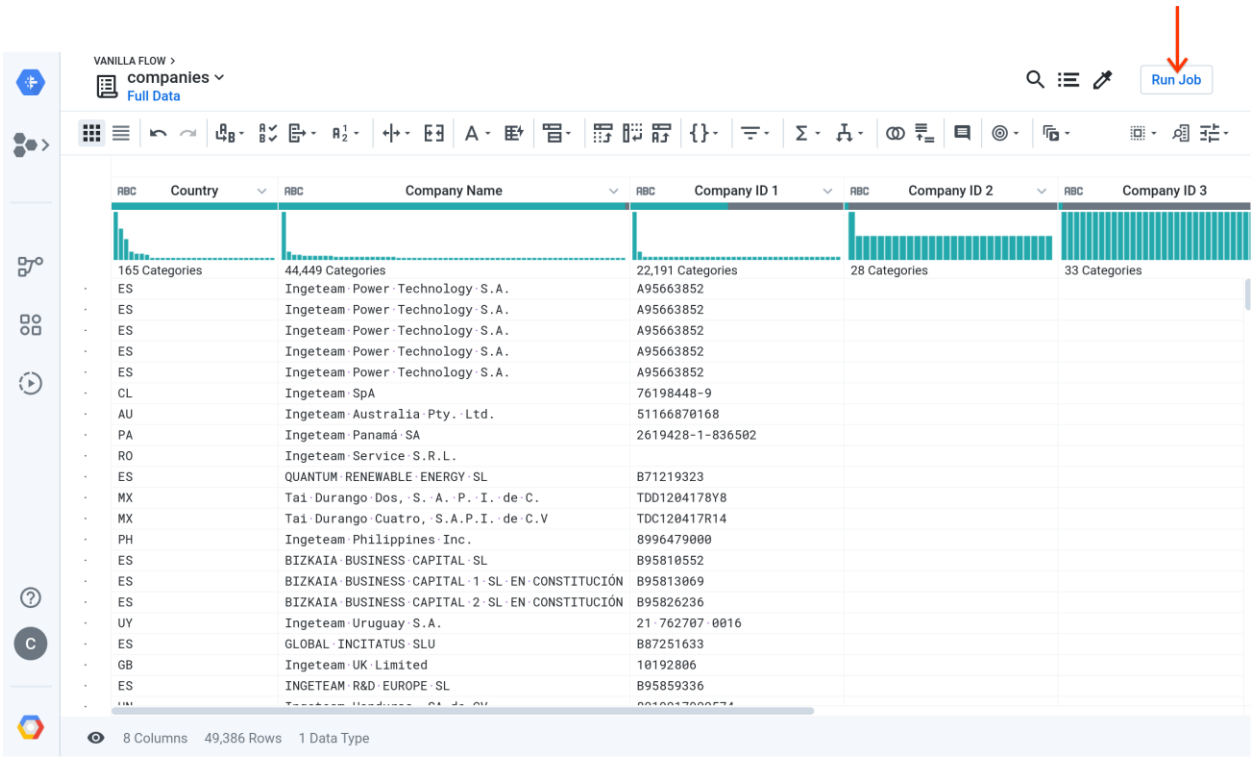

VANILLA FLOW
companies
Full Data
Run Job
Remove duplicate rows
Cancel
Add
Preview
Country
Company Name
Company ID 1
165 Categories
44,449 Categories
22,191 Categories
ES
Ingeteam Power Technology S.A.
A95663852
8 Columns
49,788 Rows
1 Data Type
Show only affected
Columns
Rows



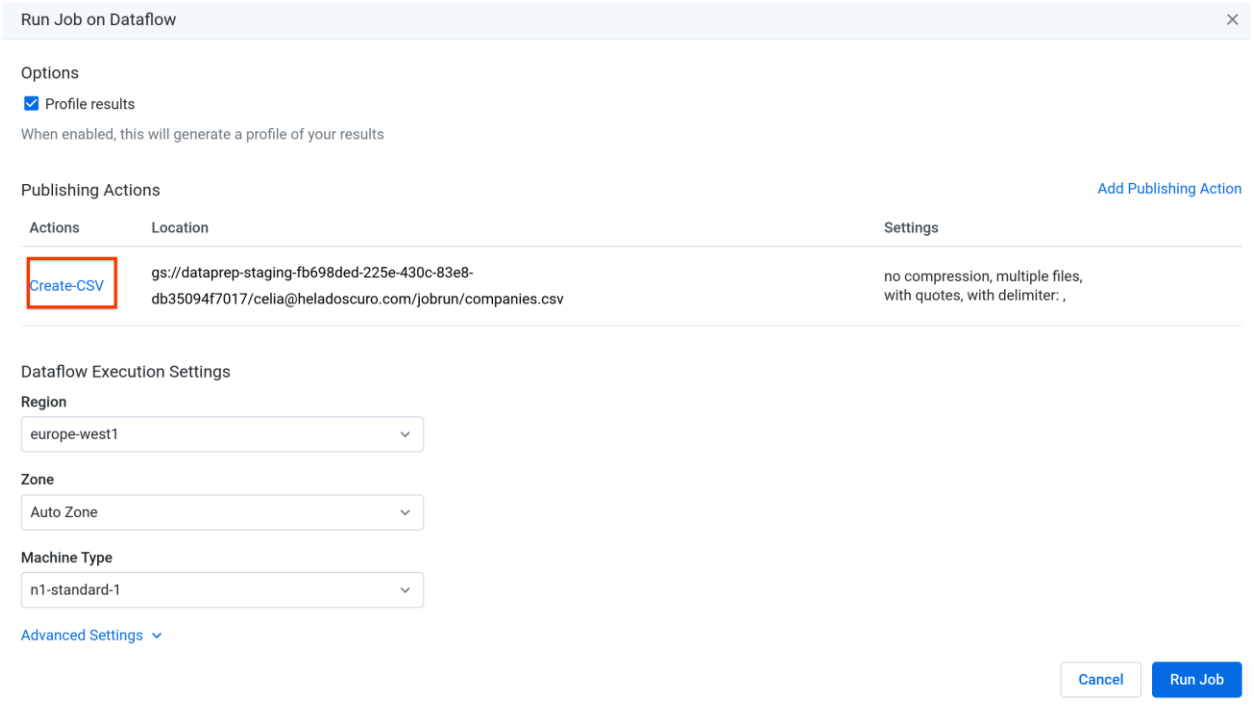
After all the transformations and cleaning we did on the data, we have 49,386 rows to upload and 44,449 different company names. There are duplicate company names because they have different IDs or they are placed on different cities.



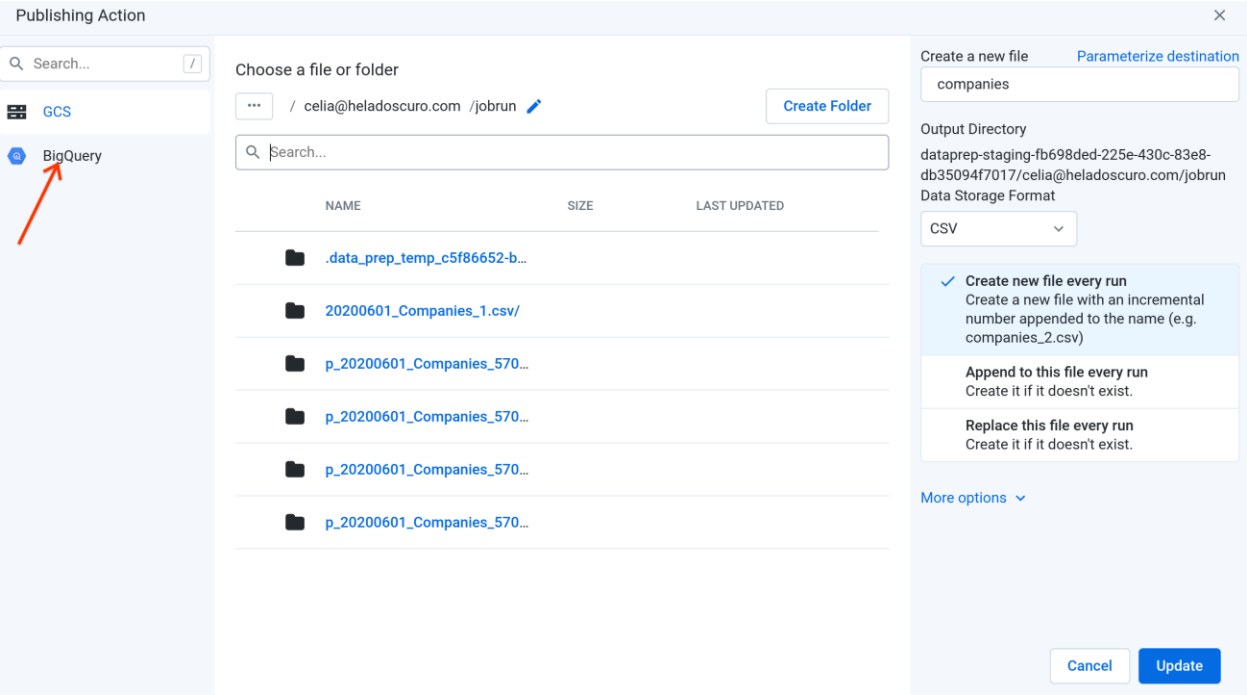
We click on “Run Job”.



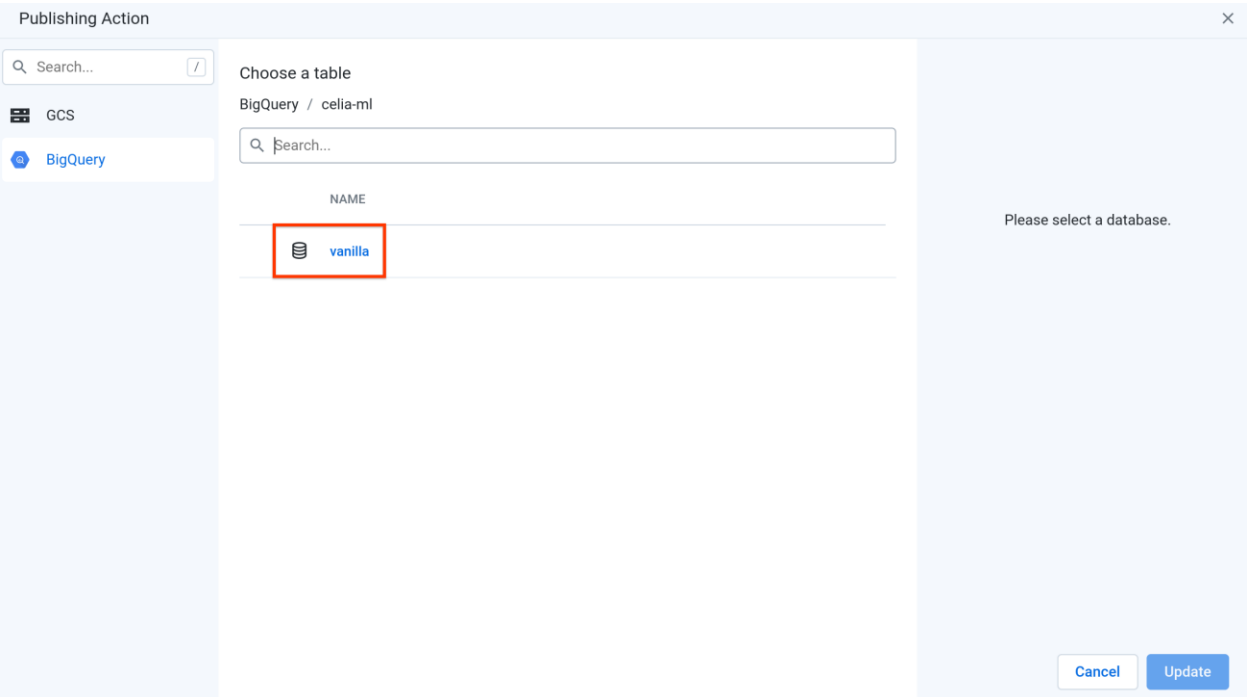
We click on “Create-CSV”. We are going to change this publishing action to append to our BigQuery table.



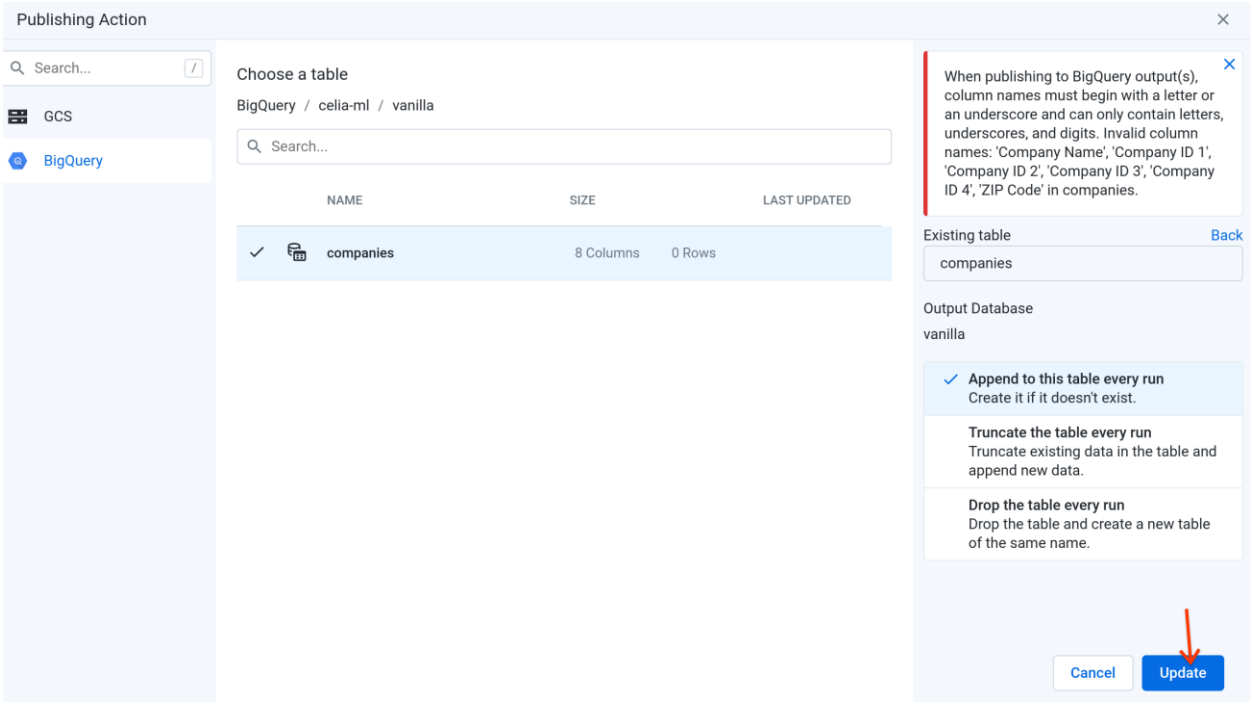
We select BigQuery

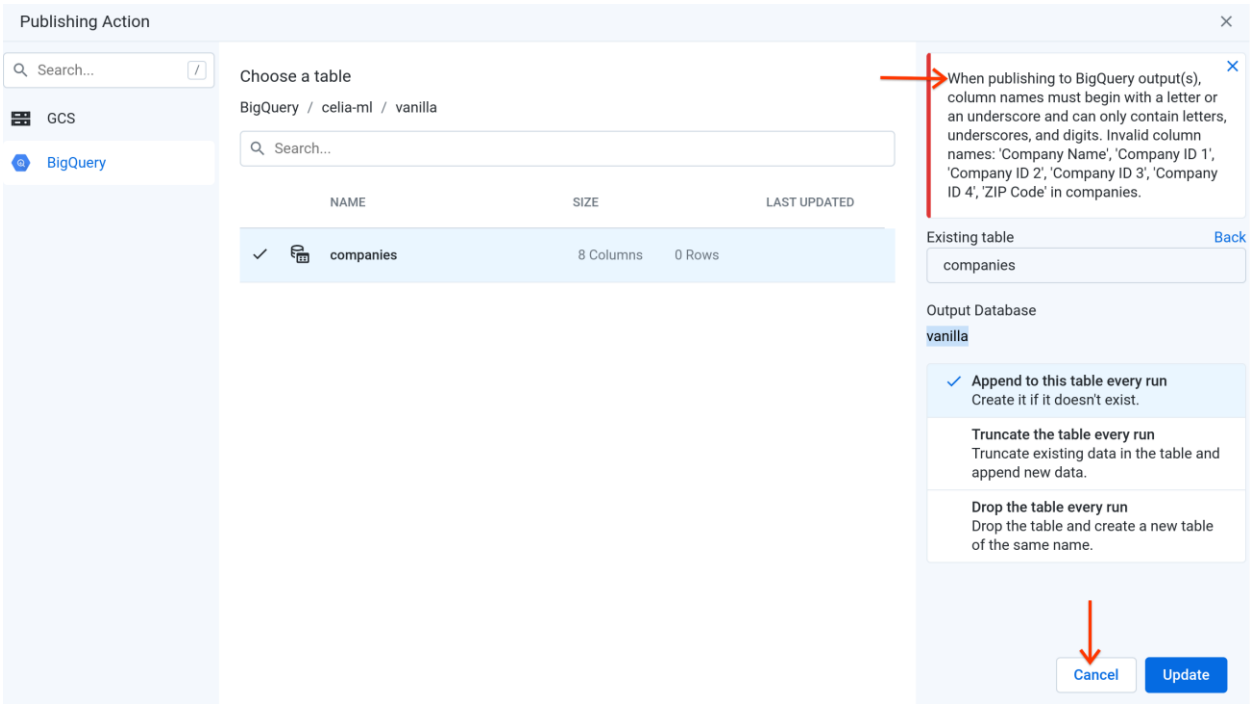


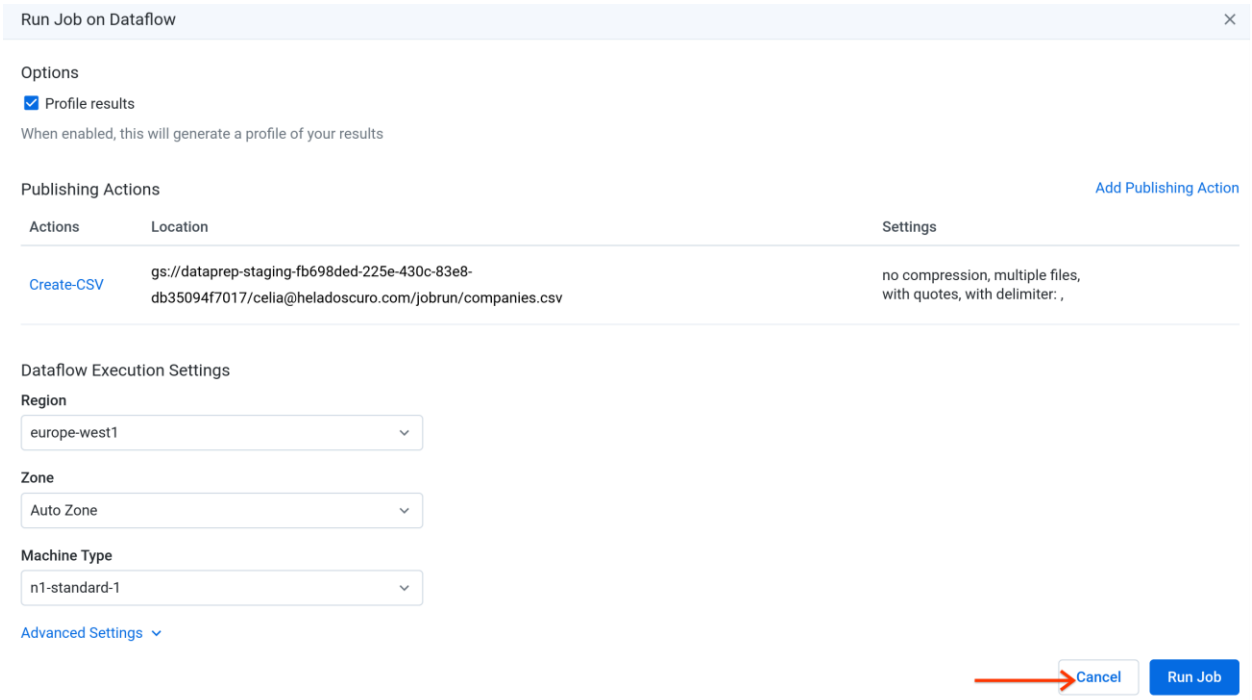
We click on our BigQuery dataset.



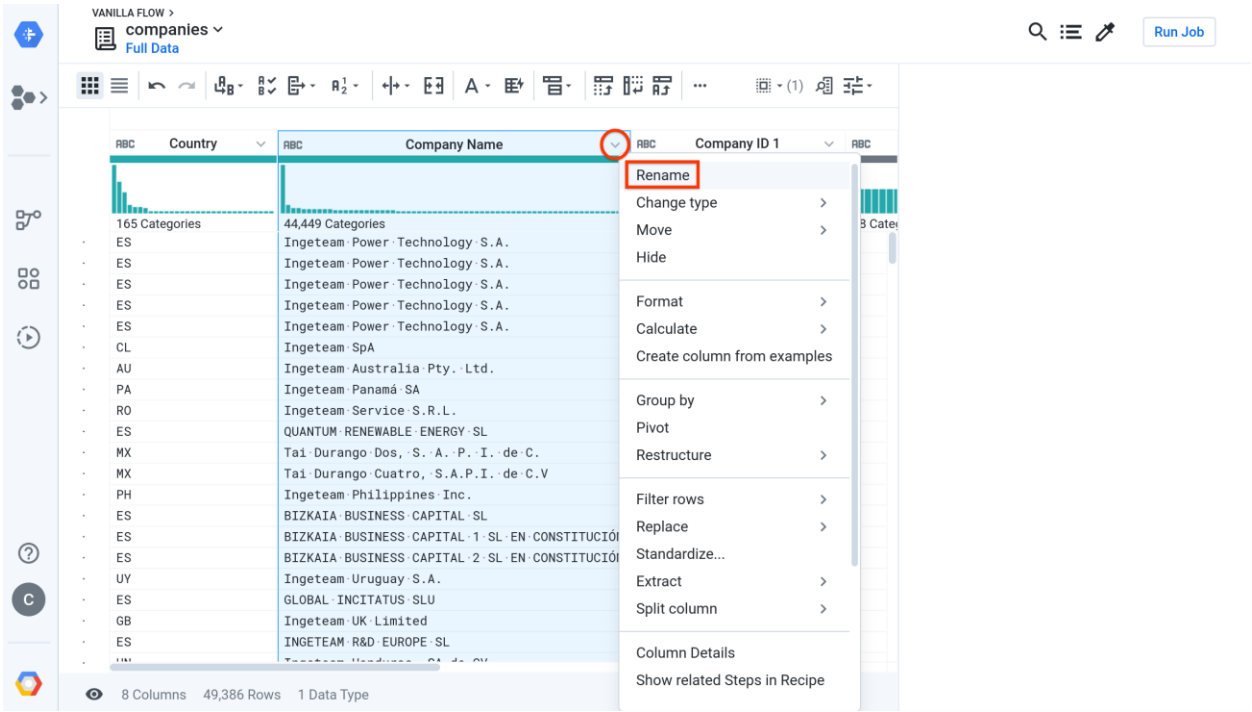
We try to append the data in our CSV file to our BigQuery Table. But we can't click on "Update" because we have an error message which says that the fields in the CSV file can't have spaces. So we cancel the publishing action and we come back to our recipe to edit the column names.

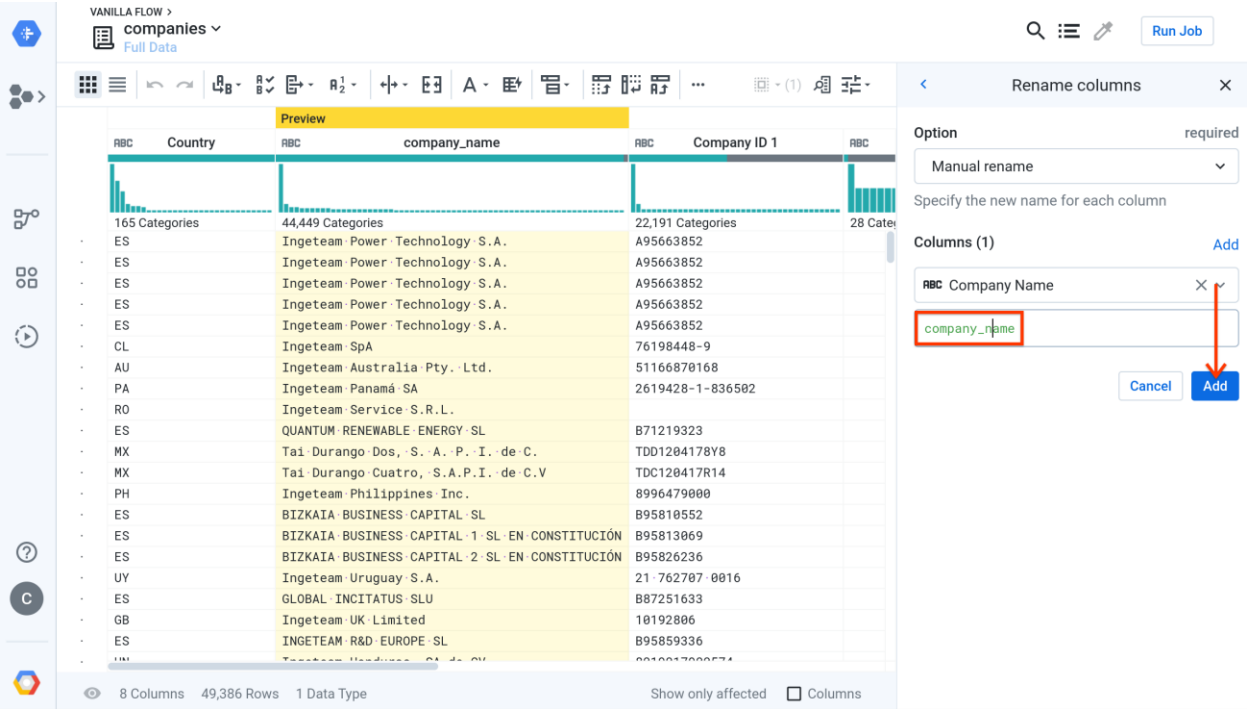


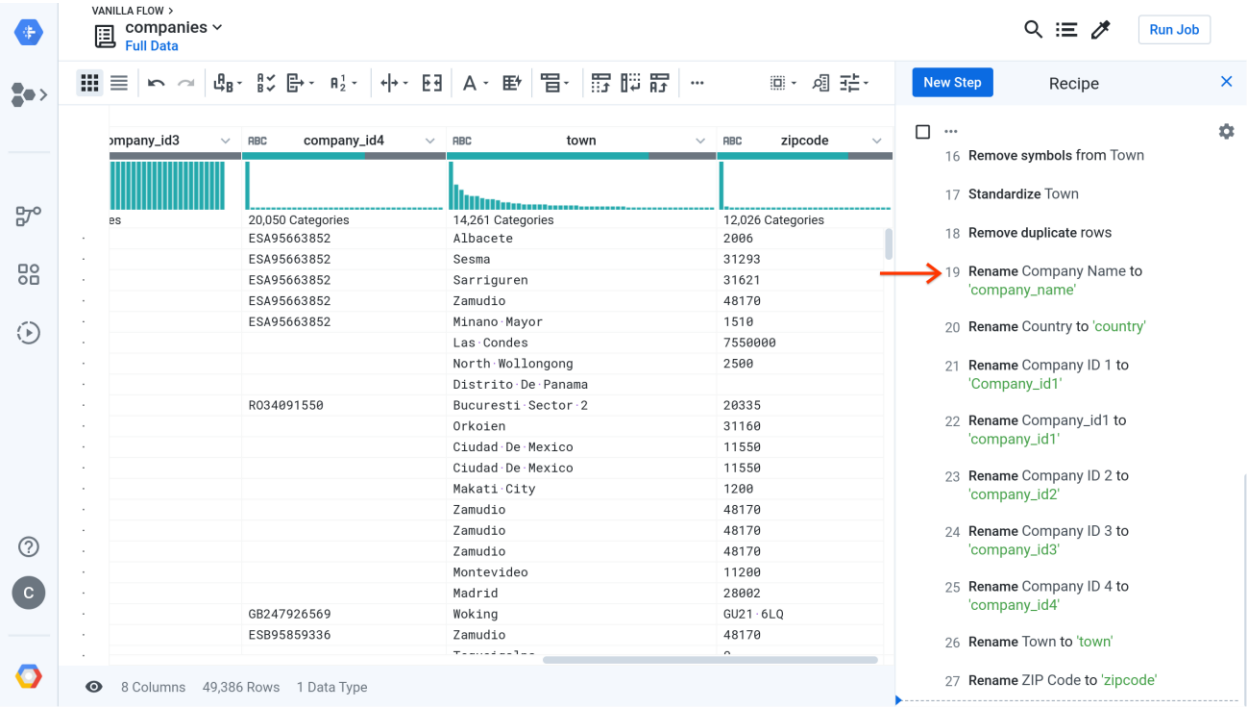




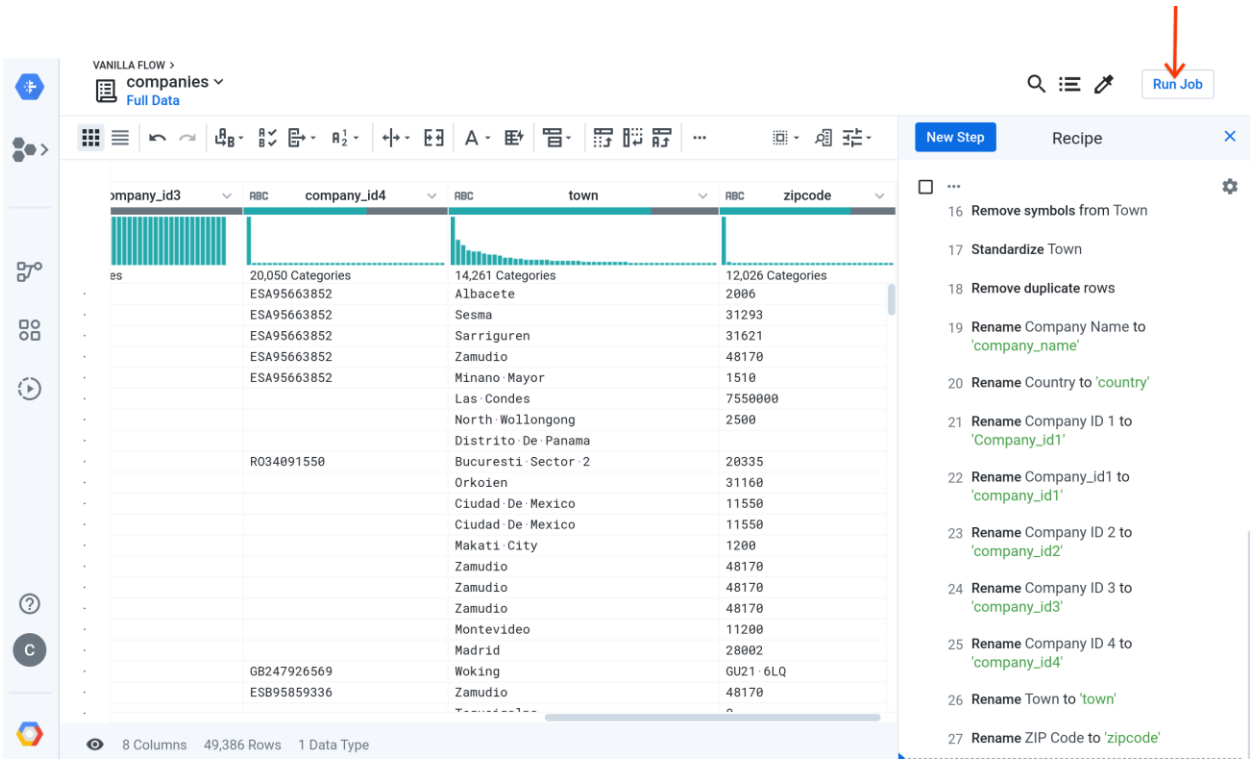
We rename the CSV column names.

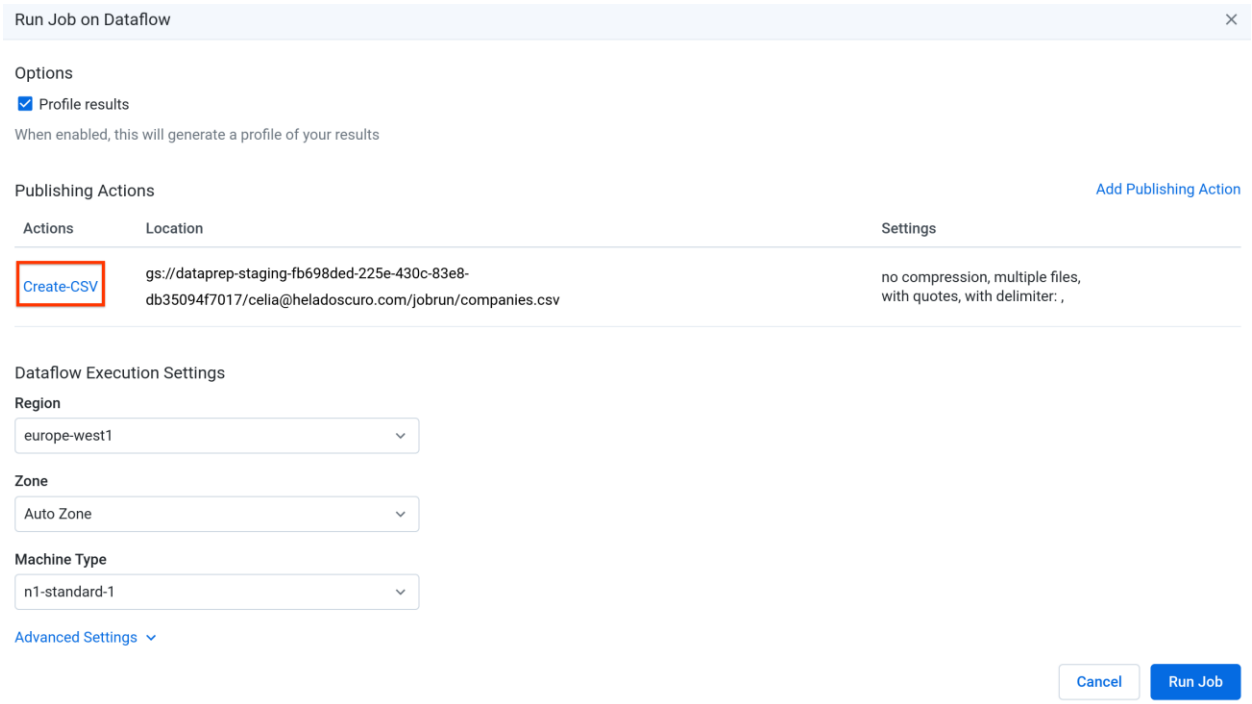


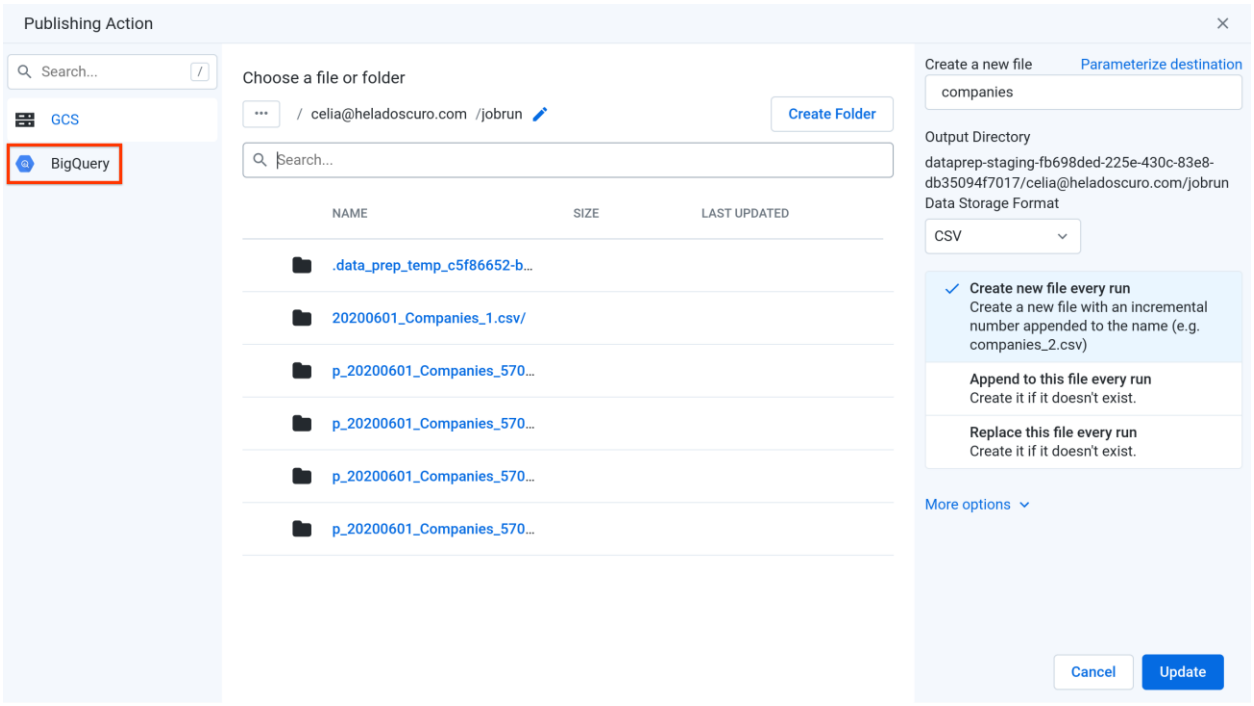


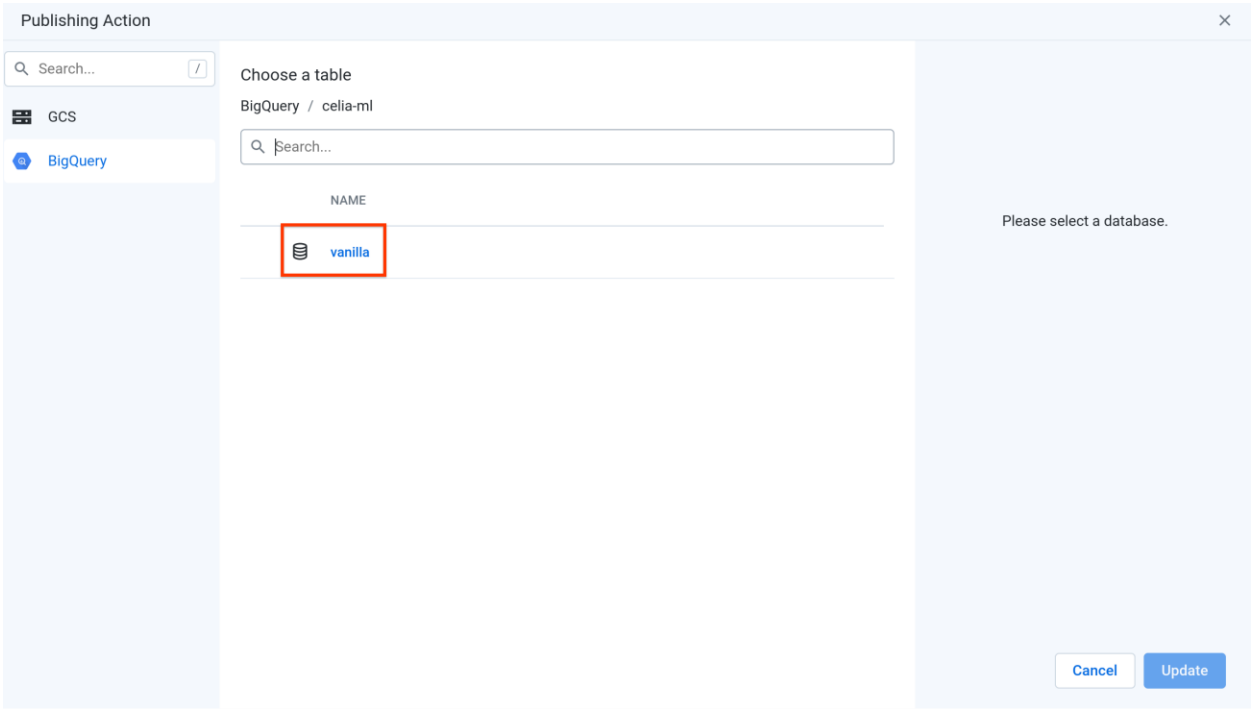


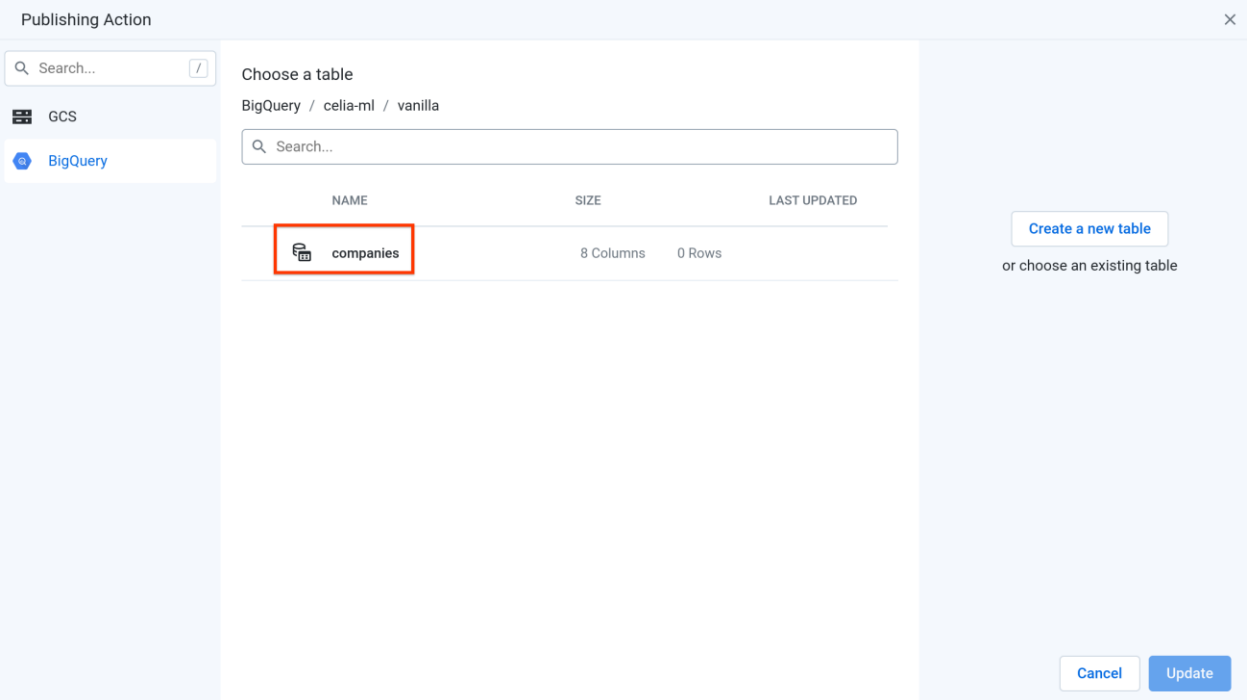
Once all the CSV columns have the right name format, we click on “Run Job” again.


VANILLA FLOW
companies
Full Data
Run Job
New Step
Recipe
company_id3
company_id4
town
zipcode
20,050 Categories
14,261 Categories
12,026 Categories
8 Columns
49,386 Rows
1 Data Type
16 Remove symbols from Town
17 Standardize Town
18 Remove duplicate rows
19 Rename Company Name to 'company_name'
20 Rename Country to 'country'
21 Rename Company ID 1 to 'Company_id1'
22 Rename Company_id1 to 'company_id1'
23 Rename Company ID 2 to 'company_id2'
24 Rename Company ID 3 to 'company_id3'
25 Rename Company ID 4 to 'company_id4'
26 Rename Town to 'town'
27 Rename ZIP Code to 'zipcode'

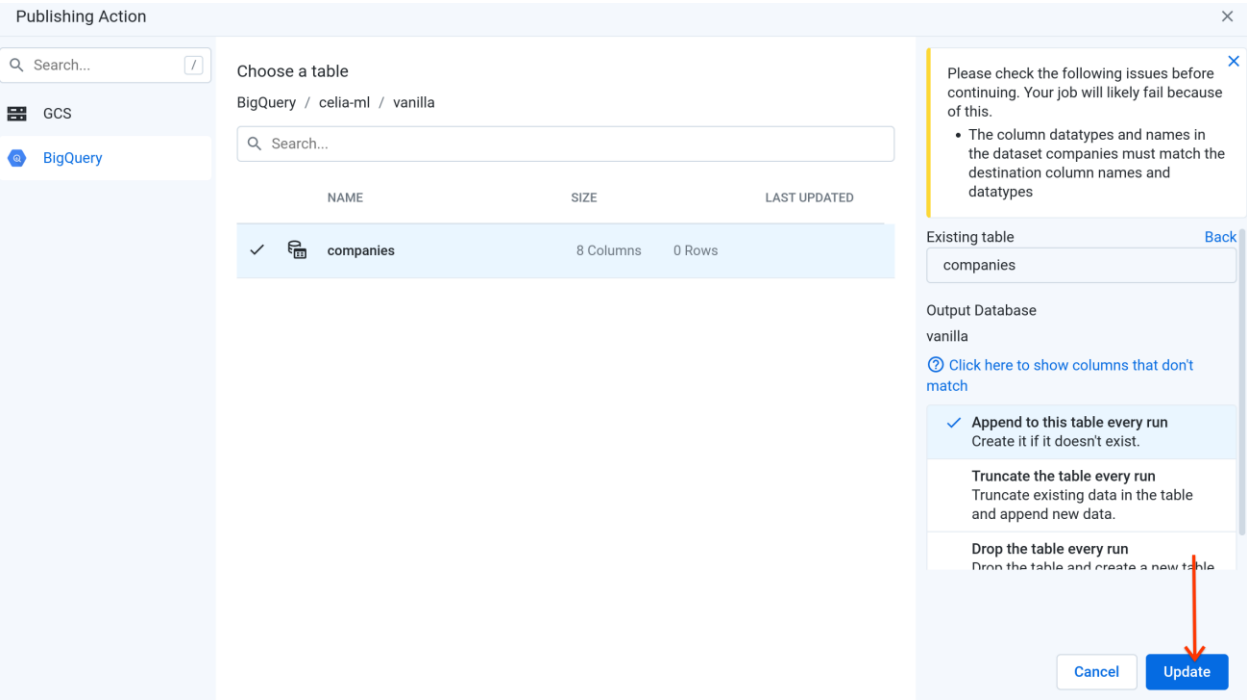

Run Job on Dataflow
Options
Profile results
When enabled, this will generate a profile of your results
Publishing Actions
Add Publishing Action
Actions
Location
Settings
Create-CSV
gs://dataprep-staging-fb698ded-225e-430c-83e8-db35094f7017/celia@heladoscuro.com/jobrun/companies.csv
no compression, multiple files, with quotes, with delimiter: ,
Dataflow Execution Settings
Region
europe-west1
Zone
Auto Zone
Machine Type
n1-standard-1
Advanced Settings
Cancel
Run Job


Publishing Action
Search...
GCS
BigQuery
Choose a file or folder
/ celia@heladoscuro.com /jobrun
Create Folder
Search...
NAME
SIZE
LAST UPDATED
.data_prep_temp_c5f86652-b...
20200601_Companies_1.csv/
p_20200601_Companies_570...
p_20200601_Companies_570...
p_20200601_Companies_570...
p_20200601_Companies_570...
Create a new file
Parameterize destination
companies
Output Directory
dataprep-staging-fb698ded-225e-430c-83e8-db35094f7017/celia@heladoscuro.com/jobrun
Data Storage Format
CSV
Create new file every run
Create a new file with an incremental number appended to the name (e.g. companies_2.csv)
Append to this file every run
Create it if it doesn't exist.
Replace this file every run
Create it if it doesn't exist.
More options
Cancel
Update

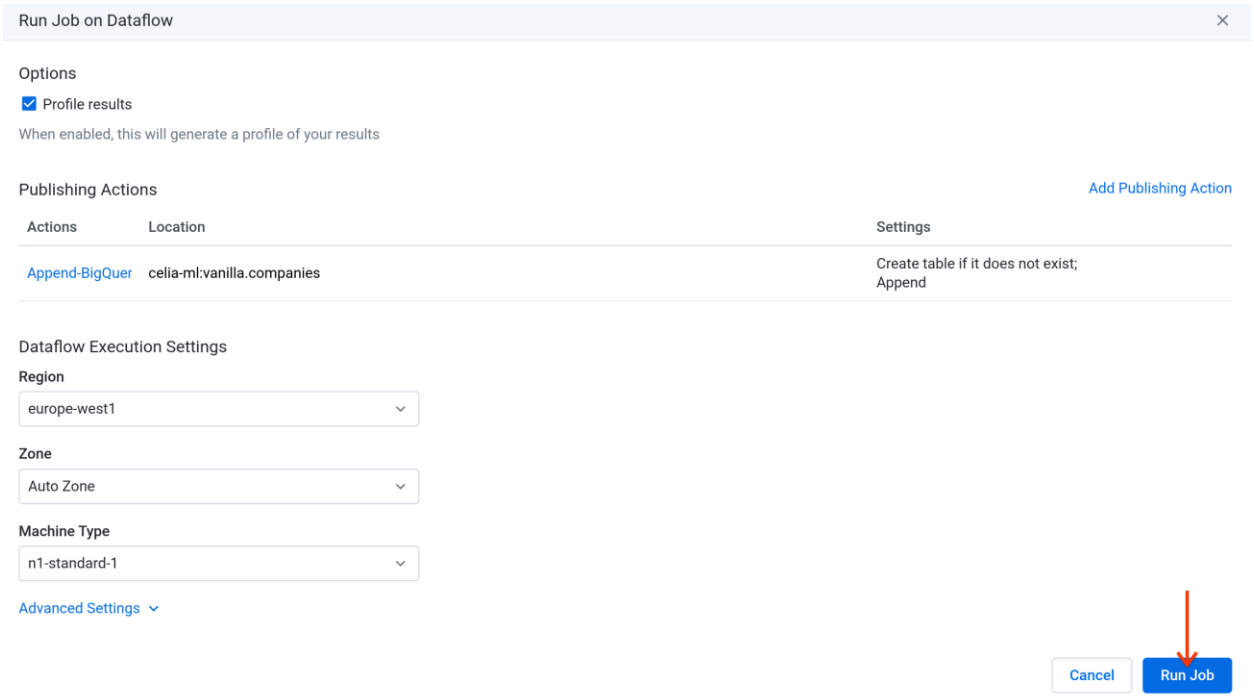

Publishing Action
Search...
GCS
BigQuery
Choose a table
BigQuery / celia-ml
Search...
NAME
vanilla
Please select a database.
Cancel
Update



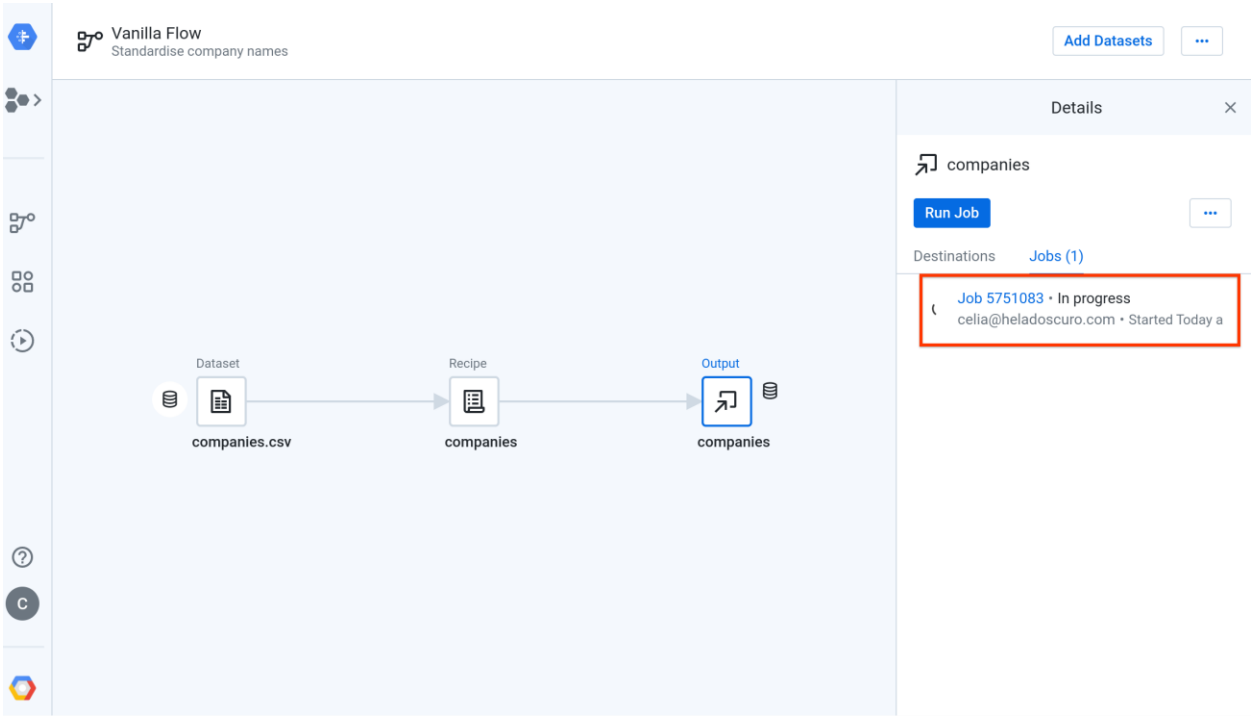
We select “append to this table” and we click on “Update”.

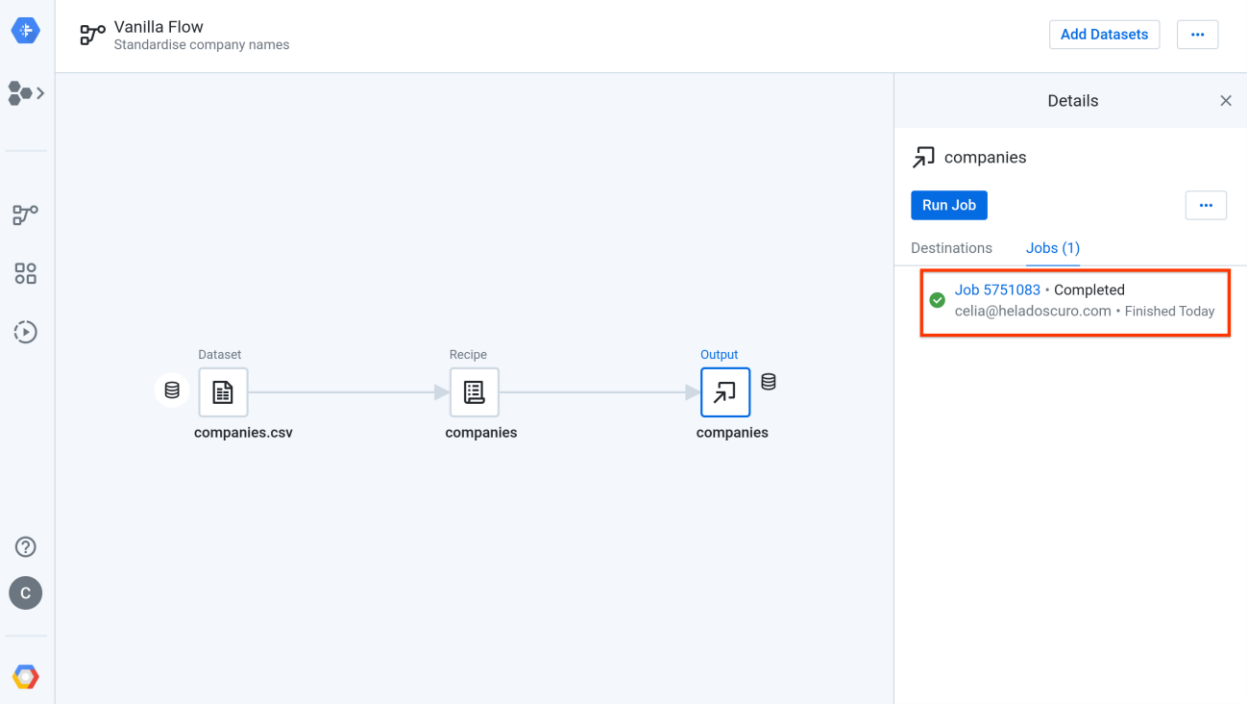


Click on “Run Job”.

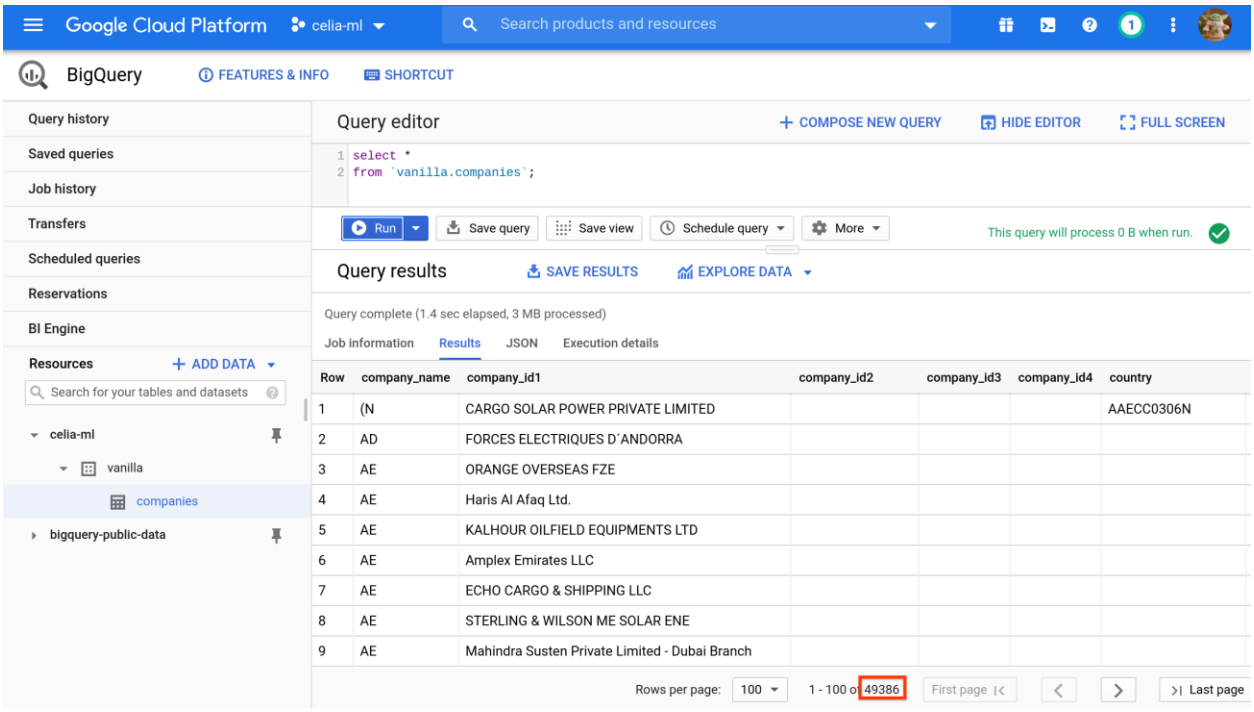


Cloud Dataprep is the combination of Trifacta software for data preparation and Cloud Dataflow to upload the data. When we hit on “Run Job”, we trigger a Cloud Dataflow job which actually copies the data from the CSV file to the BigQuery table.

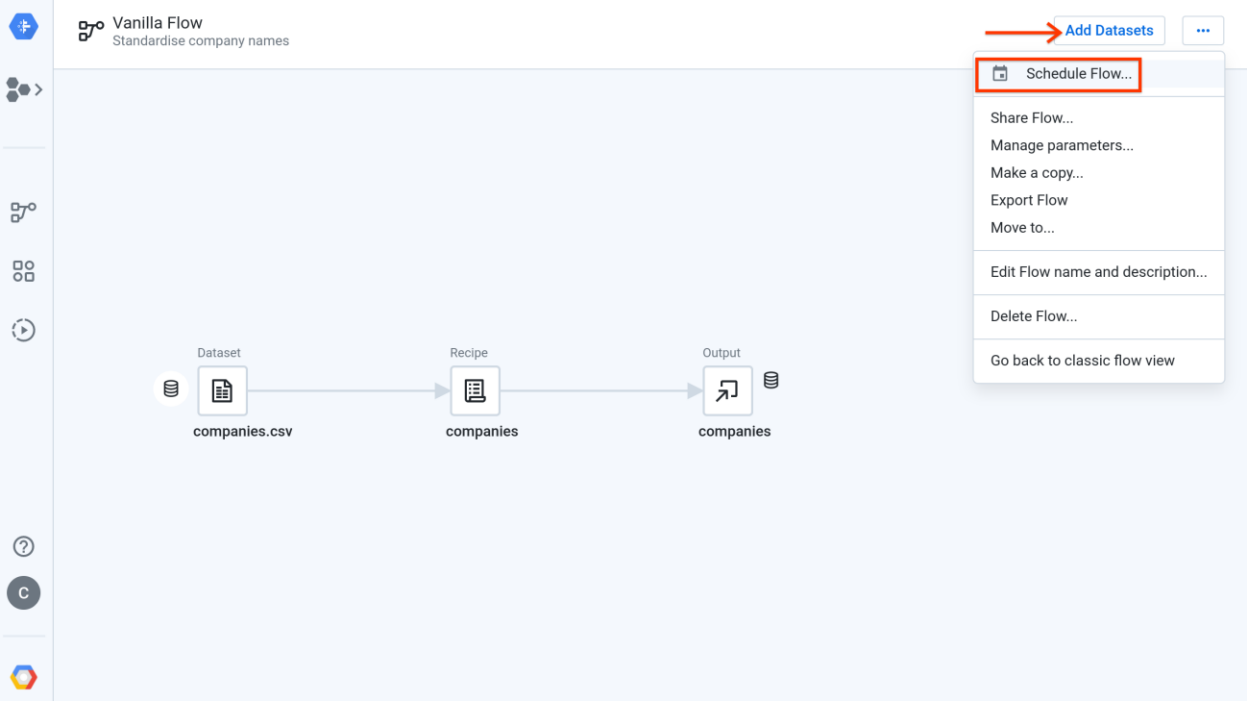




Once the job completes successfully, we check in BigQuery that we upload the standardised companies data into our table.



If we want to schedule our job to run regularly to upload the data from our CSV file to our BigQuery Table, we come back to the Dataprep flow. We open it, and we click on the 3 dots on the top right corner. We click on “Schedule Flow”.



Recipe and flow

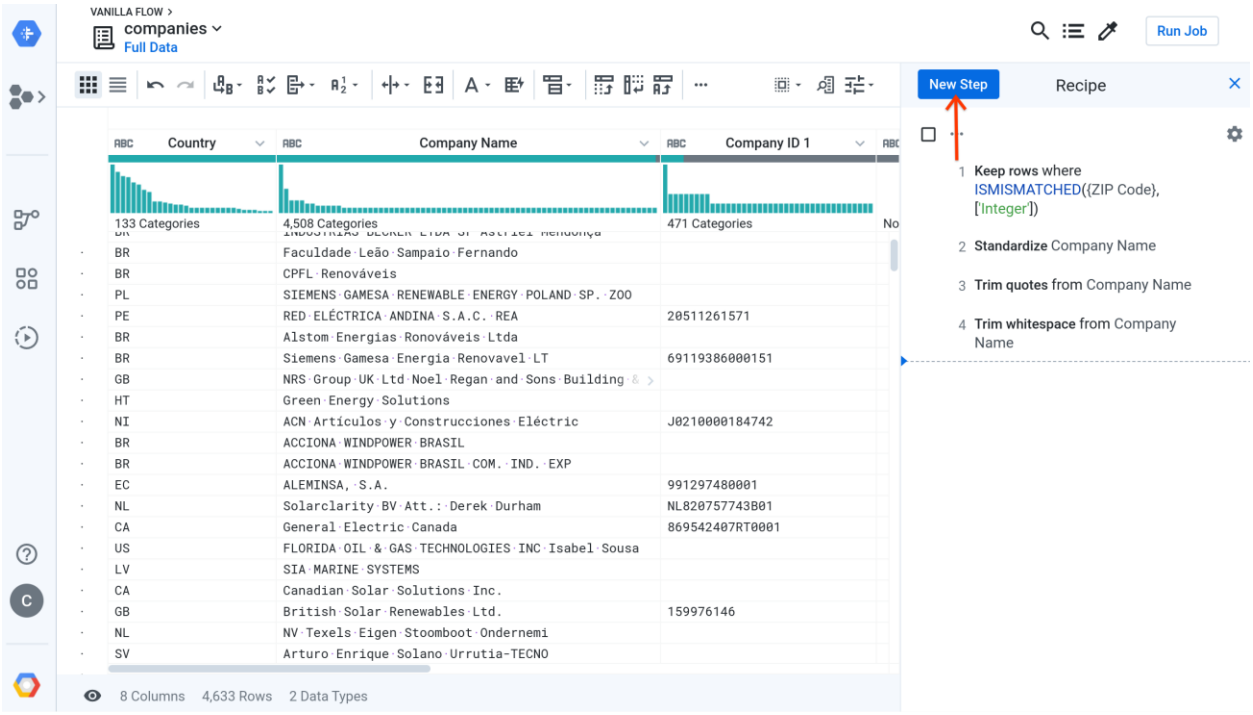
The complete recipe and flow with all transformations done to prepare the companies.csv data to load are available in these links.

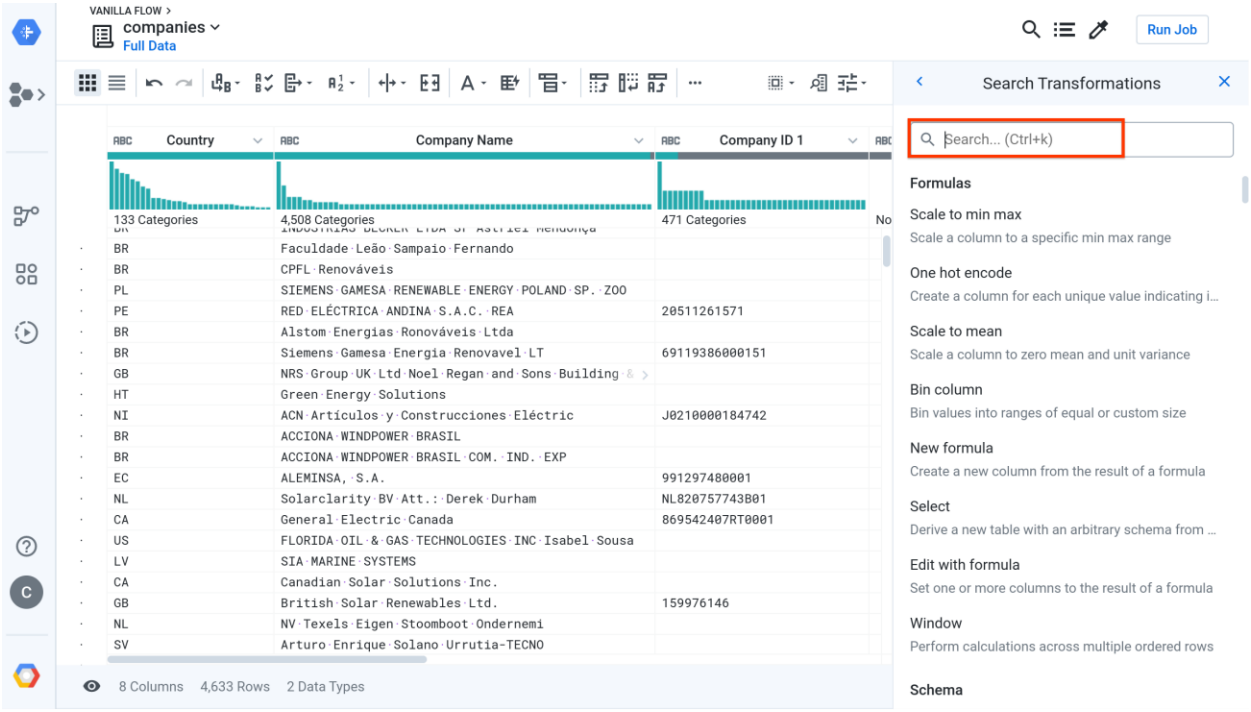
Other option

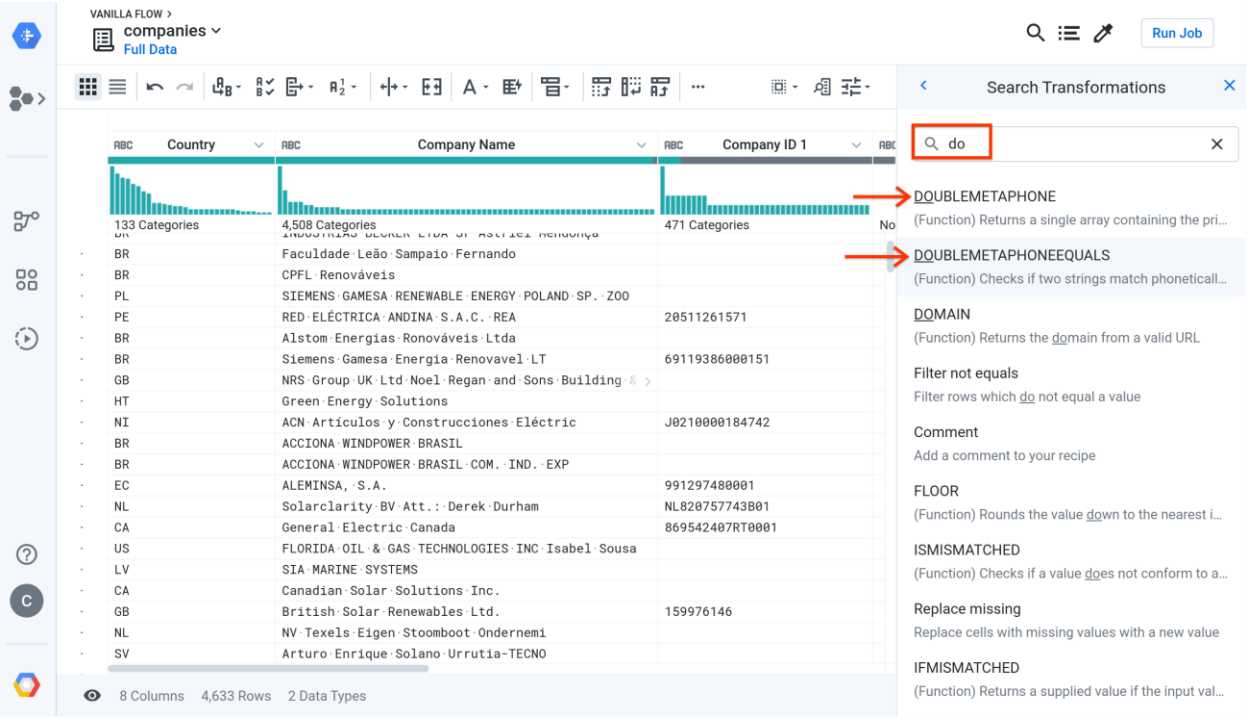
If we have a master table in BigQuery with the standardised company names, we can also create a flow in Cloud Dataprep where we join the source CSV file and the master table. Then we can compare records using the DOUBLEMETAPHONEEQUALS function.

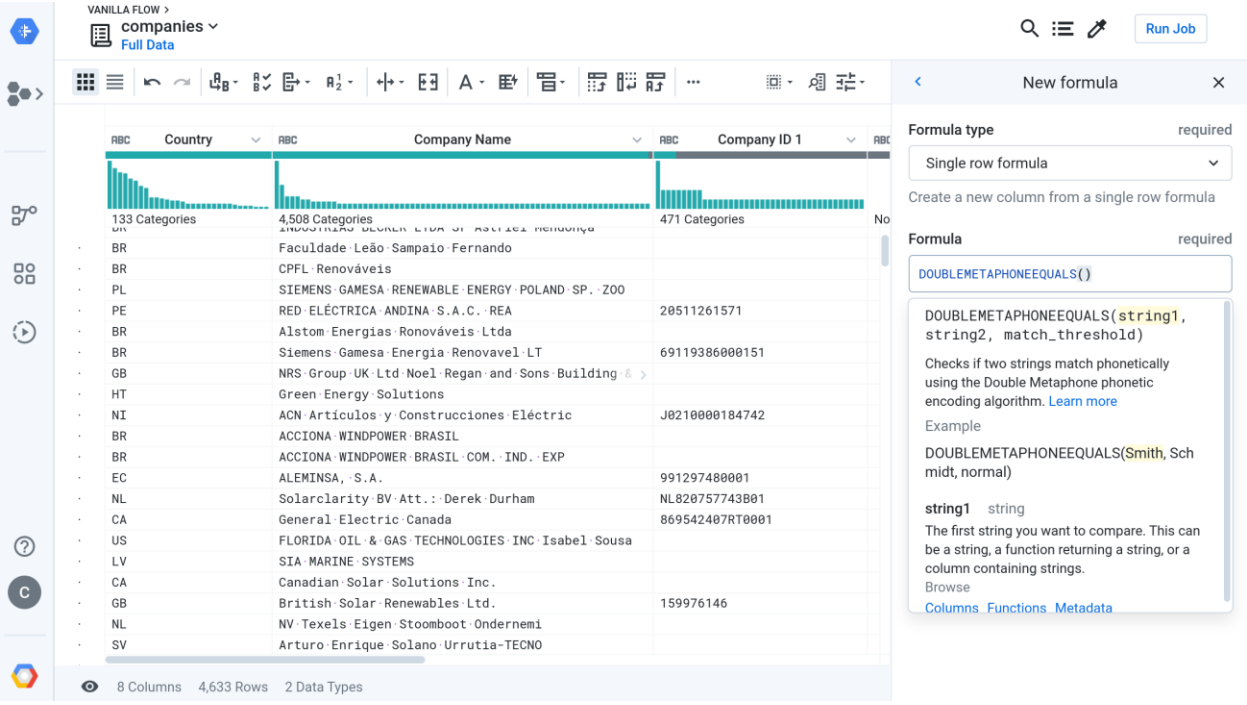
The double metaphone algorithm is based on phonetic coding. It encodes an English word phonetically by reducing them to a combination of 12 consonant sounds. It also attempts to encode non-English words. It returns two codes if a word has two plausible pronunciations.

If we want to add a function as the DOUBLEMETAPHONEEQUALS, we must open the recipe again, and proceed as shown in the screenshots below.


VANILLA FLOW
companies
Full Data
Run Job
New Step
Recipe
1 Keep rows where ISMISMATCHED({ZIP Code}, ['Integer'])
2 Standardize Company Name
3 Trim quotes from Company Name
4 Trim whitespace from Company Name
Country
Company Name
Company ID 1
133 Categories
4,508 Categories
471 Categories
BR Faculdade Leão Sampaio Fernando
BR CPFL Renováveis
PL SIEMENS GAMESA RENEWABLE ENERGY POLAND SP. ZOO
PE RED ELÉCTRICA ANDINA S.A.C. REA 20511261571
BR Alstom Energias Ronováveis Ltda
BR Siemens Gamesa Energia Renovavel LT 69119386000151
GB NRS Group UK Ltd Noel Regan and Sons Building
HT Green Energy Solutions
NI ACN Artículos y Construcciones Eléctric J0210000184742
BR ACCIONA WINDPOWER BRASIL
BR ACCIONA WINDPOWER BRASIL COM. IND. EXP
EC ALEMINSA, S.A. 991297480001
NL Solarclarity BV Att.: Derek Durham NL820757743B01
CA General Electric Canada 869542407RT0001
US FLORIDA OIL & GAS TECHNOLOGIES INC Isabel Sousa
LV SIA MARINE SYSTEMS
CA Canadian Solar Solutions Inc.
GB British Solar Renewables Ltd. 159976146
NL NV Texels Eigen Stoomboot Ondernemi
SV Arturo Enrique Solano Urrutia-TECNO
8 Columns 4,633 Rows 2 Data Types


VANILLA FLOW
companies
Full Data
Run Job
Search Transformations
Search... (Ctrl+k)
Formulas
Scale to min max
Scale a column to a specific min max range
One hot encode
Create a column for each unique value indicating i...
Scale to mean
Scale a column to zero mean and unit variance
Bin column
Bin values into ranges of equal or custom size
New formula
Create a new column from the result of a formula
Select
Derive a new table with an arbitrary schema from ...
Edit with formula
Set one or more columns to the result of a formula
Window
Perform calculations across multiple ordered rows
Schema
Country
Company Name
Company ID 1
133 Categories
4,508 Categories
471 Categories
8 Columns 4,633 Rows 2 Data Types





Other fuzzy matching techniques, such as the [Levenshtein Distance], must be implemented by the user as functions in Trifacta to use them.

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