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To Transpose or Unpivot? What you need to know about table structuring in Power Query (2)

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To Transpose or Unpivot? What you need to know about table structuring in Power Query (2) 📎 🖼️

Only 6% of Analytics Reporting in organizations source their data from standard databases. Oh no, I made up that number. I have no idea what the numbers are. But I am certain that the majority of self-service BI & data analytics users must deal with a lot of crappy data.

One of the big issues Power Query users must also deal with is Table Structuring. When should you use "Transpose" and when should you use "Unpivot"?

(The data used in this demo is number 3 on the list of [Dirty Data Samples on this link](#)).

I have introduced the two concepts in [part one of this article](#). Our data had the format shown below:



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Ship Mode>>	First Class	Same Day	Second Class	Standard Class	First Class	Same Day	Second Class
Order ID							
CA-2011-100293							
CA-2011-100706			129.44		129.44		
CA-2011-100895							
CA-2011-100916							
CA-2011-101266			13.36		13.36		
CA-2011-101560							542.34
CA-2011-101770							
CA-2011-102274							
CA-2011-102673							
CA-2011-102988							4251.92
CA-2011-103317					242.546		
CA-2011-103366	149.95				149.95		
CA-2011-103807							
CA-2011-103989					590.762		
CA-2011-104283				616.14	616.14		
CA-2011-106054						12.78	
CA-2011-106810							
CA-2011-107573				23.472	23.472		
CA-2011-107811							

Order ID labelled "b" is well structured in a column, but **Segment** and **Ship Mode** are on Rows instead of columns as well.

So, we started by Transposing the table.

Column1	Column2	Column3	Column4
Valid 44 %	Valid 81 %	Valid 6 %	Valid 19 %
Error 0 %	Error 0 %	Error 0 %	Error 0 %
Empty 56 %	Empty 19 %	Empty 94 %	Empty 81 %
Segment>>	Ship Mode>>	Order ID	CA-2011-100293
Consumer	First Class		null
	Same Day		null
	Second Class		null
	Standard Class		null
Consumer Total			null
Corporate	First Class		null
	Same Day		null
	Second Class		null
	Standard Class		null
Corporate Total			null
Home Office	First Class		null
	Same Day		null
	Second Class		null
	Standard Class		91.056
Home Office Total			91.056

Then we did a little extra cleaning, removing the Total lines, Filling down the Segment Column. And the very important one, Promoted the first row to headings. This step was necessary to do a partial transpose (Unpivot) of all other columns apart from Segment and Ship Mode (which are now in order).



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Segment>>	Ship Mode>>	Order ID	1.2 CA-2011-100293	1.2 CA-2011
Consumer	First Class	null	null	
Consumer	Same Day	null	null	
Consumer	Second Class	null	null	
Consumer Total	Standard Class	null	null	
Corporate	First Class	null	null	
Corporate	Same Day	null	null	
Corporate	Second Class	null	null	
Corporate	Standard Class	null	null	
Corporate Total	Standard Class	null	null	
Home Office	First Class	null	null	
Home Office	Same Day	null	null	
Home Office	Second Class	null	null	
Home Office	Standard Class	null	91.056	
Home Office Total	Standard Class	null	91.056	

Then we could get a clean table (after naming the columns properly).

Segment>>	Ship Mode>>	Order ID	1.2 Value
Consumer	First Class	CA-2011-103366	149.95
Consumer	First Class	CA-2011-109043	243.6
Consumer	First Class	CA-2011-113166	9.568
Consumer	First Class	CA-2011-124023	8.96
Consumer	First Class	CA-2011-130155	34.2
Consumer	First Class	CA-2011-136861	31.984
Consumer	First Class	CA-2011-153927	286.65
Consumer	First Class	CA-2011-157784	514.03
Consumer	First Class	CA-2011-160094	1000.95
Consumer	First Class	CA-2011-164749	9.912

What we have cleverly done can be summarized as:

1. Because we have rows that are meant to be columns, we transposed the table.
2. Although we had a good column before that transpose operation, it went bad (into a row).
3. We were fine with that because, by making that new row become a heading row, we would apply an Unpivot to that section to bring it back as a column.

Apparently, our steps worked because we had only one good column before transpose. And after transposing, we could make that row a header row and unpivot the section of headings to bring it back. If we had two good columns before transpose, it means we would have those two columns go into rows after transpose. Only one can be made header, and only that same one can be Unpivoted back to column. This is the bone of contention in this article.

Have a look at the table below:



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Order ID	Order Date	Segment	Ship Mode	First Class	Same Day	Second Class
CA-2011-100293	14-Mar-13	Consumer	Corporate	Home Office	Consumer	Corporate
CA-2011-100706	16-Dec-13	Consumer	Corporate	Home Office	Consumer	Corporate
CA-2011-100895	02-Jun-13	Consumer	Corporate	Home Office	Consumer	Corporate
CA-2011-100916	21-Oct-13	Consumer	Corporate	Home Office	Consumer	Corporate
CA-2011-101266	27-Aug-13	Consumer	Corporate	Home Office	Consumer	Corporate
CA-2011-101560	28-Nov-13	Consumer	Corporate	Home Office	Consumer	Corporate
CA-2011-101770	31-Mar-13	Consumer	Corporate	Home Office	Consumer	Corporate
CA-2011-102274	21-Nov-13	Consumer	Corporate	Home Office	Consumer	Corporate
CA-2011-102673	01-Nov-13	Consumer	Corporate	Home Office	Consumer	Corporate
CA-2011-102988	05-Apr-13	Consumer	Corporate	Home Office	Consumer	Corporate
CA-2011-103317	05-Jul-13	Consumer	Corporate	Home Office	Consumer	Corporate
CA-2011-103366	15-Jan-13	Consumer	Corporate	Home Office	Consumer	Corporate
CA-2011-103807	02-Dec-13	Consumer	Corporate	Home Office	Consumer	Corporate
CA-2011-103989	19-Mar-13	Consumer	Corporate	Home Office	Consumer	Corporate
CA-2011-104283	27-Jun-13	Consumer	Corporate	Home Office	Consumer	Corporate
CA-2011-106054	06-Jan-13	Consumer	Corporate	Home Office	Consumer	Corporate
CA-2011-106810	14-May-13	Consumer	Corporate	Home Office	Consumer	Corporate
CA-2011-107573	12-Dec-13	Consumer	Corporate	Home Office	Consumer	Corporate
CA-2011-107811	29-Apr-13	Consumer	Corporate	Home Office	Consumer	Corporate

If we transpose this table, **Ship Mode** and **Segment** (a) will be well aligned as columns while **Order ID** and **Order Date** (b) will now be wrongly aligned as rows. That is back to square 1. We would be running in circles.

So, the approach must be different to solve this, and the following steps summarizes that:

1. Import the data and delete all steps from Promoted Headers. (This, you now know, is a standard approach if you need to transpose a table without losing any of its contents.)

Order ID	Order Date	Segment	Ship Mode	First Class	Same Day	Second Class
CA-2011-100293	14-Mar-13	Consumer	Corporate	Home Office	Consumer	Corporate
CA-2011-100706	16-Dec-13	Consumer	Corporate	Home Office	Consumer	Corporate
CA-2011-100895	02-Jun-13	Consumer	Corporate	Home Office	Consumer	Corporate
CA-2011-100916	21-Oct-13	Consumer	Corporate	Home Office	Consumer	Corporate
CA-2011-101266	27-Aug-13	Consumer	Corporate	Home Office	Consumer	Corporate
CA-2011-101560	28-Nov-13	Consumer	Corporate	Home Office	Consumer	Corporate
CA-2011-101770	31-Mar-13	Consumer	Corporate	Home Office	Consumer	Corporate
CA-2011-102274	21-Nov-13	Consumer	Corporate	Home Office	Consumer	Corporate
CA-2011-102673	01-Nov-13	Consumer	Corporate	Home Office	Consumer	Corporate
CA-2011-102988	05-Apr-13	Consumer	Corporate	Home Office	Consumer	Corporate
CA-2011-103317	05-Jul-13	Consumer	Corporate	Home Office	Consumer	Corporate
CA-2011-103366	15-Jan-13	Consumer	Corporate	Home Office	Consumer	Corporate
CA-2011-103807	02-Dec-13	Consumer	Corporate	Home Office	Consumer	Corporate
CA-2011-103989	19-Mar-13	Consumer	Corporate	Home Office	Consumer	Corporate
CA-2011-104283	27-Jun-13	Consumer	Corporate	Home Office	Consumer	Corporate
CA-2011-106054	06-Jan-13	Consumer	Corporate	Home Office	Consumer	Corporate
CA-2011-106810	14-May-13	Consumer	Corporate	Home Office	Consumer	Corporate
CA-2011-107573	12-Dec-13	Consumer	Corporate	Home Office	Consumer	Corporate
CA-2011-107811	29-Apr-13	Consumer	Corporate	Home Office	Consumer	Corporate

1	2	3	4	5	6	7
CA-2011-100293	14-Mar-13	Consumer	Corporate	Home Office	Consumer	Corporate
CA-2011-100706	16-Dec-13	Consumer	Corporate	Home Office	Consumer	Corporate
CA-2011-100895	02-Jun-13	Consumer	Corporate	Home Office	Consumer	Corporate
CA-2011-100916	21-Oct-13	Consumer	Corporate	Home Office	Consumer	Corporate
CA-2011-101266	27-Aug-13	Consumer	Corporate	Home Office	Consumer	Corporate
CA-2011-101560	28-Nov-13	Consumer	Corporate	Home Office	Consumer	Corporate
CA-2011-101770	31-Mar-13	Consumer	Corporate	Home Office	Consumer	Corporate
CA-2011-102274	21-Nov-13	Consumer	Corporate	Home Office	Consumer	Corporate
CA-2011-102673	01-Nov-13	Consumer	Corporate	Home Office	Consumer	Corporate
CA-2011-102988	05-Apr-13	Consumer	Corporate	Home Office	Consumer	Corporate
CA-2011-103317	05-Jul-13	Consumer	Corporate	Home Office	Consumer	Corporate
CA-2011-103366	15-Jan-13	Consumer	Corporate	Home Office	Consumer	Corporate
CA-2011-103807	02-Dec-13	Consumer	Corporate	Home Office	Consumer	Corporate
CA-2011-103989	19-Mar-13	Consumer	Corporate	Home Office	Consumer	Corporate
CA-2011-104283	27-Jun-13	Consumer	Corporate	Home Office	Consumer	Corporate
CA-2011-106054	06-Jan-13	Consumer	Corporate	Home Office	Consumer	Corporate
CA-2011-106810	14-May-13	Consumer	Corporate	Home Office	Consumer	Corporate
CA-2011-107573	12-Dec-13	Consumer	Corporate	Home Office	Consumer	Corporate
CA-2011-107811	29-Apr-13	Consumer	Corporate	Home Office	Consumer	Corporate

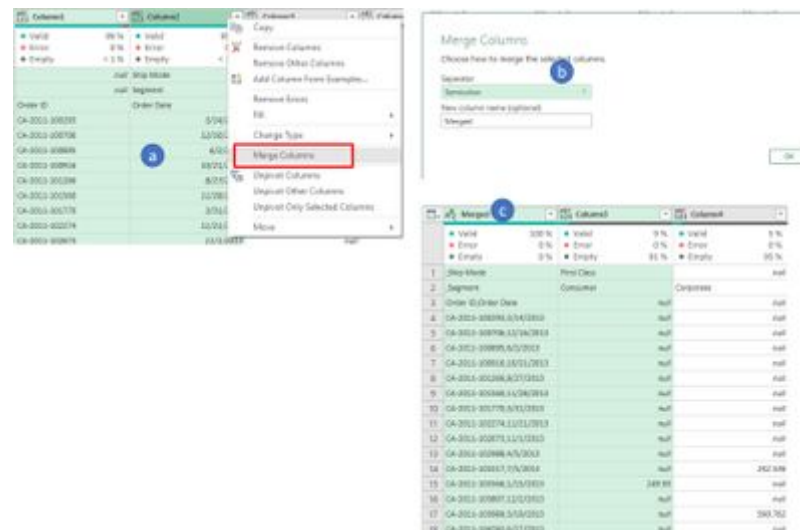
2. Merge the two columns that are good into one. (This is the key to solving this. By merging all columns that are in perfect order, when



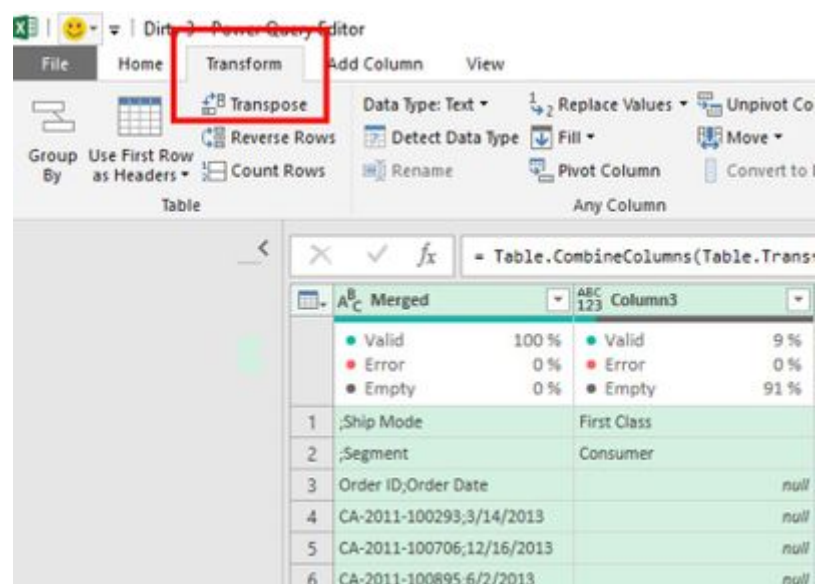
the table is transposed, and things go south for them, we can unpivot them all together).

Select **Column 1** and **Column 2**, right click on the column header and select merge.

Make sure to use a delimiter that is not part of the data content.



3. **Transpose the table.** Go to the Transform tab and hit the Transpose button. (for tables that require transpose operations and have columns that are in order, the columns should be combined into a single one, with a unique delimiter.



4. **Promote Headers.** Make the first row (which now contains the combined **Order ID's** and **Order Dates**) the headers. This is necessary



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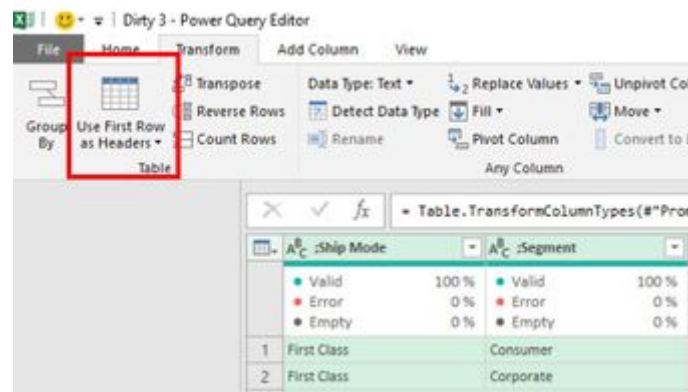
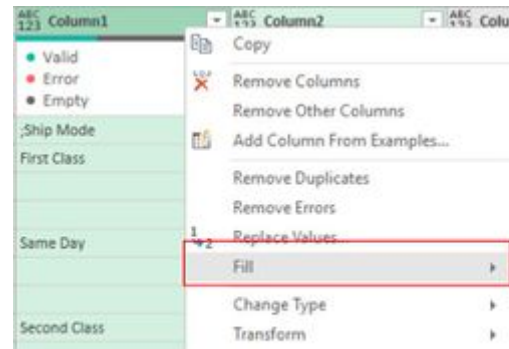
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for us to bring them back to column with an Unpivot Step.

(for the sake of this data, a little cleaning is also required to fill down

rows with null values prior to promoting the headers)



5. Select the good columns (*Ship Mode* and *Segment*) and unpivot the others. This will bring back the combined *Order ID* and *Order Date* as a column, with the ensuing values as another column right in front. What do you think the next step would be from here?



Ship Mode	Segment
Valid	100 %
Error	0 %
Empty	0 %
First Class	Consumer
First Class	Corporate
First Class	Home Office
Same Day	Consumer
Same Day	Corporate
Same Day	Home Office
Second Class	Consumer
Second Class	Corporate
Second Class	Home Office
Standard Class	Consumer
Standard Class	Corporate
Standard Class	Home Office

Ship Mode	Segment	Attribute	Value
Valid	100 %	Valid	100 %
Error	0 %	Error	0 %
Empty	0 %	Empty	0 %
First Class	Consumer	CA-2011-103366,1/15/2013	149.85
First Class	Consumer	CA-2011-109043,8/15/2013	242.6
First Class	Consumer	CA-2011-113166,12/24/2013	8.568
First Class	Consumer	CA-2011-124023,4/7/2013	8.96
First Class	Consumer	CA-2011-130155,5/19/2013	34.2
First Class	Consumer	CA-2011-156861,9/5/2013	31.984
First Class	Consumer	CA-2011-155927,8/12/2013	286.85
First Class	Consumer	CA-2011-157784,7/5/2013	514.03
First Class	Consumer	CA-2011-160094,4/30/2013	1000.95
First Class	Consumer	CA-2011-164749,3/23/2013	8.932

6. My guess is you guessed right. Now we need to split the new column named **Attribute**, to get it separated into the **Order ID** component and the **Order Date** Component, using our clever delimiter.

Attribute
Valid
Error
Empty
CA-2011-103366,1/15/2013
CA-2011-109043,8/15/2013
CA-2011-113166,12/24/2013
CA-2011-124023,4/7/2013
CA-2011-130155,5/19/2013
CA-2011-156861,9/5/2013
CA-2011-155927,8/12/2013
CA-2011-157784,7/5/2013
CA-2011-160094,4/30/2013
CA-2011-164749,3/23/2013
CA-2011-166730,12/1/2013
CA-2012-102722,4/18/2012
CA-2012-102778,11/1/2012
CA-2012-117828,12/1/2012

7. The final thing would be to tidy things up, as necessary. Such as renaming the headers properly, filtering out Grand Totals (they are somewhere in this data) and renaming columns appropriately.


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Ship Mode	Segment	Order ID	Order Date	Value
Valid	Valid	Valid	Valid	Valid
Empty	Empty	Empty	Empty	Empty
First Class	Consumer	CA-2011-103366	1/15/2013	249.95
First Class	Consumer	CA-2011-109043	8/15/2013	243.6
First Class	Consumer	CA-2011-113166	12/24/2013	9.568
First Class	Consumer	CA-2011-124023	4/7/2013	8.96
First Class	Consumer	CA-2011-124023	5/19/2013	34.2
First Class	Consumer	CA-2011-156861	9/5/2013	31.984
First Class	Consumer	CA-2011-153927	8/12/2013	286.65
First Class	Consumer	CA-2011-157784	7/5/2013	334.03
First Class	Consumer	CA-2011-160094	4/30/2013	2000.95
First Class	Consumer	CA-2011-164749	1/21/2013	9.912
First Class	Consumer	CA-2011-166730	12/30/2013	39.128
First Class	Consumer	CA-2012-102722	4/18/2014	106.5
First Class	Consumer	CA-2012-102778	11/21/2014	28.176

I will conclude by stressing the fact that, when you require a Transpose step in your cleaning steps, you should:

1. Ensure there are no promoted header steps before you transpose.
2. If you have more than one column in order, merge them into one before you transpose.
3. To carry out a partial transpose of selected columns, use the Unpivot option.

Make sure the items you need to be partially transposed are sitting on the headers of your data.

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