

# M3 Practical Challenge:

## Cleansing Your Data with Alteryx

The objective is to get a database of the market capitalization of the S&P 500 companies and an evolution of the prices of the stocks of that companies during a period of time.

Once that's done, I'm going to calculate the [Stochastic Relative Strength Index](#) or StocRSI for a couple of companies, in this case Apple and Facebook. After that plot the results on a graph.

Another process I will be doing is creating two tops\_10 of the Cities and States which have the most amount of S&P 500 Companies and show the sum Net income and sum Long-Term Debt of all the companies in that City or State.

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## 1. Importing the data

First, we need to get the data. For that I'm going to make use of Kaggle to obtain 3 .csv files related with Stocks.

<https://www.kaggle.com/dgawlik/nyse/version/3?select=fundamentals.csv>

<https://www.kaggle.com/dgawlik/nyse/version/3?select=prices.csv>

<https://www.kaggle.com/dgawlik/nyse/version/3?select=securities.csv>

The First, fundamentals.csv file include 1,781 rows of data of 448 different companies from 2012 to 2017. Including information about different indicators, such as Net Income, Total Assets, Long-Term Debt...

The second, prices.csv file include 851,264 market prices of 501 companies from 2010 to 2017, day by day including the open, close, low, high and volume data.

The third, securities.csv file includes information about 505 companies such as its Ticker symbol, name, sector, industry, address, CIK identifier.

The input from fundamentals.csv is:

Period End	Accounts Payable	Accounts Receivable	Add'l Income/expense items	After Tax ROE	Capital Expenditures	Capital Surplus	Cash Ratio	Cash and Cash Equivalents	Changes in Inventories	Common Stocks	Cost of Revenue	Current Assets
1 2012-12-31	3068000000.0	-220000000.0	-1961000000.0	23.0	-1888000000.0	4695000000.0	53.0	1300000000.0	0.0	1270000000.0	10499000000.0	78.0
2 2013-12-31	4975000000.0	-930000000.0	-2723000000.0	67.0	-3114000000.0	10592000000.0	75.0	2175000000.0	0.0	50000000.0	11019000000.0	104.0
3 2014-12-31	4668000000.0	-1600000000.0	-150000000.0	143.0	-5311000000.0	15135000000.0	60.0	1768000000.0	0.0	7000000.0	15620000000.0	88.0
4 2015-12-31	5102000000.0	3520000000.0	-708000000.0	135.0	-6151000000.0	11591000000.0	51.0	1085000000.0	0.0	6000000.0	11096000000.0	73.0
5 2012-12-29	2405453000.0	-894820000.0	6000000.0	32.0	-271182000.0	5202150000.0	23.0	598111000.0	-260298000.0	7000.0	3106967000.0	124.0
6 2013-12-28	2609239000.0	-324280000.0	26980000.0	26.0	-195757000.0	5312930000.0	40.0	1112471000.0	-203513000.0	7000.0	3241668000.0	144.0
7 2015-01-03	3616038000.0	-482090000.0	3092000.0	25.0	-228446000.0	5629450000.0	3.0	104671000.0	-227657000.0	7000.0	5390240000.0	130.0
8 2016-01-02	3757085000.0	-124760000.0	-7484000.0	19.0	-234747000.0	603332000.0	2.0	90782000.0	-244096000.0	7000.0	5314246000.0	130.0
9 2013-09-28	36232000000.0	-19490000000.0	11560000000.0	30.0	-8165000000.0	0.0	93.0	14259000000.0	-973000000.0	19764000000.0	106606+11	168.0
10 2014-09-27	48649000000.0	-44520000000.0	98000000.0	35.0	-8971000000.0	0.0	40.0	13844000000.0	-76000000.0	23313000000.0	112258+11	108.0
11 2015-09-26	60671000000.0	-31240000000.0	12850000000.0	45.0	-11247000000.0	0.0	52.0	21120000000.0	-238000000.0	27416000000.0	140099+11	111.0
12 2016-09-24	59321000000.0	10440000000.0	13480000000.0	36.0	-12734000000.0	0.0	85.0	20484000000.0	-217000000.0	31251000000.0	131376+11	135.0
13 2012-12-31	57340000000.0	22300000000.0	-8000000.0	1507.0	-3330000000.0	0.0	118.0	5901000000.0	-203000000.0	0.0	4506000000.0	227.0
14 2013-12-31	60740000000.0	-3400000000.0	50.0	9.0	-1887000000.0	3674000000.0	144.0	950000000.0	-5000000.0	14000000.0	4549000000.0	20.0
15 2014-12-31	65940000000.0	-1720000000.0	4510000000.0	102.0	-412000000.0	4194000000.0	74.0	8348000000.0	-20300000.0	16000000.0	4426000000.0	141.0
16 2015-12-31	84630000000.0	-1070000000.0	-2060000000.0	130.0	-532000000.0	13200000000.0	77.0	8339000000.0	-434000000.0	17000000.0	4500000000.0	150.0
17 2013-09-30	14870635000.0	-3131518000.0	-44000.0	19.0	-2024500000.0	23699500000.0	8.0	1211096000.0	-1486672000.0	2678000.0	85451348000.0	97.0
18 2014-09-30	17250160000.0	-693286000.0	-28594000.0	14.0	-2564457000.0	27491500000.0	10.0	1808513000.0	-1304569000.0	2711000.0	116586761e+11	97.0
19 2015-09-30	172518227000.0	-1476791000.0	-44220000.0	22.0	-2318500000.0	3736477000.0	10.0	2167442000.0	-1379189000.0	2750000.0	132432468e+11	94.0
20 2016-09-30	24670159000.0	-9127240000.0	59480000.0	67.0	-4646160000.0	4333007000.0	11.0	2741832000.0	-1170253000.0	2778000.0	14257708e+11	90.0
21 2012-12-31	108690000000.0	36000000000.0	-12600000000.0	22.0	-1795000000.0	0.0	114.0	10602000000.0	-41700000.0	11755000000.0	88990000000.0	236.0
22 2013-12-31	594800000000.0	-13000000000.0	53000000.0	100.0	-1145000000.0	0.0	85.0	3475000000.0	-154000000.0	12040000000.0	91930000000.0	202.0
23 2014-12-31	535000000000.0	-19500000000.0	69000000.0	11.0	-1077000000.0	0.0	43.0	4063000000.0	-29700000.0	12383000000.0	92180000000.0	130.0
24 2015-12-31	568300000000.0	-17100000000.0	4790000000.0	21.0	-1115000000.0	0.0	67.0	5001000000.0	-257000000.0	12734000000.0	87471000000.0	154.0
25 2013-11-29	7292570000.0	336490000.0	9260000.0	4.0	-188350000.0	3392696000.0	208.0	834556000.0	0.0	61000.0	586557000.0	265.0
26 2014-11-28	7761630000.0	9280000.0	8423000.0	4.0	-148332000.0	3778495000.0	150.0	1117400000.0	0.0	61000.0	622080000.0	185.0
27 2015-11-27	7793560000.0	34870000.0	9.0	-184936000.0	4184883000.0	180.0	876560000.0	0.0	61000.0	744317000.0	216.0	
28 2016-12-02	8660160000.0	-1604160000.0	11978000.0	16.0	-203805000.0	4616313000.0	169.0	1011315000.0	0.0	61000.0	819968000.0	208.0
29 2013-11-02	3230840000.0	98550000.0	12377000.0	14.0	-123074000.0	711879000.0	821.0	392099000.0	28527000.0	51842000.0	941278000.0	959.0
30 2014-11-01	4306210000.0	-36460000.0	11645000.0	13.0	-177913000.0	643058000.0	404.0	569233000.0	24642000.0	51869000.0	10348585000.0	538.0
31 2015-10-31	4389040000.0	-71198000.0	6303000.0	14.0	-153960000.0	634484000.0	272.0	884353000.0	-3557000.0	52011000.0	1175830000.0	366.0
32 2016-10-29	431196000.0	-8392000.0	17566000.0	17.0	-127397000.0	402270000.0	518.0	921132000.0	38221000.0	51363000.0	1194236000.0	635.0
33 2012-12-31	9308000000.0	17532000000.0	2350000000.0	7.0	-1240000000.0	0.0	35.0	5352000000.0	-1304000000.0	6134000000.0	86936000000.0	175.0
34 2013-12-31	14113500000.0	2960000000.0	155000000.0	7.0	-813000000.0	0.0	48.0	708200000.0	254100000.0	613600000.0	85915000000.0	182.0
35 2014-12-31	15240000000.0	4250000000.0	339000000.0	11.0	-894000000.0	0.0	42.0	5976000000.0	1274000000.0	5115000000.0	76433000000.0	167.0

The input from prices.csv is:

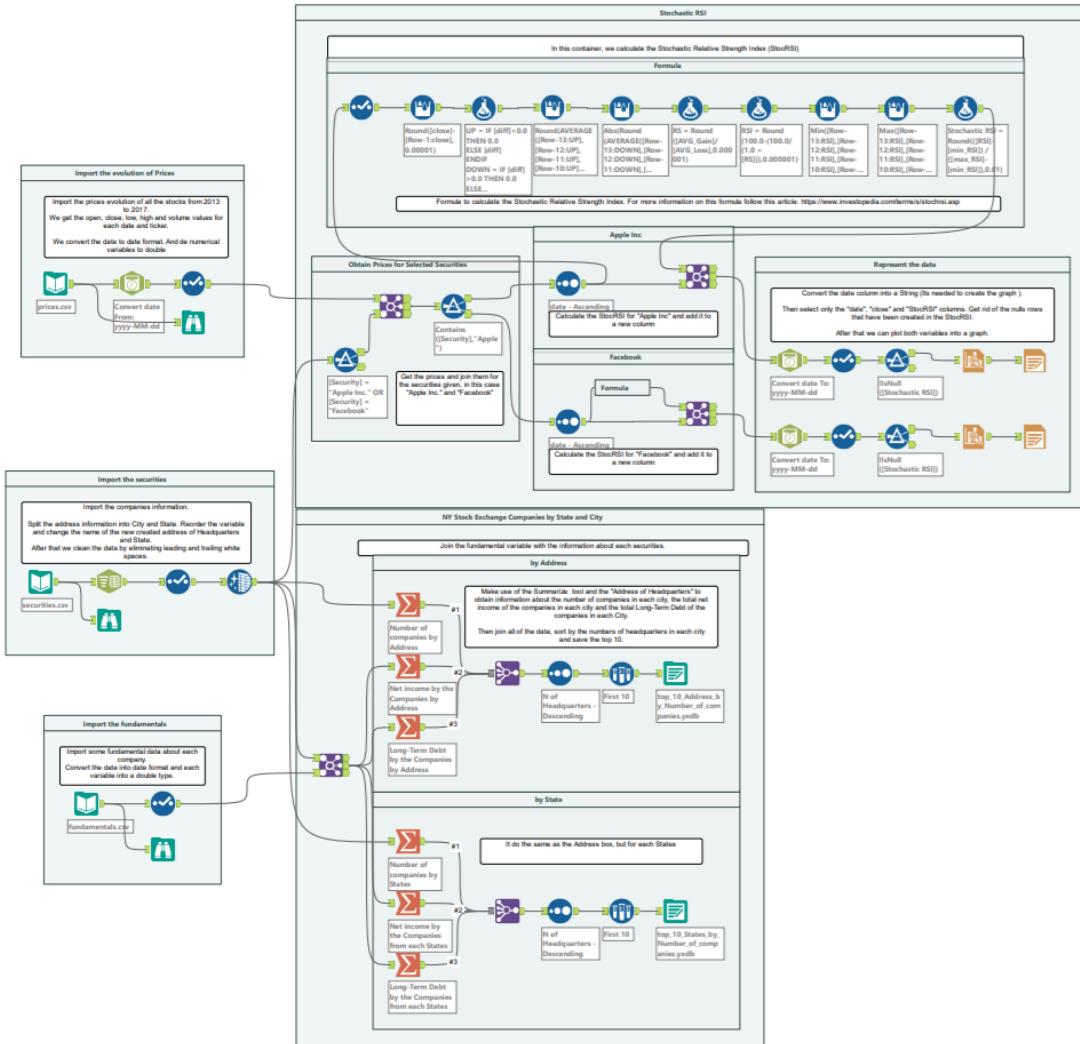
Results - Browse (6) - Input

Record	date	symbol	open	close	low	high	volume
1	2016-01-05 00:00:00	WLTW	123.43	125.839996	122.309998	126.25	2163600.0
2	2016-01-06 00:00:00	WLTW	125.239998	119.980003	119.940002	125.540001	2386400.0
3	2016-01-07 00:00:00	WLTW	116.379997	114.949997	114.93	119.739998	2489500.0
4	2016-01-08 00:00:00	WLTW	115.480003	116.620003	113.5	117.440002	2006300.0
5	2016-01-11 00:00:00	WLTW	117.010002	114.970001	114.089996	117.330002	1408600.0
6	2016-01-12 00:00:00	WLTW	115.510002	115.550003	114.5	116.059998	1098000.0
7	2016-01-13 00:00:00	WLTW	116.459999	112.849998	112.589996	117.07	949600.0
8	2016-01-14 00:00:00	WLTW	113.510002	114.379997	110.050003	115.029999	785300.0
9	2016-01-15 00:00:00	WLTW	113.330002	112.529999	111.919998	114.879997	1093700.0
10	2016-01-19 00:00:00	WLTW	113.660004	110.379997	109.870003	115.870003	1523500.0
11	2016-01-20 00:00:00	WLTW	109.059998	109.300003	108.32	111.599998	1653900.0
12	2016-01-21 00:00:00	WLTW	109.730003	110.0	108.32	110.580002	944300.0
13	2016-01-22 00:00:00	WLTW	111.879997	111.949997	110.190002	112.949997	744900.0
14	2016-01-25 00:00:00	WLTW	111.32	110.120003	110.0	114.629997	703800.0
15	2016-01-26 00:00:00	WLTW	110.419998	111.0	107.300003	111.400002	563100.0
16	2016-01-27 00:00:00	WLTW	110.769997	110.709999	109.019997	112.57	896100.0
17	2016-01-28 00:00:00	WLTW	110.900002	112.580002	109.900002	112.970001	680400.0
18	2016-01-29 00:00:00	WLTW	113.349998	114.470001	111.669998	114.589996	749900.0
19	2016-02-01 00:00:00	WLTW	114.0	114.5	112.900002	114.849998	574200.0
20	2016-02-02 00:00:00	WLTW	113.25	110.559998	109.75	113.860001	694800.0
21	2016-02-03 00:00:00	WLTW	113.379997	114.050003	109.639999	114.639999	896300.0
22	2016-02-04 00:00:00	WLTW	114.080002	115.709999	114.080002	116.32	956300.0
23	2016-02-05 00:00:00	WLTW	115.120003	114.019997	109.709999	116.489998	997100.0
24	2016-02-08 00:00:00	WLTW	113.300003	111.160004	110.459999	113.300003	1200500.0
25	2016-02-09 00:00:00	WLTW	111.169998	110.650002	109.639999	112.110001	1725200.0
26	2016-02-10 00:00:00	WLTW	106.730003	107.519997	106.360001	112.110001	1946000.0
27	2016-02-11 00:00:00	WLTW	105.629997	107.129997	104.110001	109.260002	1319500.0
28	2016-02-12 00:00:00	WLTW	108.559998	107.839996	107.07	109.43	922400.0
29	2016-02-16 00:00:00	WLTW	109.110001	110.769997	107.010002	111.300003	1185100.0
30	2016-02-17 00:00:00	WLTW	110.830002	111.239998	107.970001	112.110001	921500.0
31	2016-02-18 00:00:00	WLTW	111.120003	111.599998	108.93	112.199997	440900.0
32	2016-02-19 00:00:00	WLTW	111.370003	110.330002	107.279999	112.400002	1244300.0
33	2016-02-22 00:00:00	WLTW	111.360001	113.040001	111.010002	113.230003	681300.0
34	2016-02-23 00:00:00	WLTW	112.370003	111.889999	111.349998	112.800003	411200.0
35	2016-02-24 00:00:00	WLTW	110.769997	111.559998	109.82	112.489998	447300.0

The input from securities.csv is:

Record	Ticker symbol	Security	SEC filings	GICS Sector	GICS Sub Industry	Address of Headquarters	Date first added	CIK
1	MMM	3M Company	reports	Industrials	Industrial Conglomerates	St. Paul, Minnesota	2016-03-31	0000066740
2	ABT	Abbott Laboratories	reports	Health Care	Health Care Equipment	North Chicago, Illinois	2012-12-31	000001800
3	ABBV	AbbVie	reports	Health Care	Pharmaceuticals	North Chicago, Illinois	2011-07-06	0001551152
4	ACN	Accenture plc	reports	Information Technology	IT Consulting & Other Services	Dublin, Ireland	2015-08-31	0001467373
5	ATVI	Activision Blizzard	reports	Information Technology	Home Entertainment Software	Santa Monica, California	2016-05-03	000018877
6	AYI	Acyutu Brands Inc	reports	Industrials	Electrical Components & Equipment	Atlanta, Georgia	2016-05-03	0001144215
7	ADBE	Adobe Systems Inc	reports	Information Technology	Application Software	San Jose, California	1997-05-05	0000196343
8	AAP	Advance Auto Parts	reports	Consumer Discretionary	Automotive Retail	Roanoke, Virginia	2015-07-09	0001158449
9	AES	AES Corp	reports	Utilities	Independent Power Producers & Energy Traders	Arlington, Virginia	2008-07-01	0000874761
10	AET	Aetna Inc	reports	Health Care	Managed Health Care	Hartford, Connecticut	1976-06-30	0001122304
11	AMG	Affiliated Managers Group Inc	reports	Financials	Asset Management & Custody Banks	Beverly, Massachusetts	2014-07-01	0001004434
12	AFL	AFLAC Inc	reports	Financials	Life & Health Insurance	Columbus, Georgia	2000-04-07	0000004977
13	A	Agilent Technologies Inc	reports	Health Care	Health Care Equipment	Santa Clara, California	2001-09-02	0001090872
14	APD	Air Products & Chemicals Inc	reports	Materials	Industrial Gases	Allentown, Pennsylvania	1985-04-30	0000002369
15	AKAM	Akamai Technologies Inc	reports	Information Technology	Internet Software & Services	Cambridge, Massachusetts	2007-07-12	0001086222
16	ALK	Alaska Air Group Inc	reports	Industrials	Airlines	Seattle, Washington	2016-05-13	0000766421
17	ALB	Albemarle Corp	reports	Materials	Specialty Chemicals	Baton Rouge, Louisiana	2016-07-01	0000195913
18	ALXN	Alexion Pharmaceuticals	reports	Health Care	Biotechnology	Cheshire, Connecticut	2012-05-25	0000099866
19	ALLE	Allegion	reports	Industrials	Building Products	Dublin, Ireland	2013-12-02	0001579241
20	AGN	Allergan Plc	reports	Health Care	Pharmaceuticals	Dublin, Ireland	2008-04-29	0000884629
21	ADS	Alliance Data Systems	reports	Information Technology	Data Processing & Outsourced Services	Plano, Texas	2013-12-23	0001101215
22	LNT	Alliant Energy Corp	reports	Utilities	Electric Utilities	Madison, Wisconsin	2016-07-01	0000052541
23	ALL	Allstate Corp	reports	Financials	Property & Casualty Insurance	Northfield Township, Illinois	2008-09-01	0000899051
24	GOOGL	Alphabet Inc Class A	reports	Information Technology	Internet Software & Services	Mountain View, California	2014-04-03	0001652044
25	GOOG	Alphabet Inc Class C	reports	Information Technology	Internet Software & Services	Mountain View, California	2016-03-22	0001652044
26	MO	Altria Group Inc	reports	Consumer Staples	Tobacco	Richmond, Virginia	2007-04-18	0000764180
27	AMZN	Amazon.com Inc	reports	Consumer Discretionary	Internet & Direct Marketing Retail	Seattle, Washington	2005-11-18	0001018724
28	AEE	Ameren Corp	reports	Utilities	Multilevel Utilities	St. Louis, Missouri	1991-09-19	0001002910
29	AAL	American Airlines Group	reports	Industrials	Airlines	Fort Worth, Texas	2015-03-23	0000006201
30	AEP	American Electric Power	reports	Utilities	Electric Utilities	Columbus, Ohio	2016-04-09	0000004904
31	AXP	American Express Co	reports	Financials	Consumer Finance	New York, New York	1976-06-30	0000004962
32	AGC	American International Group, Inc.	reports	Financials	Property & Casualty Insurance	New York, New York	1980-03-31	0000005272
33	AMT	American Tower Corp A	reports	Real Estate	Specialized REITs	Boston, Massachusetts	2007-11-19	0001053507
34	AWK	American Water Works Company Inc	reports	Utilities	Water Utilities	Voorhees, New Jersey	2016-03-04	0001410636
35	AMP	Americorp Financial	reports	Financials	Asset Management & Custody Banks	Minneapolis, Minnesota	2008-02-02	0000820027

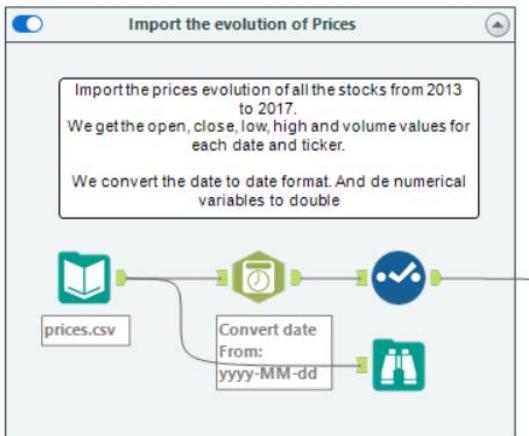
## 2. Create the WorkFlow



### 2.1. Organizing the imports

The first thing that the workflow does is make the imports and treat the data to prepare it.

#### 2.1.1. Prices



Import the prices.csv file, the first thing we need to do with this data is to change the date format, that's because some of the fields have the format yyyy-MM-dd hh:mm:ss and others have the format yyyy-MM-dd, so we need to unify this field and change its type to date format.

For that I used the DateTime tool to change the string into a Date format. Once that's done, the select tool change the new date field into "date" and delete the original, as well as change the types of the numeric fields into double:

The screenshot shows two Power BI configuration windows side-by-side.

**DateTime (22) - Configuration**

- Select the format to convert: String to Date/Time format
- Select the string field to convert: date
- Specify the new column name: DateTime\_Out
- Specify your DateTime Language: English
- Select the format that matches the incoming string field: yyyy-MM-dd
- Specify the format of the incoming string field: dd/MM/yy hh:mm:ss
- Example and Output fields.

**Select (36) - Configuration**

Field	Type	Size	Rename	Description
date	V_String	254	date	
DateTime_Out	Date	10		
symbol	V_String	254	Ticker Symbol	
open	Double	8		
close	Double	8		
low	Double	8		
high	Double	8		
volume	Double	8		
*Unknown	Unknown	0		Dynamic or Unknown Fields

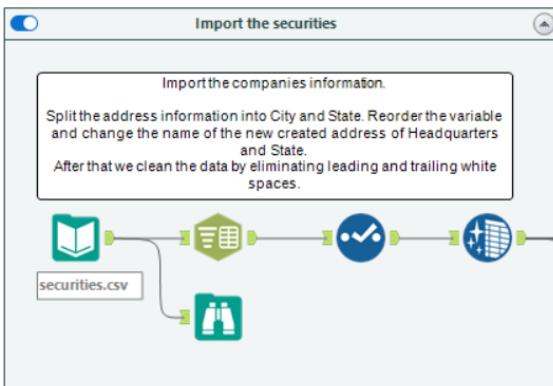
By doing the previous step we now have this information:

#### Results - Select (36) - Output

7 of 7 Fields | Cell Viewer | \* 16,052 of 851,264 records displayed(partial results) | ↑ ↓ |

Record	date	Ticker Symbol	open	close	low	high	volume
1	2016-01-05	WLTW	123.43	125.839996	122.309998	126.25	2163600
2	2016-01-06	WLTW	125.239998	119.980003	119.940002	125.540001	2386400
3	2016-01-07	WLTW	116.379997	114.949997	114.93	119.739998	2489500
4	2016-01-08	WLTW	115.480003	116.620003	113.5	117.440002	2006300
5	2016-01-11	WLTW	117.010002	114.970001	114.089996	117.330002	1408600
6	2016-01-12	WLTW	115.510002	115.550003	114.5	116.059998	1098000
7	2016-01-13	WLTW	116.459999	112.849998	112.589996	117.07	949600
8	2016-01-14	WLTW	113.510002	114.379997	110.050003	115.029999	785300
9	2016-01-15	WLTW	113.330002	112.529999	111.919998	114.879997	1093700
10	2016-01-19	WLTW	113.660004	110.379997	109.870003	115.870003	1523500
11	2016-01-20	WLTW	109.059998	109.300003	108.32	111.599998	1653900
12	2016-01-21	WLTW	109.730003	110	108.32	110.580002	944300
13	2016-01-22	WLTW	111.879997	111.949997	110.190002	112.949997	744900
14	2016-01-25	WLTW	111.32	110.120003	110	114.629997	703800
15	2016-01-26	WLTW	110.419998	111	107.300003	111.400002	563100
16	2016-01-27	WLTW	110.769997	110.709999	109.019997	112.57	896100
17	2016-01-28	WLTW	110.900002	112.580002	109.900002	112.970001	680400
18	2016-01-29	WLTW	113.349998	114.470001	111.669998	114.589996	749900
19	2016-02-01	WLTW	114	114.5	112.900002	114.849998	574200
20	2016-02-02	WLTW	113.25	110.559998	109.75	113.860001	694800
21	2016-02-03	WLTW	113.379997	114.050003	109.639999	114.639999	896300
22	2016-02-04	WLTW	114.080002	115.709999	114.080002	116.32	956300
23	2016-02-05	WLTW	115.120003	114.019997	109.709999	116.489998	997100
24	2016-02-08	WLTW	113.300003	111.160004	110.459999	113.300003	1200500
25	2016-02-09	WLTW	111.169998	110.650002	109.639999	112.110001	1725200
26	2016-02-10	WLTW	106.730003	107.519997	106.360001	112.110001	1946000
27	2016-02-11	WLTW	105.629997	107.129997	104.110001	109.260002	1319500
28	2016-02-12	WLTW	108.559998	107.839996	107.07	109.43	922400
29	2016-02-16	WLTW	109.110001	110.769997	107.010002	111.300003	1185100
30	2016-02-17	WLTW	110.830002	111.239998	107.970001	112.110001	921500
31	2016-02-18	WLTW	111.120003	111.599998	108.93	112.199997	440900
32	2016-02-19	WLTW	111.370003	110.330002	107.279999	112.400002	1244300
33	2016-02-22	WLTW	111.360001	113.040001	111.010002	113.230003	681300
34	2016-02-23	WLTW	112.370003	111.889999	111.349998	112.800003	411200
35	2016-02-24	WLTW	110.769997	111.559998	109.82	112.489998	447300

#### 2.1.2. Securities



Import the Securities.csv file, the first thing that is done is using the Text To Columns tool to split the “Address of Headquarters” into the city and state (Some fields ends with ‘[number]’ so we need to get rid of that in order to unify the states). After that’s done, the Select tool is used to change the name of some of the newly created columns.

The screenshot shows two windows side-by-side. On the left is the 'Text To Columns (23) - Configuration' dialog. It has a 'Select Column to Split' section where 'Address of Headquarters' is selected as the column to split, with a delimiter of '.'. Under 'Split to columns', 'Number of columns' is set to 3, and 'Extra characters' is set to 'Leave extra in last column'. The 'Output root name' is 'Address of Headquarters'. Below this are 'Advanced options' with checkboxes for ignoring delimiters in quotes, single quotes, parentheses, brackets, and empty columns. On the right is the 'Select (28) - Configuration' table, which lists 28 fields with their respective types, sizes, and descriptions. The table includes fields like Ticker symbol, Security, SEC filings, GICS Sector, GICS Sub Industry, Address of Headquarters, Address of Headquarters1, Address of Headquarters2, Address of Headquarters3, Date first added, CIK, and Unknown.

Lastly we clean the data using the Data Cleansing tool for the newly created variables, in order to get rid of the leading and trailing whitespaces:

The screenshot shows the 'Data Cleansing (24) - Configuration' dialog. It has several sections: 'Options' (checkboxes for Remove Null Data), 'Select Fields to Cleanse' (checkboxes for SEC filings, GICS Sector, GICS Sub Industry, Address of Headquarters, State, Date first added, CIK), 'Replace Nulls' (checkboxes for Replace with Blanks (String Fields) and Replace with 0 (Numeric Fields)), 'Remove Unwanted Characters' (checkboxes for Leading and Trailing Whitespace, Tabs, Line Breaks, and Duplicate Whitespace, All Whitespace, Letters, Numbers, Punctuation), and 'Modify Case' (checkbox for Upper Case).

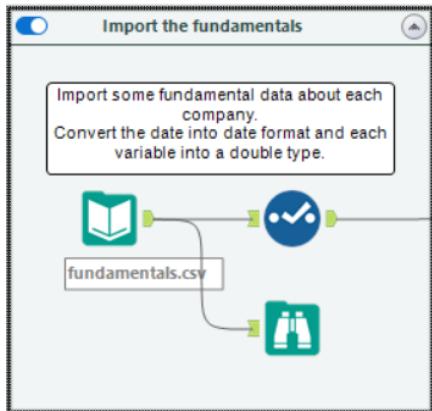
By doing the previous step we now have this information:

Results - Data Cleansing (24) - Output26

9 of 9 Fields | Cell Viewer - 505 records displayed | ↑ ↓ | Search | Data Metadata Actions

Record	Ticker Symbol	Security	SEC filings	GICS Sector	GICS Sub Industry	Address of Headquarters	State	Date first added	CIK
1	MMM	3M Company	reports	Industrials	Industrial Conglomerates	St. Paul	Minnesota	[null]	0000066740
2	ABT	Abbott Laboratories	reports	Health Care	Health Care Equipment	North Chicago	Illinois	1964-03-31	0000001800
3	ABBV	AbbVie	reports	Health Care	Pharmaceuticals	North Chicago	Illinois	2012-12-31	0001551152
4	ACN	Accenture plc	reports	Information Technology	IT Consulting & Other Services	Dublin	Ireland	2011-07-06	0001467373
5	ATVI	Activision Blizzard	reports	Information Technology	Home Entertainment Software	Santa Monica	California	2015-08-31	0000718877
6	AVY	Acuity Brands Inc	reports	Industrials	Electrical Components & Equipment	Atlanta	Georgia	2016-05-03	0001142125
7	ADBE	Adobe Systems Inc	reports	Information Technology	Application Software	San Jose	California	1997-05-05	0000796343
8	AAP	Advance Auto Parts	reports	Consumer Discretionary	Automotive Retail	Roanoke	Virginia	2015-07-09	0001153449
9	AES	AES Corp	reports	Utilities	Independent Power Producers & Energy Traders	Arlington	Virginia	[null]	0000874761
10	AET	Aetna Inc	reports	Health Care	Managed Health Care	Hartford	Connecticut	1976-06-30	0001122304
11	AMG	Affiliated Managers Group Inc	reports	Financials	Asset Management & Custody Banks	Beverly	Massachusetts	2014-07-01	0001000434
12	AFL	AFLAC Inc	reports	Financials	Life & Health Insurance	Columbus	Georgia	[null]	0000004977
13	A	Agilent Technologies Inc	reports	Health Care	Health Care Equipment	Santa Clara	California	[null]	0001090872
14	APD	Air Products & Chemicals Inc	reports	Materials	Industrial Gases	Allentown	Pennsylvania	1985-04-30	0000002969
15	AKAM	Akamai Technologies Inc	reports	Information Technology	Internet Software & Services	Cambridge	Massachusetts	2007-07-12	0001086222
16	ALK	Alaska Air Group Inc	reports	Industrials	Airlines	Seattle	Washington	2016-05-13	0000766421
17	ALB	Albermarle Corp	reports	Materials	Specialty Chemicals	Baton Rouge	Louisiana	2016-07-01	0000915913
18	ALXN	Alexion Pharmaceuticals	reports	Health Care	Biotechnology	Cheshire	Connecticut	2012-05-25	0000899966
19	ALLE	Allegion	reports	Industrials	Building Products	Dublin	Ireland	2013-12-02	0001579241
20	AGN	Allergan Plc	reports	Health Care	Pharmaceuticals	Dublin	Ireland	[null]	0000864629
21	ADS	Alliance Data Systems	reports	Information Technology	Data Processing & Outsourced Services	Plano	Texas	2013-12-23	0001101215
22	ALU	Alliant Energy Corp	reports	Utilities	Electric Utilities	Madison	Wisconsin	2016-07-01	0000000000
23	ALL	Allstate Corp	reports	Financials	Property & Casualty Insurance	Northfield Township	Illinois	[null]	0000899531
24	GOOGL	Alphabet Inc Class A	reports	Information Technology	Internet Software & Services	Mountain View	California	2014-04-03	0001652044
25	GOOG	Alphabet Inc Class C	reports	Information Technology	Internet Software & Services	Mountain View	California	[null]	0001652044
26	MIO	Atria Group Inc	reports	Consumer Staples	Tobacco	Richmond	Virginia	[null]	0000741800
27	AMZN	Amazon.com Inc	reports	Consumer Discretionary	Internet & Direct Marketing Retail	Seattle	Washington	2005-11-18	0001018724
28	AEE	American Electric Power	reports	Utilities	MultUTILities	St. Louis	Missouri	1991-09-19	0001002910
29	AAL	American Airlines Group	reports	Industrials	Airlines	Fort Worth	Texas	2015-03-23	0000006201
30	AEP	American Electric Power	reports	Utilities	Electric Utilities	Columbus	Ohio	[null]	0000004904
31	AXP	American Express Co	reports	Financials	Consumer Finance	New York	New York	1976-06-30	0000004962
32	AIG	American International Group, Inc.	reports	Financials	Property & Casualty Insurance	New York	New York	1980-03-31	0000005272
33	AMT	American Tower Corp A	reports	Real Estate	Specialized REITs	Boston	Massachusetts	2007-11-19	0001053507
34	AWK	American Water Works Company Inc	reports	Utilities	Water Utilities	Voorhees	New Jersey	2016-03-04	0001410636
35	AMP	Ameriprise Financial	reports	Financials	Asset Management & Custody Banks	Minneapolis	Minnesota	[null]	0000820027

### 2.1.3. Fundamentals



The only thing we need to do to this database is drop the column “Field\_1” since it does not have any useful information, and change the type of all the numerical variables into double

Select (13) - Configuration

Options | ↑ ↓ | TIP: To reorder multiple rows: select, right-click and drag.

Field	Type	Size	Rename	Description
Field_1	V_String	254		
Ticker Symbol	V_String	254		
Period Ending	Date	10		
Accounts Payable	Double	8		
Accounts Receivable	Double	8		
Add1 income/expense items	Double	8		
After Tax ROE	Double	8		
Capital Expenditures	Double	8		
Capital Surplus	Double	8		
Cash Ratio	Double	8		
Cash and Cash Equivalents	Double	8		
Changes in Inventories	Double	8		
Common Stocks	Double	8		
Cost of Revenue	Double	8		
Current Ratio	Double	8		
Deferred Asset Charges	Double	8		
Deferred Liability Charges	Double	8		
Depreciation	Double	8		
Earnings Before Interest and Tax	Double	8		
Earnings Before Tax	Double	8		
Effect of Exchange Rate	Double	8		
Equity Earnings/Loss Unconsolidated Subsidiy	Double	8		
Fixed Assets	Double	8		
Goodwill	Double	8		
General Margin	Double	8		

By doing the previous step we now have this information:

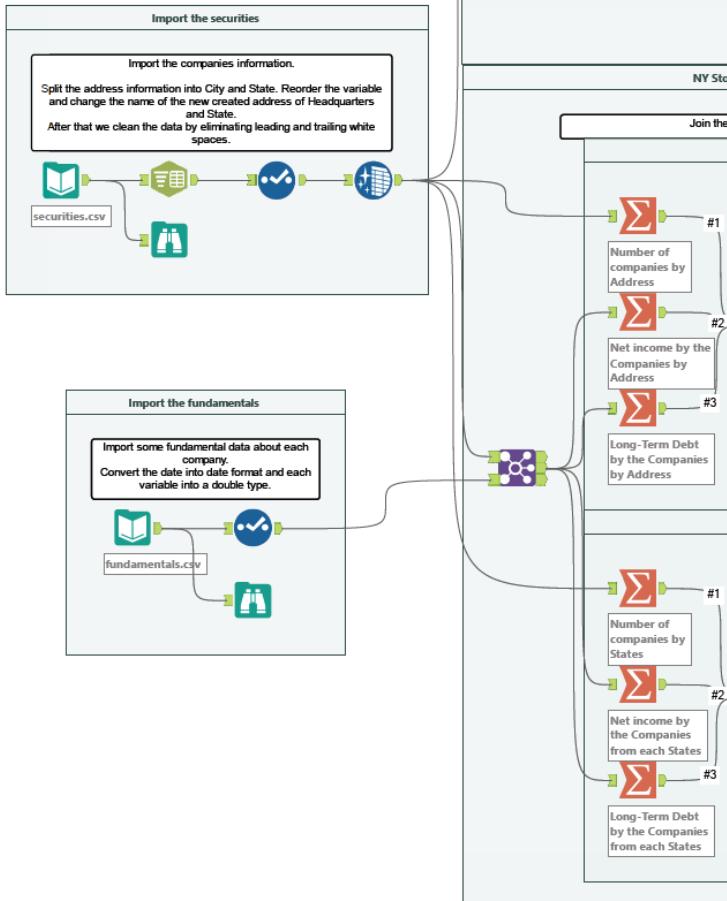
Results - Select (13) - Output

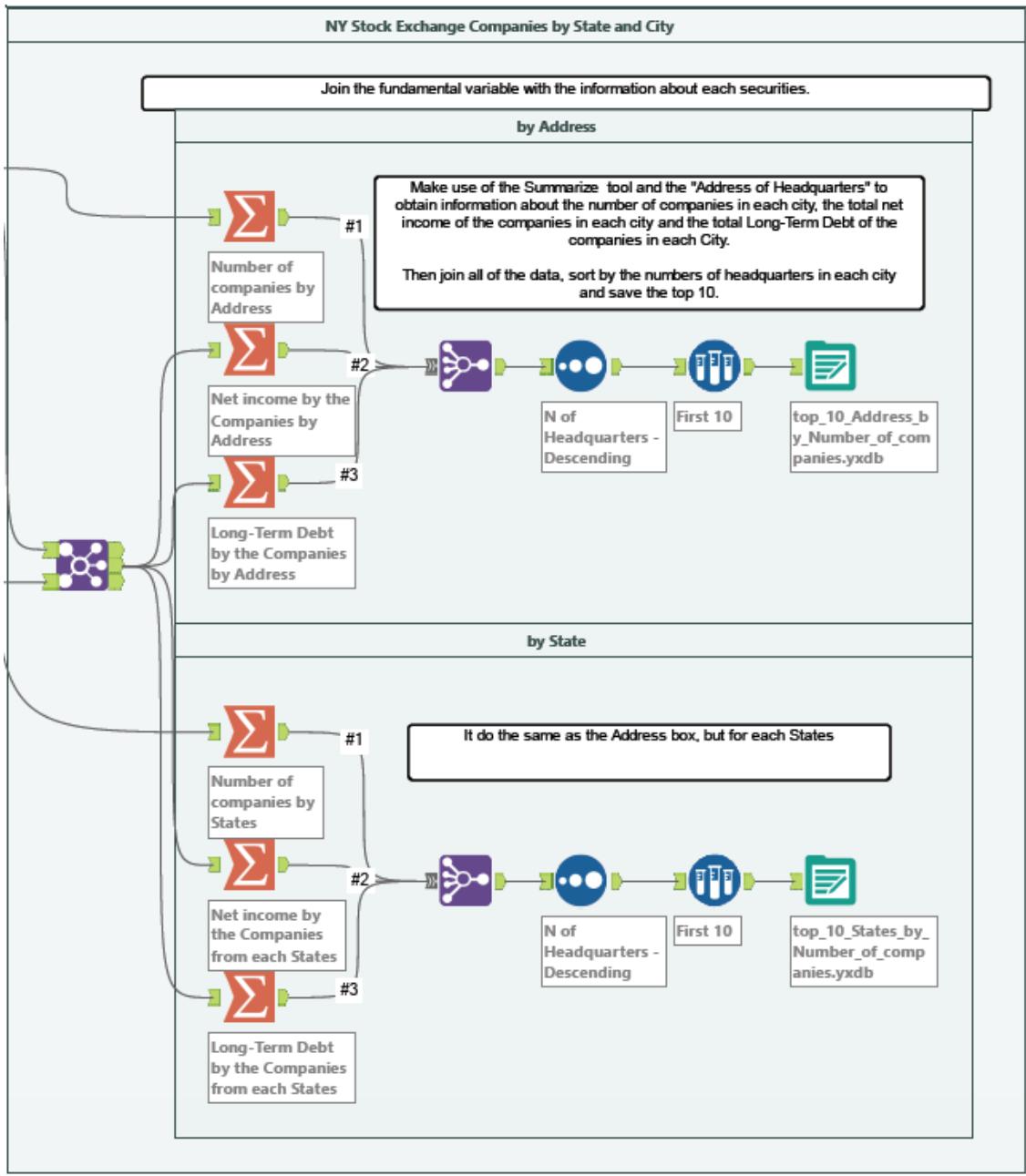
Cell Viewer • \* 1,450 of 1,781 records displayed (partial results)

↑ ↓

Record	Ticker Symbol	Period Ending	Accounts Payable	Accounts Receivable	Add'l Income/Expense Items	After Tax ROE	Capital Expenditures	Capital Surplus	Cash Ratio	Cash and Cash Equivalents	Changes in I
1	AAL	2012-12-31	3060000000	223000000	-196100000	23	1989000000	469500000	53	133000000	0
2	AAL	2013-12-31	4975000000	93000000	-272300000	67	3114000000	1059300000	75	217500000	0
3	AAL	2014-12-31	4666200000	16000000	-15000000	143	5311000000	1513500000	60	178800000	0
4	AAL	2015-12-31	5102000000	35200000	-70800000	135	6151000000	1159100000	51	108500000	0
5	AAP	2012-12-29	2409451000	89482000	600000	32	271182000	502015000	23	5981111000	-2602980000
6	AAP	2013-12-28	2609239000	32426000	2686000	26	195757000	531295000	40	1112471000	-2051510000
7	AAP	2015-01-03	3616038000	48209000	3029200	25	238446000	562945000	3	104671000	-2276570000
8	AAP	2016-01-02	3757085000	21476000	-7484000	19	234747000	603332000	2	90782000	-244096000
9	AAPL	2013-09-28	1949000000	115600000	30	816500000	0	93	1425900000	0	
10	AAPL	2014-09-27	4864900000	645200000	9800000	35	957100000	0	40	1384400000	-76000000
11	AAPL	2015-09-26	6067100000	312400000	12850000	45	1124700000	0	52	211200000	-238000000
12	AAPL	2016-09-24	5932100000	104400000	134800000	36	1273400000	0	85	2048400000	217000000
13	ABBV	2012-12-31	5734000000	22300000	-3800000	1507	33300000	0	118	590100000	-203000000
14	ABBV	2013-12-31	6448000000	68100000	-5400000	92	49100000	367100000	144	959500000	-56000000
15	ABBV	2014-12-31	6954000000	65100000	-17200000	102	61200000	419400000	74	834800000	-203000000
16	ABBV	2015-12-31	8463000000	107600000	-20600000	130	53200000	130800000	77	839900000	-434000000
17	ABC	2013-09-30	1487063500	231251800	-44000	19	202450000	2360992000	8	123106000	-1486572000
18	ABC	2014-09-30	1725016000	93826600	-2859400	14	264457000	274818500	10	180851300	-130456900
19	ABC	2015-09-30	2157822700	147879300	-4422000	22	231585000	378647700	10	216742400	-137918900
20	ABC	2016-09-30	2467019900	912724000	5040000	67	464616000	433300100	11	274183200	-1107252000
21	ABT	2012-12-31	1088900000	3600000	-126000000	22	179500000	0	114	1080200000	-417000000
22	ABT	2013-12-31	9948000000	113000000	5300000	10	114500000	0	85	347500000	-154000000
23	ABT	2014-12-31	5350000000	103000000	6000000	11	111000000	0	43	405000000	-297000000
24	ABT	2015-12-31	5000000000	171000000	4700000	21	111000000	0	67	500100000	-257000000
25	ACBE	2013-11-29	725257000	3364900	826000	4	108350000	3392696000	208	834556000	0
26	ACBE	2014-11-28	776163000	7928000	8423000	4	148332000	3775495000	150	111740000	0
27	ACBE	2015-11-27	779356000	79502000	3467000	9	184936000	4184882000	180	876560000	0
28	ACBE	2016-12-02	866016000	160416000	11978000	16	203605000	4616331100	169	1011315000	0
29	ADI	2013-11-02	323084000	12377000	8935000	14	123074000	711879000	821	392089000	28527000
30	ADI	2014-11-01	430621000	36460000	11645000	13	177913000	643050000	404	568233000	24642000
31	ADI	2015-10-31	439904000	71198000	6303000	14	153960000	634848000	272	884353000	-35557000
32	ADI	2016-10-29	431396000	8932000	17566000	17	127397000	402270000	518	921132000	38221000
33	ADM	2012-12-31	9308000000	175300000	235000000	7	124000000	0	35	5352000000	-1304000000
34	ADM	2013-12-31	14135000000	296000000	155000000	7	913000000	0	48	7082000000	2541000000
35	ADM	2014-12-31	15240000000	425000000	339000000	11	894000000	0	42	5976000000	1274000000

## 2.2. Information by City and State





We now join the securities and fundamentals databases using the Ticker Symbol as the key, as it's shown in the next photo.

Join (40) - Configuration

Join by Record Position (radio button)

Join by Specific Fields (radio button)

Left	Right
1 Ticker Symbol	Ticker Symbol
*	

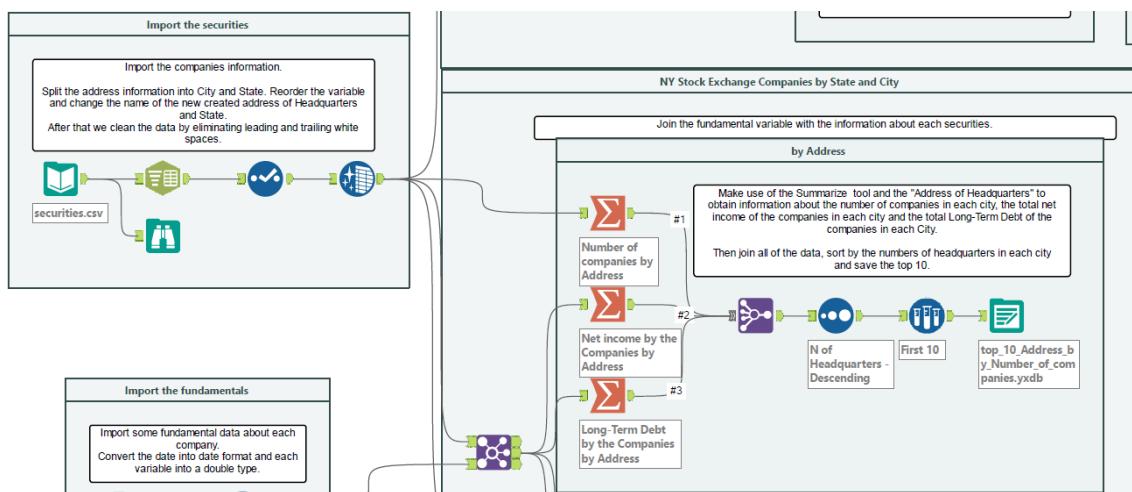
**L** **J** **R**

TIP: To reorder multiple rows: select, right-click and drag.

	Input	Field	Type	Size	Rename	Description
<input checked="" type="checkbox"/>	Left	Ticker Symbol	V_String	254		
<input checked="" type="checkbox"/>	Left	Security	V_String	254		
<input checked="" type="checkbox"/>	Left	SEC filings	V_String	254		
<input checked="" type="checkbox"/>	Left	GICS Sector	V_String	254		
<input checked="" type="checkbox"/>	Left	GICS Sub Industry	V_String	254		
<input checked="" type="checkbox"/>	Left	Address of Headquarters	V_String	254		TextToCol..
<input checked="" type="checkbox"/>	Left	State	V_String	254		TextToCol..
<input type="checkbox"/>	Left	Date first added	Date	10		
<input checked="" type="checkbox"/>	Left	CIK	V_String	254		
<input type="checkbox"/>	Right	Ticker Symbol	V_String	254	Right_Ticker Symbol	
<input checked="" type="checkbox"/>	Right	Period Ending	Date	10		
<input checked="" type="checkbox"/>	Right	Accounts Payable	Double	8		
<input checked="" type="checkbox"/>	Right	Accounts Receivable	Double	8		
<input checked="" type="checkbox"/>	Right	Add'l income/expense items	Double	8		
<input type="checkbox"/>	Right	Market Cap	Double	8		

### 2.2.1. City

Now we can get information at a city level, for that we follow the next workflow:



We connect the output from the securities into a Summarize tool, where we group all the rows by the Address of Headquarters and count them. That way we can know the number of companies that have the HQ in each city.

The screenshot shows the configuration interface for a Summarize tool with 33 rows. The 'Fields' section lists various security-related fields like Ticker Symbol, Security, SEC filings, GICS Sector, GICS Sub Industry, Address of Headquarters, State, Date first added, and CIK. The 'Actions' section contains two entries: 'Address of He...' with 'Action: Group By' and 'Output Field Name: Address of He...', and another entry with 'Action: Count' and 'Output Field Name: Count'.

After that pass the output of the previous join into two others Summarize tool, where be Sum the fields Net Income and Long-Term Debt respectively.

The screenshot shows two Summarize tool configurations. The left tool (49) has fields for Ticker Symbol, Security, SEC filings, GICS Sector, GICS Sub Industry, Address of Headquarters, State, CIK, and Period Ending. Its actions group 'Address of He...' by 'Address of He...' and sum 'Net Income' to 'Sum\_Net Income'. The right tool (50) has the same set of fields. Its actions group 'Address of He...' by 'Address of He...' and sum 'Long-Term Debt' to 'Sum\_Long-Term D...'. Both tools have a 'Select' dropdown at the top.

We now make use of the Join Multiple tool to combine the three previous outputs, using the address as key.

Join Multiple (51) - Configuration

Join by Record Position  
 Join by Specific Fields

	Input_#1	Input_#2	Input_#3
1	Address of Headquarters	Address of Headquarters	Address of Headquarters
.			

Cartesian Joins:

Error on multidimensional joins of more than 16 Records

Only Output Records that Join from All Inputs

Options ▾ | TIP: To reorder multiple rows: select, right-click and drag.

	Input	Field	Type	Size	Rename	Description
<input checked="" type="checkbox"/>	Input_#1	Address of Headquarters	V_String	254		TextToColu...
<input checked="" type="checkbox"/>	Input_#1	Count	Int64	8	N of Headquarters	
<input type="checkbox"/>	Input_#2	Address of Headquarters	V_String	254	Input_#2_Address of Headquarters	TextToColu...
<input checked="" type="checkbox"/>	Input_#2	Sum_Net Income	Double	8	Sum Net Income	
<input type="checkbox"/>	Input_#3	Address of Headquarters	V_String	254	Input_#3_Address of Headquarters	TextToColu...
<input checked="" type="checkbox"/>	Input_#3	Sum_Long-Term Debt	Double	8	Sum Long-Term Debt	
<input checked="" type="checkbox"/>		*Unknown	Unknown	0		Dynamic or ...

By doing this we get the following output:

Results - Join Multiple (51) - Output

Record	Address of Headquarters	N of Headquarters	Sum Net Income	Sum Long-Term Debt
1	Akron	2	6691000000	92838000000
2	Allentown	2	8969900000	93682000000
3	Amsterdam	2	3523311000	18055082000
4	Arlington	2	2215393000	23280292000
5	Armonk	1	58299000000	125363000000
6	Atlanta	13	117737622000	340857416000
7	Auburn Hills	1	2008300000	5889800000
8	Austin	2	4878028000	2196000000
9	Baltimore	3	1463446000	1965916000
10	Baton Rouge	1	1192929000	7138607000
11	Battle Creek	1	4014000000	23636000000
12	Bellevue	2	6922960000	30805075000
13	Benton Harbor	1	3148000000	12736000000
14	Bentonville	1	64078000000	173501000000
15	Berwyn	1	2151450000	5258741000
16	Bethesda	3	19979000000	71954000000
17	Beverly	1	1502600000	6804000000
18	Birmingham	2	397889000	8863620000
19	Boise	1	6858000000	24751000000
20	Bolingbrook	1	952541000	0
21	Boston	4	13676522000	110723851000
22	Brentwood	1	1385971000	174391000
23	Bridgeport	1	989500000	0
24	Brookfield	1	2725000000	14970000000
25	Broomfield	2	4770000000	53140800000
26	Buffalo	1	4313891000	0
27	Burbank	1	31410000000	54663000000
28	Burlington	1	2105000000	13738900000
29	Cambridge	2	-694119000	3934469000
30	Camden	1	2553000000	9641000000
31	Carthage	1	880600000	3254400000
32	Cayce	1	2175000000	21723000000
33	Cedar Rapids	1	2650000000	5288000000
34	Chandler	1	1215811000	6296538000
35	Charlotte	3	47536249000	632530300000

Since we only want the top 10 cities by number of companies, we now order them using the Sort tool and sample the 10 first using the Sample tool.

The screenshot shows two configuration panels side-by-side.

**Sort (52) - Configuration**

- Checkboxes:  Use Dictionary Order,  Inglés (Estados Unidos) (Prec)
- Fields section:
 

	Name	Order
▶	N of Headquarters	Descending
*		

**Sample (53) - Configuration**

Select Sample Type

- First N rows
- Last N rows
- Skip 1st N rows
- 1 of every N rows
- 1 in N chance to include each row
- First N% of rows

N =

Group by column (optional)

Address of Headquarters  
 N of Headquarters  
 Sum Net Income  
 Sum Long-Term Debt

After all, we now can output and save the result using the Output Data tool.

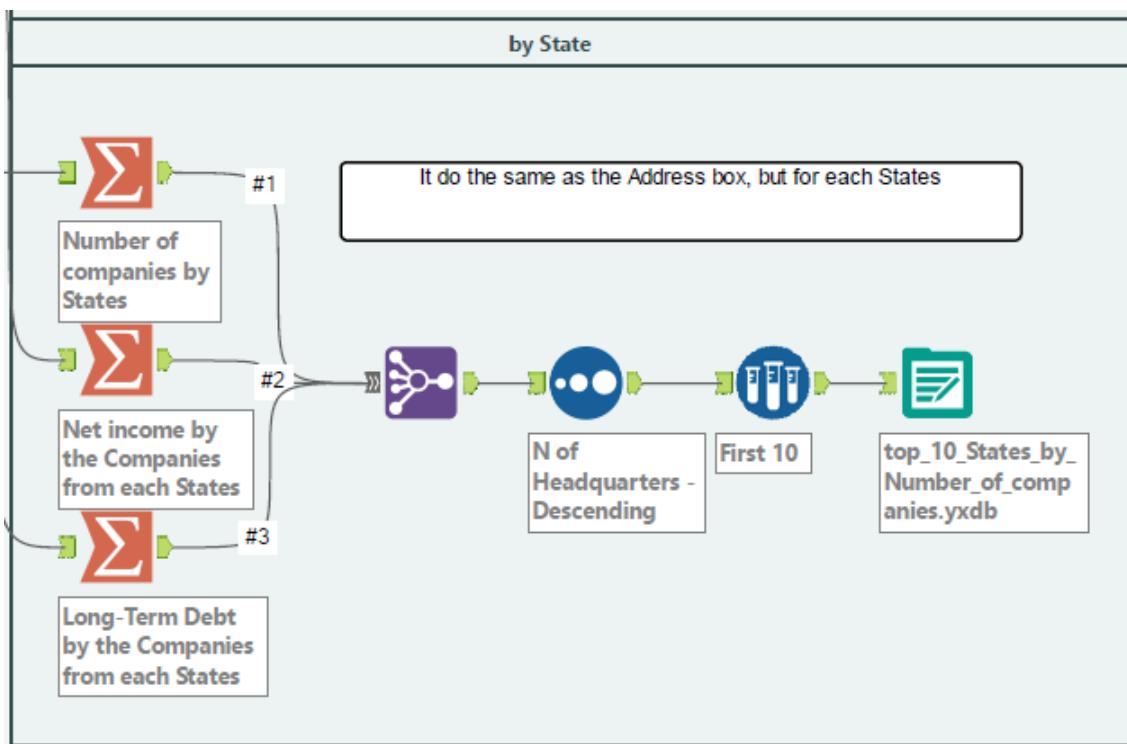
The result is:

Results - Sample (53) - Output

4 of 4 Fields | Cell Viewer | 10 records displayed | ↑ ↓

Record	Address of Headquarters	N of Headquarters	Sum Net Income	Sum Long-Term Debt
1	New York	48	421364179000	4560830654000
2	Houston	20	11293866000	576866178000
3	Atlanta	13	117737622000	340857416000
4	Dublin	11	16980500000	71898100000
5	Chicago	9	52023838000	331845882000
6	San Francisco	9	129943960000	138412162000
7	Columbus	7	33003913000	133606349000
8	Denver	6	6760834000	83241193000
9	San Jose	6	56673720000	131497892000
10	Seattle	6	18552863000	51304400000

## 2.2.2. State



This is the same schema for city, the only difference is in the Summarize tool use the State variable instead of the Address of Headquarters.

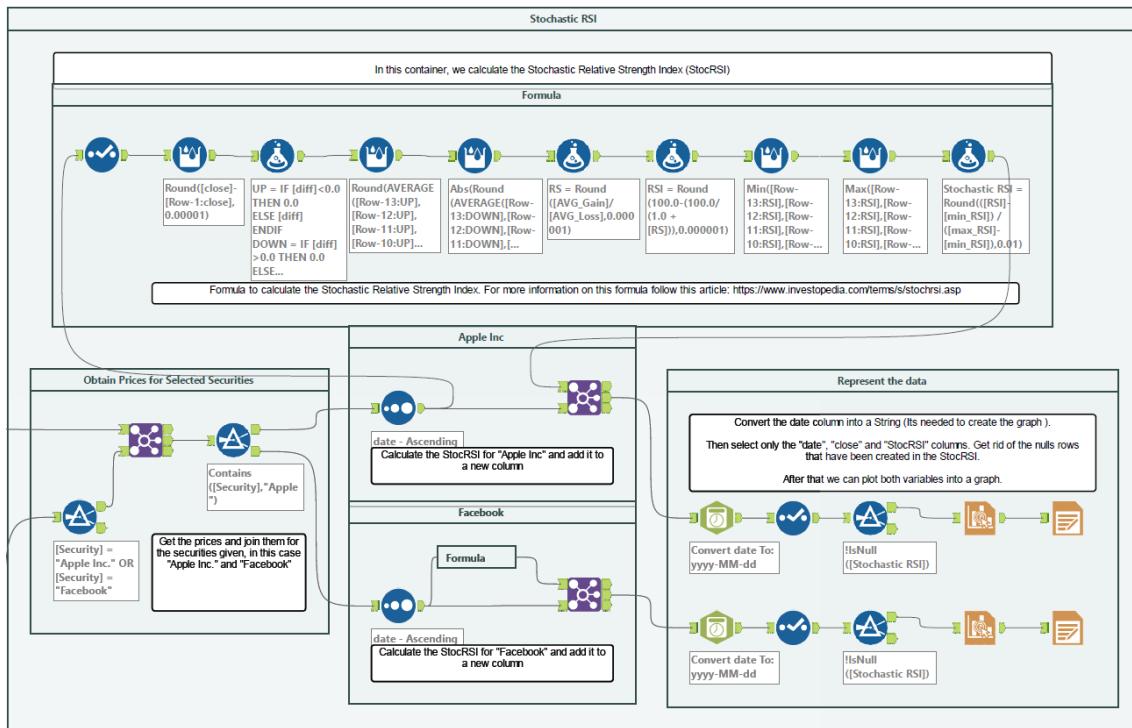
Summarize (25) - Configuration			Summarize (41) - Configuration			Summarize (43) - Configuration		
Fields:			Fields:			Fields:		
<input type="checkbox"/>	Field	Type	<input type="checkbox"/>	Field	Type	<input type="checkbox"/>	Field	Type
	Ticker Symbol	V_String		Ticker Symbol	V_String		Ticker Symbol	V_String
	Security	V_String		Security	V_String		Security	V_String
	SEC filings	V_String		SEC filings	V_String		SEC filings	V_String
	GICS Sector	V_String		GICS Sector	V_String		GICS Sector	V_String
	GICS Sub Industry	V_String		GICS Sub Industry	V_String		GICS Sub Industry	V_String
	Address of Headquarters	V_String		Address of Headquarters	V_String		Address of Headquarters	V_String
	State	V_String		State	V_String		State	V_String
	Date first added	Date		CIK	V_String		CIK	V_String
	Period Ending	Date						
Actions:			Actions:			Actions:		
<input type="checkbox"/> Field Action Output Field Name			<input type="checkbox"/> Field Action Output Field Name			<input type="checkbox"/> Field Action Output Field Name		
<input type="checkbox"/> State Group By State			<input type="checkbox"/> State Group By State			<input type="checkbox"/> State Group By State		
<input type="checkbox"/> Count Count			<input type="checkbox"/> Net Income Sum Sum_Net Income			<input type="checkbox"/> Long-Term Debt Sum Sum_Long-Term Debt		

The final result is:

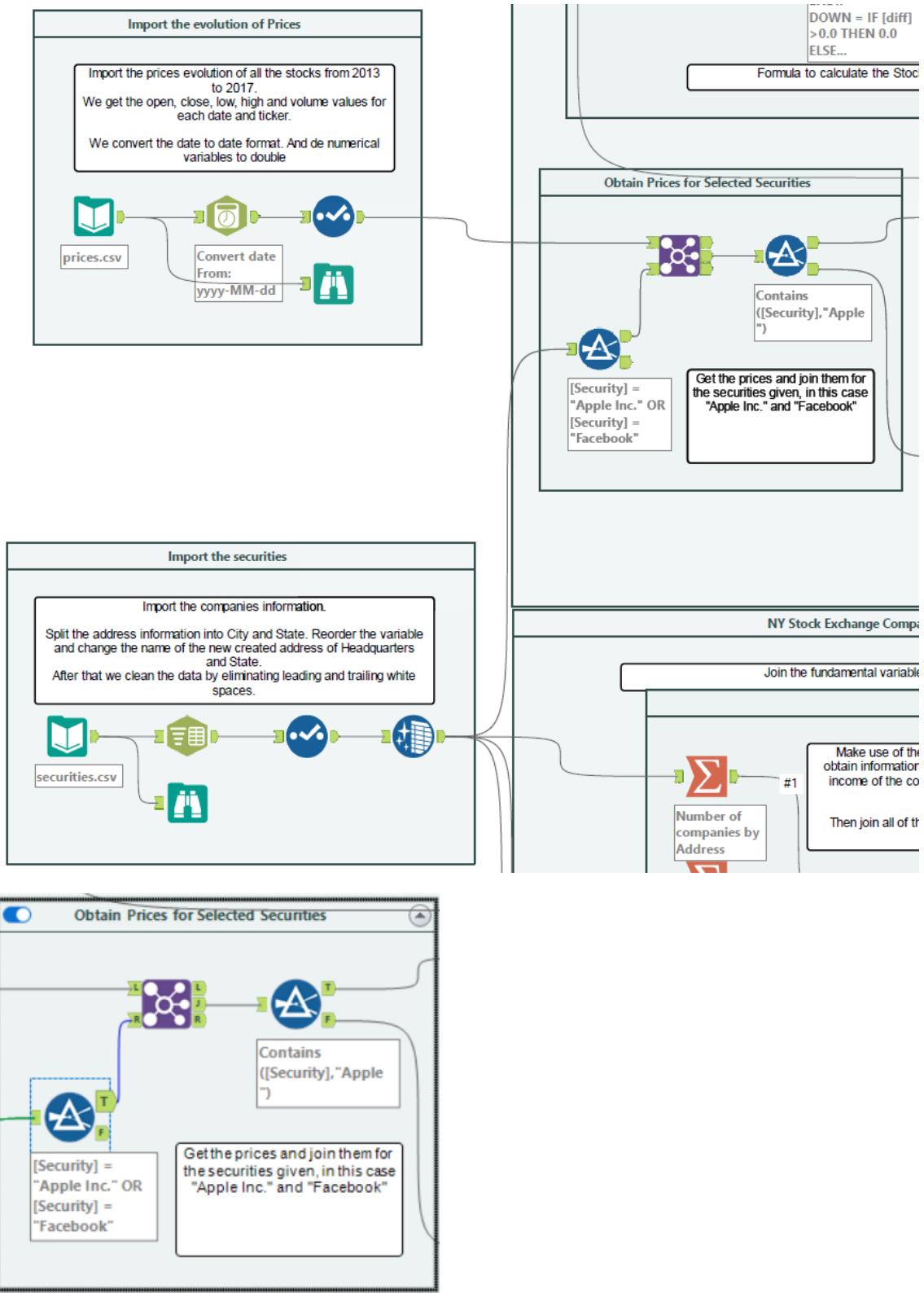
Results - Sample (47) - Output

4 of 4 Fields		Cell Viewer			10 records displayed	
Record	State	N of Headquarters	Sum Net Income	Sum Long-Term Debt		
1	California	67	722944297000	1264600274000		
2	New York	60	548905785000	4873651871000		
3	Texas	40	236464965000	1271817901000		
4	Illinois	30	200821276000	908656275000		
5	Ohio	23	75417431000	423059847000		
6	New Jersey	21	95550915000	446630910000		
7	Massachusetts	20	48716072000	264346200000		
8	Connecticut	17	67889419000	393633652000		
9	Georgia	16	132054289000	388187121000		
10	Pennsylvania	16	52637794000	186783724000		

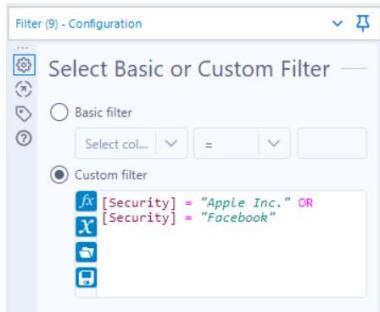
### 2.3. Stochastic Relative Strength index



First, we need to get the data with which we are going to work. In order to calculate the StocRSI we need the prices evolution of a stock, we can get all the prices from the prices.csv import, and we need to know for which company we are going to calculate the StocRSI. We can get that from the securities.csv import.



From the securities.csv import, we apply a Filter tool, in order to get only the securities “Apple Inc” and “Facebook”.



We now make use of the Join tool to get from the prices, only the ones that have the “Ticker Symbol” corresponding to “Apple” or “Facebook”.

	Input	Field	Type	Size	Rename
<input checked="" type="checkbox"/>	Left	date	Date	10	
<input checked="" type="checkbox"/>	Left	Ticker Symbol	V_String	254	
<input checked="" type="checkbox"/>	Right	Security	V_String	254	
<input checked="" type="checkbox"/>	Left	open	Double	8	
<input checked="" type="checkbox"/>	Left	close	Double	8	
<input checked="" type="checkbox"/>	Left	low	Double	8	
<input checked="" type="checkbox"/>	Left	high	Double	8	
<input checked="" type="checkbox"/>	Left	volume	Double	8	
<input type="checkbox"/>	Right	Ticker Symbol	V_String	254	Right_Ticker Symbol
<input type="checkbox"/>	Right	SEC filings	V_String	254	
<input type="checkbox"/>	Right	GICS Sector	V_String	254	
<input type="checkbox"/>	Right	GICS Sub Industry	V_String	254	
<input type="checkbox"/>	Right	Address of Headquarters	V_String	254	
<input type="checkbox"/>	Right	State	V_String	254	
<input type="checkbox"/>	Right	Data first added	Date	10	

Lastly, we split both companies using the Filter tool so that we can apply the formula to each stock independently.

That way we get the following two outputs:

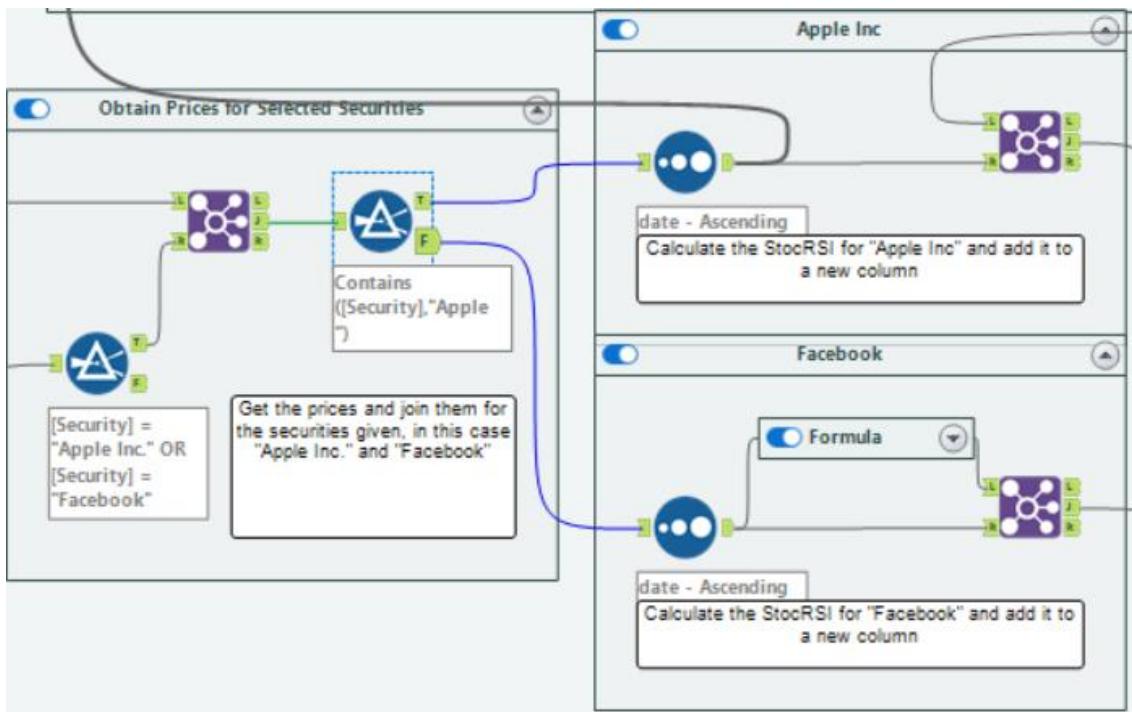
Results - Filter (58) - Out - True									
	Record	date	Ticker Symbol	Security	open	close	low	high	volume
	1	2010-01-04	AAPL	Apple Inc.	213.429998	214.009998	212.380001	214.499996	123432400
	2	2010-01-05	AAPL	Apple Inc.	214.599998	214.379993	213.249994	215.589994	150476200
	3	2010-01-06	AAPL	Apple Inc.	214.379993	210.969995	210.750004	215.23	138040000
	4	2010-01-07	AAPL	Apple Inc.	211.75	210.58	209.050005	212.000006	119282800
	5	2010-01-08	AAPL	Apple Inc.	210.299994	211.980005	209.060005	212.000006	111902700
	6	2010-01-11	AAPL	Apple Inc.	212.799997	210.110003	208.450005	213.000002	115557400
	7	2010-01-12	AAPL	Apple Inc.	209.189995	207.720001	206.419998	209.769995	148614900
	8	2010-01-13	AAPL	Apple Inc.	207.870005	210.650002	204.099998	210.929995	151473000
	9	2010-01-14	AAPL	Apple Inc.	210.110003	209.43	209.020004	210.459997	108223500
	10	2010-01-15	AAPL	Apple Inc.	210.929995	205.93	205.869999	211.599997	148516900
	11	2010-01-19	AAPL	Apple Inc.	208.330002	215.039995	207.240004	215.189999	182501900
	12	2010-01-20	AAPL	Apple Inc.	214.910006	211.73	209.500002	215.549994	153038200
	13	2010-01-21	AAPL	Apple Inc.	212.079994	208.069996	207.210003	213.309996	152038600
	14	2010-01-22	AAPL	Apple Inc.	206.780006	197.75	197.16	207.499996	220441900
	15	2010-01-25	AAPL	Apple Inc.	202.510002	203.070002	200.190002	204.699999	266424900
	16	2010-01-26	AAPL	Apple Inc.	205.950001	205.940001	202.580004	213.710005	466777500
	17	2010-01-27	AAPL	Apple Inc.	206.849995	207.880005	199.530001	210.58	430642100
	18	2010-01-28	AAPL	Apple Inc.	204.930004	199.289995	198.699995	205.500004	293375600
	19	2010-01-29	AAPL	Apple Inc.	201.079996	192.060003	190.250002	202.199995	311488100
	20	2010-02-01	AAPL	Apple Inc.	192.369997	194.729998	191.299999	196	187469100
	21	2010-02-02	AAPL	Apple Inc.	195.909998	195.859997	193.379993	196.319994	174585600
	22	2010-02-03	AAPL	Apple Inc.	195.169994	199.229994	194.420004	200.200003	153832000
	23	2010-02-04	AAPL	Apple Inc.	196.730003	192.050003	191.570005	198.370001	189413000
	24	2010-02-05	AAPL	Apple Inc.	192.630003	195.460001	190.850002	196	212576700
	25	2010-02-08	AAPL	Apple Inc.	195.690006	194.119997	193.999994	197.880003	119567700
	26	2010-02-09	AAPL	Apple Inc.	196.419996	196.190004	194.749998	197.499994	158221700
	27	2010-02-10	AAPL	Apple Inc.	195.889997	195.120007	194.26	196.6	92590400
	28	2010-02-11	AAPL	Apple Inc.	194.880001	198.669994	194.059996	199.750006	137586400
	29	2010-02-12	AAPL	Apple Inc.	198.109995	200.379993	195.500002	201.639996	163867200
	30	2010-02-16	AAPL	Apple Inc.	201.940002	203.399996	201.520006	203.690002	135934400
	31	2010-02-17	AAPL	Apple Inc.	204.190001	202.550003	200.860004	204.310003	109099200
	32	2010-02-18	AAPL	Apple Inc.	201.629995	202.929998	200.920006	203.889994	105706300
	33	2010-02-19	AAPL	Apple Inc.	201.860001	201.669996	201.109997	203.200005	103867400
	34	2010-02-22	AAPL	Apple Inc.	202.339998	200.419994	199.190006	202.500002	97640900
	35	2010-02-23	AAPL	Apple Inc.	199.999998	197.059998	195.709993	201.330002	143773700

Results - Filter (58) - Out - False

8 of 8 Fields | Cell Viewer | 1,008 records displayed | ↑ ↓ |

Record	date	Ticker Symbol	Security	open	close	low	high	volume
1	2013-01-02	FB	Facebook	27.440001	28	27.42	28.18	69846400
2	2013-01-03	FB	Facebook	27.879999	27.77	27.59	28.469999	63140600
3	2013-01-04	FB	Facebook	28.01	28.76	27.83	28.93	72715400
4	2013-01-07	FB	Facebook	28.690001	29.42	28.65	29.790001	83781800
5	2013-01-08	FB	Facebook	29.51	29.059999	28.860001	29.6	45871300
6	2013-01-09	FB	Facebook	29.67	30.59	29.49	30.6	104787700
7	2013-01-10	FB	Facebook	30.6	31.299999	30.280001	31.450001	95316400
8	2013-01-11	FB	Facebook	31.280001	31.719999	31.1	31.959999	89598000
9	2013-01-14	FB	Facebook	32.080002	30.950001	30.620001	32.209999	98892800
10	2013-01-15	FB	Facebook	30.639999	30.1	29.879999	31.709999	173242600
11	2013-01-16	FB	Facebook	30.209999	29.85	29.530001	30.35	75332700
12	2013-01-17	FB	Facebook	30.08	30.139999	30.030001	30.42	40256700
13	2013-01-18	FB	Facebook	30.309999	29.66	29.27	30.440001	49631500
14	2013-01-22	FB	Facebook	29.75	30.73	29.74	30.889999	55243300
15	2013-01-23	FB	Facebook	31.1	30.82	30.799999	31.5	48899800
16	2013-01-24	FB	Facebook	31.27	31.08	30.809999	31.49	43845100
17	2013-01-25	FB	Facebook	31.41	31.540001	31.129999	31.93	54363600
18	2013-01-28	FB	Facebook	31.879999	32.470001	31.809999	32.509998	59682500
19	2013-01-29	FB	Facebook	32	30.790001	30.709999	32.07	72976500
20	2013-01-30	FB	Facebook	30.98	31.24	30.879999	31.49	87682100
21	2013-01-31	FB	Facebook	29.15	30.98	28.74	31.469999	190744900
22	2013-02-01	FB	Facebook	31.01	29.73	29.629999	31.02	85856700
23	2013-02-04	FB	Facebook	29.059999	28.110001	28.01	29.200001	92362200
24	2013-02-05	FB	Facebook	28.26	28.639999	28.040001	28.859999	47948200
25	2013-02-06	FB	Facebook	28.74	29.049999	28.66	29.290001	38375900
26	2013-02-07	FB	Facebook	29.110001	28.65	28.27	29.15	34540100
27	2013-02-08	FB	Facebook	28.889999	28.549999	28.51	29.17	37708800
28	2013-02-11	FB	Facebook	28.610001	28.26	28.040001	28.68	37361800
29	2013-02-12	FB	Facebook	27.67	27.370001	27.1	28.16	93498700
30	2013-02-13	FB	Facebook	27.360001	27.91	27.309999	28.32	50164000
31	2013-02-14	FB	Facebook	28.02	28.5	28.01	28.629999	35615800
32	2013-02-15	FB	Facebook	28.52	28.32	28.09	28.75	33109300
33	2013-02-19	FB	Facebook	28.23	28.93	28.120001	29.08	49396400
34	2013-02-20	FB	Facebook	28.92	28.459999	28.33	29.049999	42098200
35	2013-02-21	FB	Facebook	28.280001	27.280001	27.15	28.549999	49642300

Now we can operate each company independently:



### 2.3.1. Apple Inc

The first thing that is need is to order the prices by date, to maintain a chronological order.

The screenshot shows the 'Sort (60) - Configuration' window. At the top, there is a checkbox labeled 'Use Dictionary Order' which is checked, and a dropdown menu set to 'Inglés (Estados Unidos) (Predeterminado)'. Below this, under the 'Fields' section, there is a table with one row. The row contains three columns: 'Name' (containing 'date'), 'Order' (containing 'Ascending'), and two dropdown arrows. To the right of the table are three icons: an upward arrow, a downward arrow, and a circular arrow.

We now apply the formula:

#### 2.3.1.1. Formula

The screenshot shows the 'Formula' tool interface. It displays a sequence of operations connected by arrows. The operations are as follows:

- Round([close]-[Row-1:close], 0.00001)
- UP = IF [diff]<0.0 THEN 0.0 ELSE [diff]
- DOWN = IF [diff]>0.0 THEN 0.0 ELSE...
- Round(AVERAGE([Row-13:UP], [Row-12:UP], [Row-11:UP], [Row-10:UP],...)
- Abs(Round(AVERAGE([Row-13:DOWN], [Row-12:DOWN], [Row-11:DOWN], [Row-10:DOWN],...)
- RS = Round((AVG\_Gain/[AVG\_Loss]), 0.000001)
- RSI = Round(100.0-(100.0/(1.0 + [RS])), 0.000001)
- Min([Row-13:RSI], [Row-12:RSI], [Row-11:RSI], [Row-10:RSI], [Row-9:RSI], [Row-8:RSI], [Row-7:RSI], [Row-6:RSI], [Row-5:RSI], [Row-4:RSI], [Row-3:RSI], [Row-2:RSI], [Row-1:RSI])
- Max([Row-13:RSI], [Row-12:RSI], [Row-11:RSI], [Row-10:RSI], [Row-9:RSI], [Row-8:RSI], [Row-7:RSI], [Row-6:RSI], [Row-5:RSI], [Row-4:RSI], [Row-3:RSI], [Row-2:RSI], [Row-1:RSI])
- Stochastic RSI = Round(([RSI]-[min\_RSI])/([max\_RSI]-[min\_RSI]), 0.01)

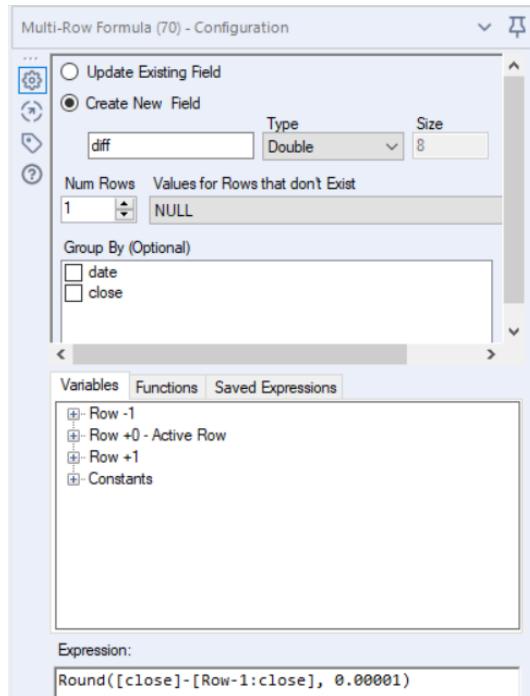
Below the operations, a note states: 'Formula to calculate the Stochastic Relative Strength Index. For more information on this formula follow this article: <https://www.investopedia.com/terms/s/stochrsi.asp>'

1. Select tool: Is used to get the date and Close variables, since it's the one we are going to use:

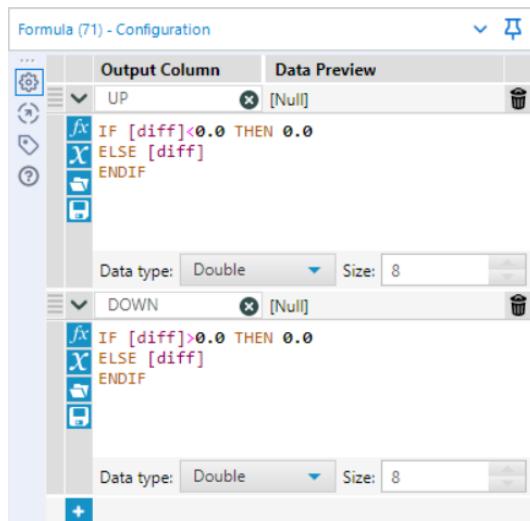
The screenshot shows the 'Select (67) - Configuration' window. At the top, there is a 'Options' dropdown with a 'Select' button. Below this, there is a table with columns: 'Field', 'Type', 'Size', 'Rename', and 'D'. The table contains the following rows:

	Field	Type	Size	Rename	D
<input checked="" type="checkbox"/>	date	Date	10		
<input type="checkbox"/>	Ticker Symbol	V_String	254		
<input type="checkbox"/>	Security	V_String	254		
<input type="checkbox"/>	open	Double	8		
<input checked="" type="checkbox"/>	close	Double	8		
<input type="checkbox"/>	low	Double	8		
<input type="checkbox"/>	high	Double	8		
<input type="checkbox"/>	volume	Double	8		
<input checked="" type="checkbox"/>	*Unknown	Unknown	0		Dy

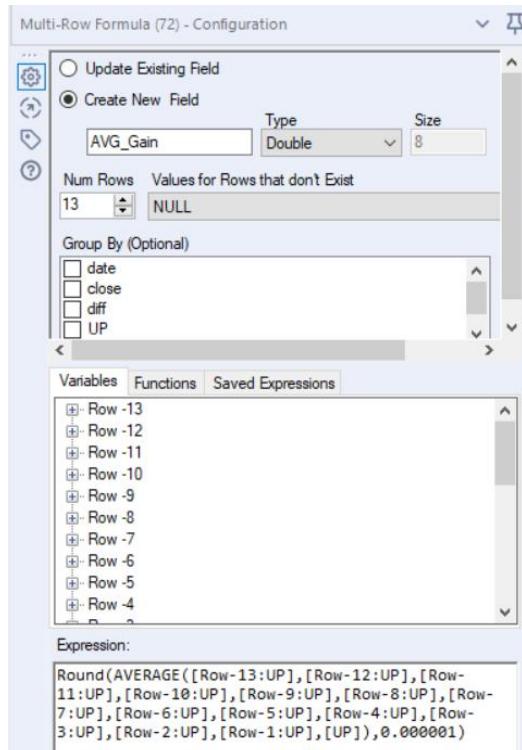
2. Multi-Row Formula tool: It's used to get the difference between the close price and the close price of the previous date:



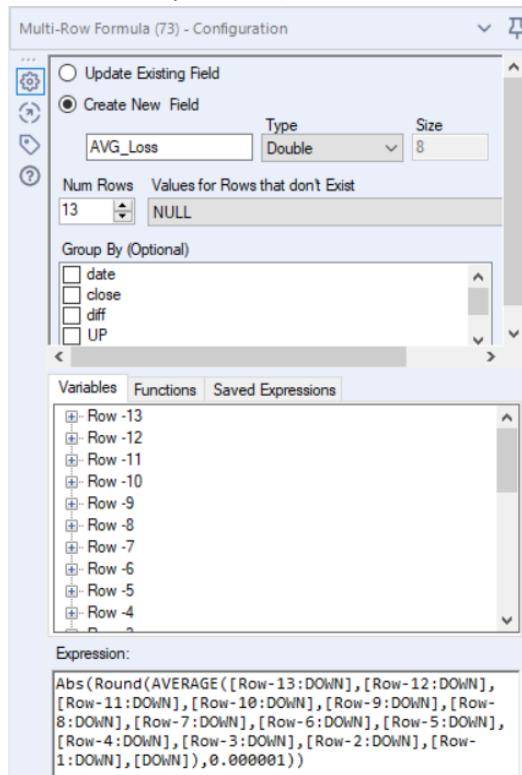
3. Formula tool: It's used to create 2 new Columns, "UP" and "DOWN", in the up column the difference which are negative get change to 0, and in the down column the positive values are change to 0. Here I make use of a **conditional IF statement**.



4. Multi-Row Formula tool: This tool is used to create a moving average for the UP column of 14 periods.



5. Multi-Row Formula tool: This tool is used to create a moving average for the DOWN column of 14 periods. (In this case be need the absolute value)



6. Formula tool: We make use of the Average gains and Average loss to calculate the RS

The screenshot shows the 'Formula (75) - Configuration' window. The output column is named 'RS' with a data type of 'Double' and a size of 8. The formula is `Round([AVG_Gain]/[AVG_Loss],0.000001)`. The interface includes standard configuration options like refresh, save, and delete.

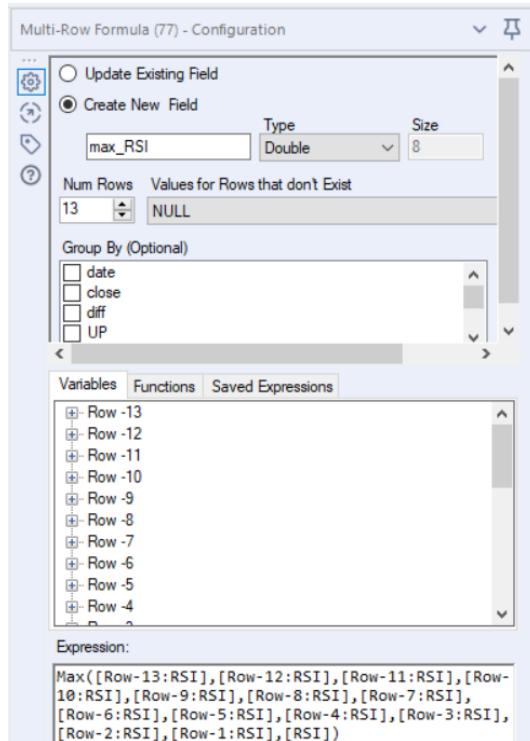
7. Formula tool: We make use of the RS to calculate the index: RSI

The screenshot shows the 'Formula (74) - Configuration' window. The output column is named 'RSI' with a data type of 'Double' and a size of 8. The formula is `Round(100.0-(100.0/(1.0+[RS])),0.000001)`. The interface includes standard configuration options like refresh, save, and delete.

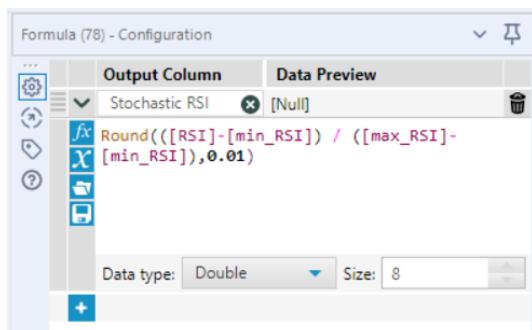
8. Multi-Row Formula tool: We get the min value of the RSI in a period of 14.

The screenshot shows the 'Multi-Row Formula (76) - Configuration' window. It is set to 'Create New Field' with the name 'min\_RSI', type 'Double', and size 8. The 'Num Rows' is set to 13, and the 'Values for Rows that don't Exist' is set to 'NULL'. Under 'Group By (Optional)', none of the checkboxes for 'date', 'close', 'diff', or 'UP' are selected. The 'Variables' tab is active, showing a list of previous rows from Row -13 to Row 2. The 'Expression:' field contains the formula: `Min([Row-13:RSI],[Row-12:RSI],[Row-11:RSI],[Row-10:RSI],[Row-9:RSI],[Row-8:RSI],[Row-7:RSI],[Row-6:RSI],[Row-5:RSI],[Row-4:RSI],[Row-3:RSI],[Row-2:RSI],[Row-1:RSI],[RSI])`.

9. Multi-Row Formula tool: We get the max value of the RSI in a period of 14.



10. Formula tool: We need a last formula to calculate the StocRSI, using the RSI, min\_RSI and max\_RSI



After the formula is done we get the following result:

Results - Formula (78) - Output

12 of 12 Fields | Cell Viewer | 1,762 records displayed | ↑ ↓ | Search

Record	date	close	diff	UP	DOWN	AVG_Gain	AVG_Loss	RS	RSI	min_RSI	max_RSI	Stochastic RSI
1	2010-01-04	214.009998	[Null]	[Null]	0	0.026429	0.243571	0.108506	9.78849	9.78849	9.78849	[Null]
2	2010-01-05	214.379993	0.37	0.37	0	0.026429	0	[Null]	[Null]	[Null]	[Null]	[Null]
3	2010-01-06	210.969995	-3.41	0	-3.41	0.026429	0.243571	0.108506	9.78849	9.78849	9.78849	[Null]
4	2010-01-07	210.58	-0.38999	0	-0.38999	0.026429	0.271428	0.09737	8.873033	8.873033	9.78849	0
5	2010-01-08	211.980005	1.4	1.4	0	0.126429	0.271428	0.465792	31.777496	8.873033	31.777496	1
6	2010-01-11	210.110003	-1.87	0	-1.87	0.126429	0.404999	0.312171	23.790421	8.873033	31.777496	0.65
7	2010-01-12	207.720001	-2.39	0	-2.39	0.126429	0.575714	0.219604	18.006172	8.873033	31.777496	0.4
8	2010-01-13	210.650002	2.93	2.93	0	0.335714	0.575714	0.583126	36.833834	8.873033	36.833834	1
9	2010-01-14	209.43	-1.22	0	-1.22	0.335714	0.662856	0.506466	33.619478	8.873033	36.833834	0.89
10	2010-01-15	205.93	-3.5	0	-3.5	0.335714	0.912856	0.367762	26.887865	8.873033	36.833834	0.64
11	2010-01-19	215.039995	9.10999	9.10999	0	0.986428	0.912856	1.080595	51.936826	8.873033	51.936826	1
12	2010-01-20	211.73	-3.31	0	-3.31	0.986428	1.149285	0.858297	46.187289	8.873033	51.936826	0.87
13	2010-01-21	208.069996	-3.66	0	-3.66	0.986428	1.410714	0.69924	41.150161	8.873033	51.936826	0.75
14	2010-01-22	197.75	-10.32	0	-10.32	0.986428	2.147856	0.459262	31.47221	8.873033	51.936826	0.52
15	2010-01-25	203.070002	5.32	5.32	0	1.366428	2.147856	0.636182	38.882105	8.873033	51.936826	0.7
16	2010-01-26	205.940001	2.87	2.87	0	1.544999	2.147856	0.719322	41.837538	8.873033	51.936826	0.77
17	2010-01-27	207.880005	1.94	1.94	0	1.683571	1.904285	0.884096	46.924148	8.873033	51.936826	0.88
18	2010-01-28	199.289995	-8.59001	0	-8.59001	1.683571	2.490001	0.676133	40.338863	18.006172	51.936826	0.66
19	2010-01-29	192.600003	-7.22999	0	-7.22999	1.583571	3.006429	0.526728	34.500448	18.006172	51.936826	0.49
20	2010-02-01	194.729998	2.67	2.67	0	1.774285	2.872857	0.617603	38.180134	18.006172	51.936826	0.59
21	2010-02-02	195.859997	1.13	1.13	0	1.854999	2.702143	0.686492	40.705322	26.887865	51.936826	0.55
22	2010-02-03	199.229994	3.37	3.37	0	1.886428	2.702143	0.698123	41.111451	26.887865	51.936826	0.57
23	2010-02-04	192.050003	-7.17999	0	-7.17999	1.886428	3.127856	0.603106	37.621093	26.887865	51.936826	0.43
24	2010-02-05	195.460001	3.41	3.41	0	2.129999	2.877856	0.740134	42.533161	31.47221	51.936826	0.54
25	2010-02-08	194.119997	-1.34	0	-1.34	1.479286	2.973571	0.497478	33.221056	31.47221	46.924148	0.11
26	2010-02-09	196.190004	2.07001	2.07001	0	1.627144	2.737142	0.594468	37.283157	31.47221	46.924148	0.38
27	2010-02-10	195.120007	-1.07	0	-1.07	1.627144	2.552142	0.637576	38.935355	31.47221	46.924148	0.48
28	2010-02-11	198.669994	3.54999	3.54999	0	1.880714	1.814999	1.036207	50.88900	33.221056	50.88900	1
29	2010-02-12	200.339993	1.71	1.71	0	1.622857	1.814999	0.894137	47.205508	33.221056	50.88900	0.79
30	2010-02-16	203.339996	3.02	3.02	0	1.633571	1.814999	0.90004	47.369529	33.221056	50.88900	0.8
31	2010-02-17	202.550003	-0.84999	0	-0.84999	1.495	1.875713	0.79703	44.352626	33.221056	50.88900	0.63
32	2010-02-18	202.929998	0.38	0.38	0	1.522143	1.262141	1.206001	54.669105	33.221056	54.669105	1
33	2010-02-19	201.669996	-1.26	0	-1.26	1.522143	0.835713	1.82137	64.556226	33.221056	64.556226	1
34	2010-02-22	200.419994	-1.25	0	-1.25	1.331429	0.924999	1.439384	59.006044	33.221056	64.556226	0.82
35	2010-02-23	197.059998	-3.36	0	-3.36	1.250714	1.164999	1.073575	51.77411	33.221056	64.556226	0.59

Once we are done with the formula, we add the StocRSI into the stock price data base we start with using a Join tool and using the date as the key.

Join (81) - Configuration

Join by Record Position

Join by Specific Fields

Left	Right
1 date	date

Options | ↑ ↓ TIP: To reorder multiple rows: select, right-click and drag.

Input	Field	Type	Size	Rename	Description
Left	date	Date	10		
Left	close	Double	8		Formula: ...
Left	diff	Double	8		Formula: ...
Left	UP	Double	8		
Left	DOWN	Double	8		
Left	AVG_Gain	Double	8		Formula: ...
Left	Avg_Loss	Double	8		Formula: ...
Left	RS	Double	8		
Left	RSI	Double	8		
Left	min_RSI	Double	8		Formula: ...
Left	max_RSI	Double	8		Formula: ...
Right	date	Date	10		
Right	Ticker Symbol	V_String	254		
Right	Security	V_String	254		
Right	open	Double	8		
Right	close	Double	8		
Right	low	Double	8		
Right	high	Double	8		
Right	volume	Double	8		
Left	Stochastic RSI	Double	8		
	*Unknown	Unknown	0		Dynamic o...

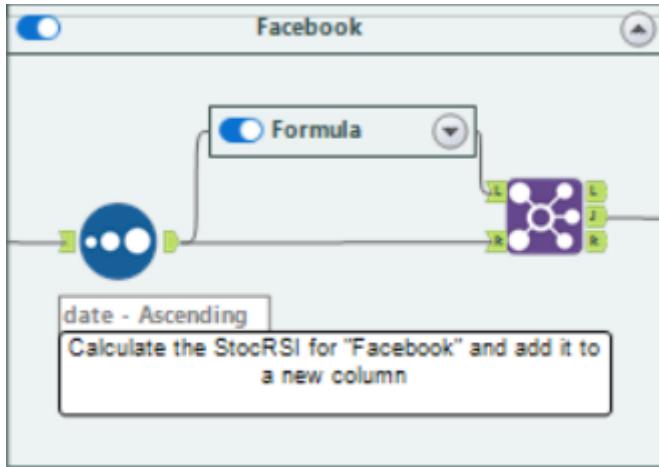
After doing this we get the following result:

Results - Join (81) - Out - Join

9 of 9 Fields | Cell Viewer | 1,762 records displayed | ↑ ↓ |

Record	date	Ticker Symbol	Security	open	close	low	high	volume	Stochastic RSI
1	2010-01-04	AAPL	Apple Inc.	213.429998	214.009998	212.380001	214.499996	123432400	[Null]
2	2010-01-05	AAPL	Apple Inc.	214.599998	214.379993	213.249994	215.589994	150476200	[Null]
3	2010-01-06	AAPL	Apple Inc.	214.379993	210.969995	210.750004	215.23	138040000	[Null]
4	2010-01-07	AAPL	Apple Inc.	211.75	210.58	209.050005	212.000006	119282800	0
5	2010-01-08	AAPL	Apple Inc.	210.299994	211.980005	209.060005	212.000006	111902700	1
6	2010-01-11	AAPL	Apple Inc.	212.799997	210.110003	208.450005	213.000002	115557400	0.65
7	2010-01-12	AAPL	Apple Inc.	209.189995	207.720001	206.419998	209.769995	148614900	0.4
8	2010-01-13	AAPL	Apple Inc.	207.870005	210.650002	204.099998	210.929995	151473000	1
9	2010-01-14	AAPL	Apple Inc.	210.110003	209.43	209.020004	210.459997	108223500	0.89
10	2010-01-15	AAPL	Apple Inc.	210.929995	205.93	205.869999	211.599997	148516900	0.64
11	2010-01-19	AAPL	Apple Inc.	208.330002	215.039995	207.240004	215.189999	182501900	1
12	2010-01-20	AAPL	Apple Inc.	214.910006	211.73	209.500002	215.549994	153038200	0.87
13	2010-01-21	AAPL	Apple Inc.	212.079994	208.669996	207.210003	213.309996	152038600	0.75
14	2010-01-22	AAPL	Apple Inc.	206.780006	197.75	197.16	207.499996	220441900	0.52
15	2010-01-25	AAPL	Apple Inc.	202.510002	203.070002	200.190002	204.689999	266424900	0.7
16	2010-01-26	AAPL	Apple Inc.	205.950001	205.940001	202.580004	213.710005	466777500	0.77
17	2010-01-27	AAPL	Apple Inc.	206.849995	207.880005	199.530001	210.58	430642100	0.88
18	2010-01-28	AAPL	Apple Inc.	204.930004	199.289995	198.699995	205.500004	293375600	0.66
19	2010-01-29	AAPL	Apple Inc.	201.079996	192.060003	190.250002	202.199995	311488100	0.49
20	2010-02-01	AAPL	Apple Inc.	192.369997	194.729998	191.299999	196	187469100	0.59
21	2010-02-02	AAPL	Apple Inc.	195.809998	195.859997	193.379993	196.319994	174585600	0.55
22	2010-02-03	AAPL	Apple Inc.	195.169994	199.229994	194.420004	200.200003	153832000	0.57
23	2010-02-04	AAPL	Apple Inc.	196.730003	192.050003	191.570005	198.370001	189413000	0.43
24	2010-02-05	AAPL	Apple Inc.	192.630003	195.460001	190.850002	196	212576700	0.54
25	2010-02-08	AAPL	Apple Inc.	195.690006	194.119997	193.999994	197.880003	119567700	0.11
26	2010-02-09	AAPL	Apple Inc.	196.419996	196.190004	194.749998	197.499994	158221700	0.38
27	2010-02-10	AAPL	Apple Inc.	195.889997	195.120007	194.26	196.6	92590400	0.48
28	2010-02-11	AAPL	Apple Inc.	194.880001	198.669994	194.059996	199.750006	137586400	1
29	2010-02-12	AAPL	Apple Inc.	198.109995	200.379993	195.500002	201.639996	163867200	0.79
30	2010-02-16	AAPL	Apple Inc.	201.940002	203.339996	201.520006	203.690002	135934400	0.8
31	2010-02-17	AAPL	Apple Inc.	204.190001	202.550003	200.860004	204.310003	109099200	0.63
32	2010-02-18	AAPL	Apple Inc.	201.629995	202.929998	200.920006	203.889994	105706300	1
33	2010-02-19	AAPL	Apple Inc.	201.860001	201.669996	201.109997	203.200005	103867400	1
34	2010-02-22	AAPL	Apple Inc.	202.339998	200.419994	199.190006	202.500002	97640900	0.82
35	2010-02-23	AAPL	Apple Inc.	199.999998	197.059998	195.709993	201.330002	143773700	0.59

### 2.3.2. Facebook



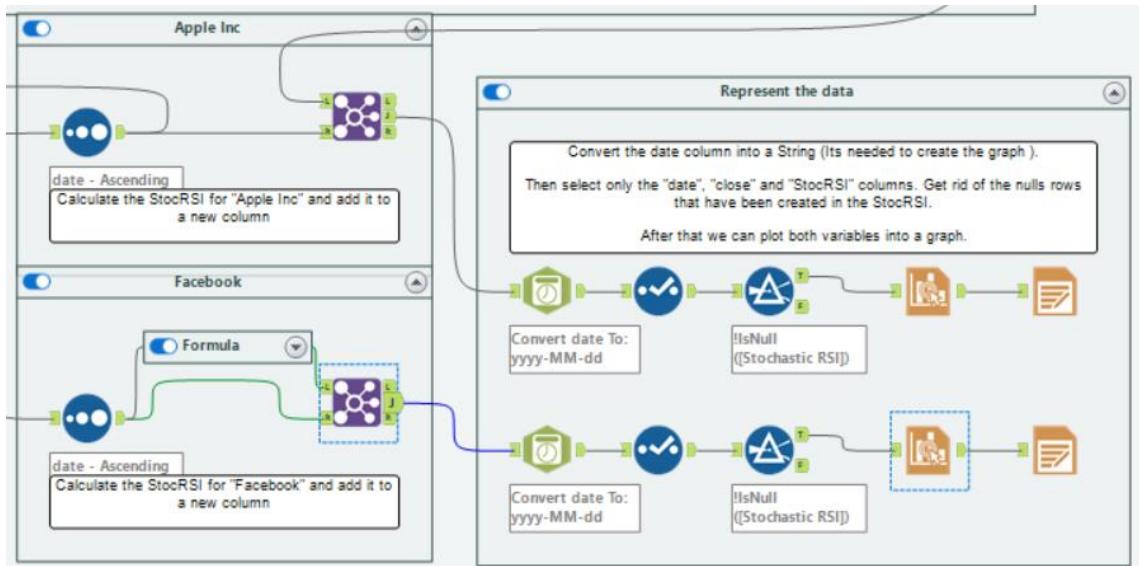
We follow the exact same process for “Facebook”, and get the following result:

Results - Join (96) - Out - Join

9 of 9 Fields | Cell Viewer | 1,008 records displayed | ↑ ↓ |

Record	date	Ticker Symbol	Security	open	close	low	high	volume	Stochastic RSI
1	2013-01-02	FB	Facebook	27.440001	28	27.42	28.18	69846400	[Null]
2	2013-01-03	FB	Facebook	27.879999	27.77	27.59	28.469999	63140600	[Null]
3	2013-01-04	FB	Facebook	28.01	28.76	27.83	28.93	72715400	1
4	2013-01-07	FB	Facebook	28.690001	29.42	28.65	29.790001	83781800	1
5	2013-01-08	FB	Facebook	29.51	29.059999	28.860001	29.6	45871300	0.84
6	2013-01-09	FB	Facebook	29.67	30.59	29.49	30.6	104787700	0.96
7	2013-01-10	FB	Facebook	30.6	31.299999	30.280001	31.450001	95316400	0.99
8	2013-01-11	FB	Facebook	31.280001	31.719999	31.1	31.959999	89598000	1
9	2013-01-14	FB	Facebook	32.080002	30.950001	30.620001	32.209999	98892800	0.86
10	2013-01-15	FB	Facebook	30.639999	30.1	29.879999	31.709999	173242600	0.75
11	2013-01-16	FB	Facebook	30.209999	29.85	29.530001	30.35	75332700	0.72
12	2013-01-17	FB	Facebook	30.08	30.139999	30.030001	30.42	40256700	0.74
13	2013-01-18	FB	Facebook	30.309999	29.66	29.27	30.440001	49631500	0.69
14	2013-01-22	FB	Facebook	29.75	30.73	29.74	30.889999	55243300	0.75
15	2013-01-23	FB	Facebook	31.1	30.82	30.799999	31.5	48899800	0.75
16	2013-01-24	FB	Facebook	31.27	31.08	30.809999	31.49	43845100	0.29
17	2013-01-25	FB	Facebook	31.41	31.540001	31.129999	31.93	54363600	0.22
18	2013-01-28	FB	Facebook	31.879999	32.470001	31.809999	32.509998	59682500	0.26
19	2013-01-29	FB	Facebook	32	30.790001	30.709999	32.07	72976500	0
20	2013-01-30	FB	Facebook	30.98	31.24	30.879999	31.49	87682100	0
21	2013-01-31	FB	Facebook	29.15	30.98	28.74	31.469999	190744900	0
22	2013-02-01	FB	Facebook	31.01	29.73	29.629999	31.02	85856700	0
23	2013-02-04	FB	Facebook	29.059999	28.110001	28.01	29.200001	92362200	0
24	2013-02-05	FB	Facebook	28.26	28.639999	28.040001	28.959999	47948200	0.2
25	2013-02-06	FB	Facebook	28.74	29.049999	28.66	29.290001	38375900	0.31
26	2013-02-07	FB	Facebook	29.110001	28.65	28.27	29.15	34540100	0.2
27	2013-02-08	FB	Facebook	28.889999	28.549999	28.51	29.17	37708800	0.25
28	2013-02-11	FB	Facebook	28.610001	28.26	28.040001	28.68	37361800	0
29	2013-02-12	FB	Facebook	27.67	27.370001	27.1	28.16	93498700	0
30	2013-02-13	FB	Facebook	27.360001	27.91	27.309999	28.32	50164000	0.05
31	2013-02-14	FB	Facebook	28.02	28.5	28.01	28.629999	35615800	0.08
32	2013-02-15	FB	Facebook	28.52	28.32	28.09	28.75	33109300	0
33	2013-02-19	FB	Facebook	28.23	28.93	28.120001	29.08	49396400	0.42
34	2013-02-20	FB	Facebook	28.92	28.459999	28.33	29.049999	42098200	0.27
35	2013-02-21	FB	Facebook	28.280001	27.280001	27.15	28.549999	49642300	0.12

## 2.4. Represent the data



In order to create an Interactive graph, the date need to be converted into a String,

For that I make use of the DateTime tool, once I'm done with the date, I make use of the select tool to get only the variables that we need to plot: "date", "close" and "Stochastic RSI".

**DateTime (99) - Configuration**

- Select the format to convert:
  - Date/Time format to string
  - String to Date/Time format
- Select the date/time field to convert: **date**
- Specify the new column name: **DateTime\_Out**
- Specify your DateTime Language: **English**
- Select the format for the new column:
  - day, dd Month, yyyy
  - dd-MM-yy
  - dd-MM-yyyy
  - dd-Mon-yy
  - dd Month, yyyy
  - dd/MM/yy
  - dd/MM/yyyy
  - dy., Month dd, yyyy
  - MM-dd-yy
  - MM-dd-yyyy
  - MM/dd/yy
  - MM/dd/yyyy
  - Mon dd
  - Month dd, yyyy
  - Month, yyyy
  - yyyy-MM-dd** (selected)
  - yyyyMMdd
  - Custom
- Specify a custom format for the new column:

**Select (100) - Configuration**

Field	Type	Size	Rename
<input checked="" type="checkbox"/> date	Date	10	
<input checked="" type="checkbox"/> DateTime_Out	String	10	date
<input checked="" type="checkbox"/> close	Double	8	
<input checked="" type="checkbox"/> Stochastic RSI	Double	8	
<input type="checkbox"/> Ticker Symbol	V_String	254	
<input type="checkbox"/> Security	V_String	254	
<input type="checkbox"/> open	Double	8	
<input type="checkbox"/> low	Double	8	
<input type="checkbox"/> high	Double	8	
<input type="checkbox"/> volume	Double	8	
<input checked="" type="checkbox"/> *Unknown	Unknown	0	

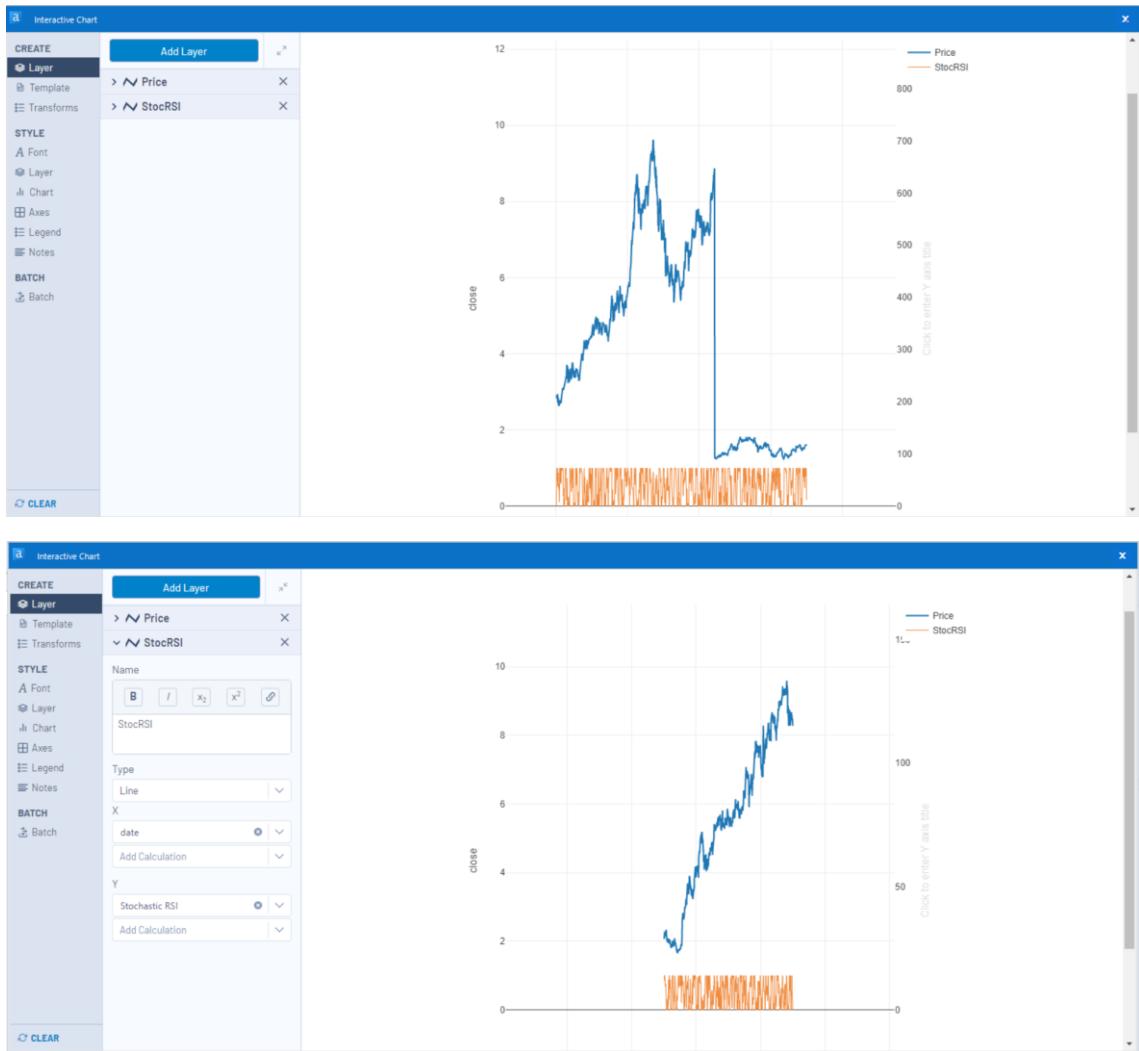
Since the Stochastis RSI formula created some nulls values at the bigining of the time series, we need to get rid of them using the filter:

**Filter (101) - Configuration**

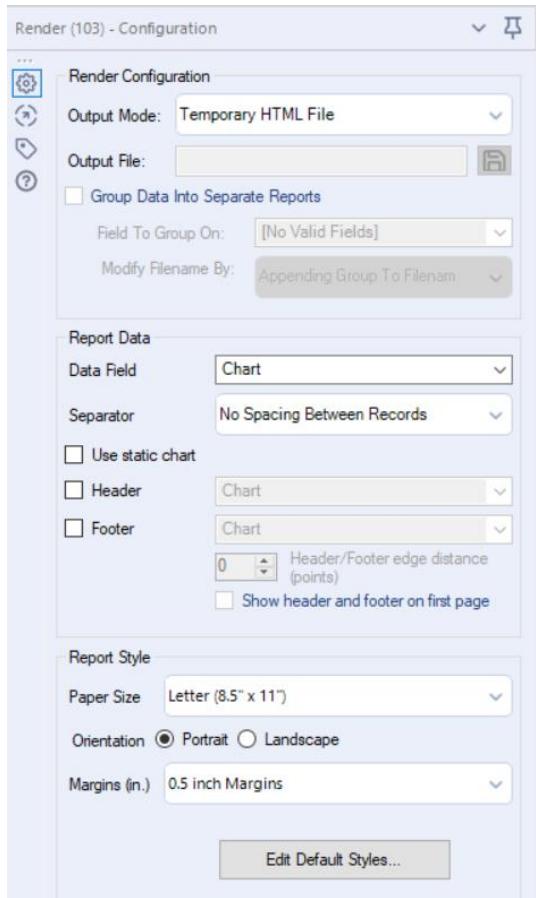
Select Basic or Custom Filter

- Basic filter
  - Stochastic ...
- Custom filter
  - `fx: !IsNull([Stochastic RSI])`
  - 
  - 
  -

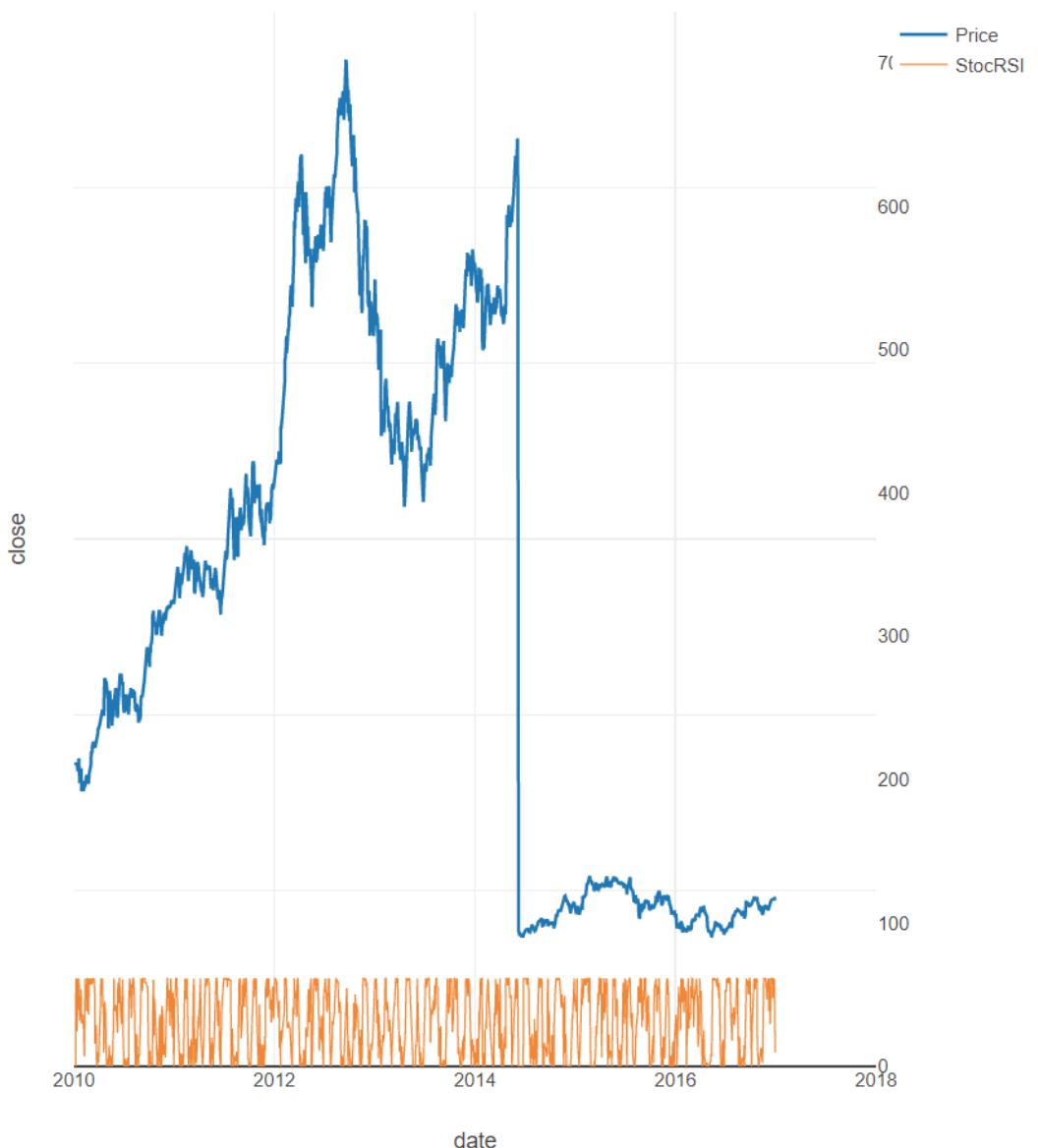
Now we can plot the graphs using the Interactive Chart tool:

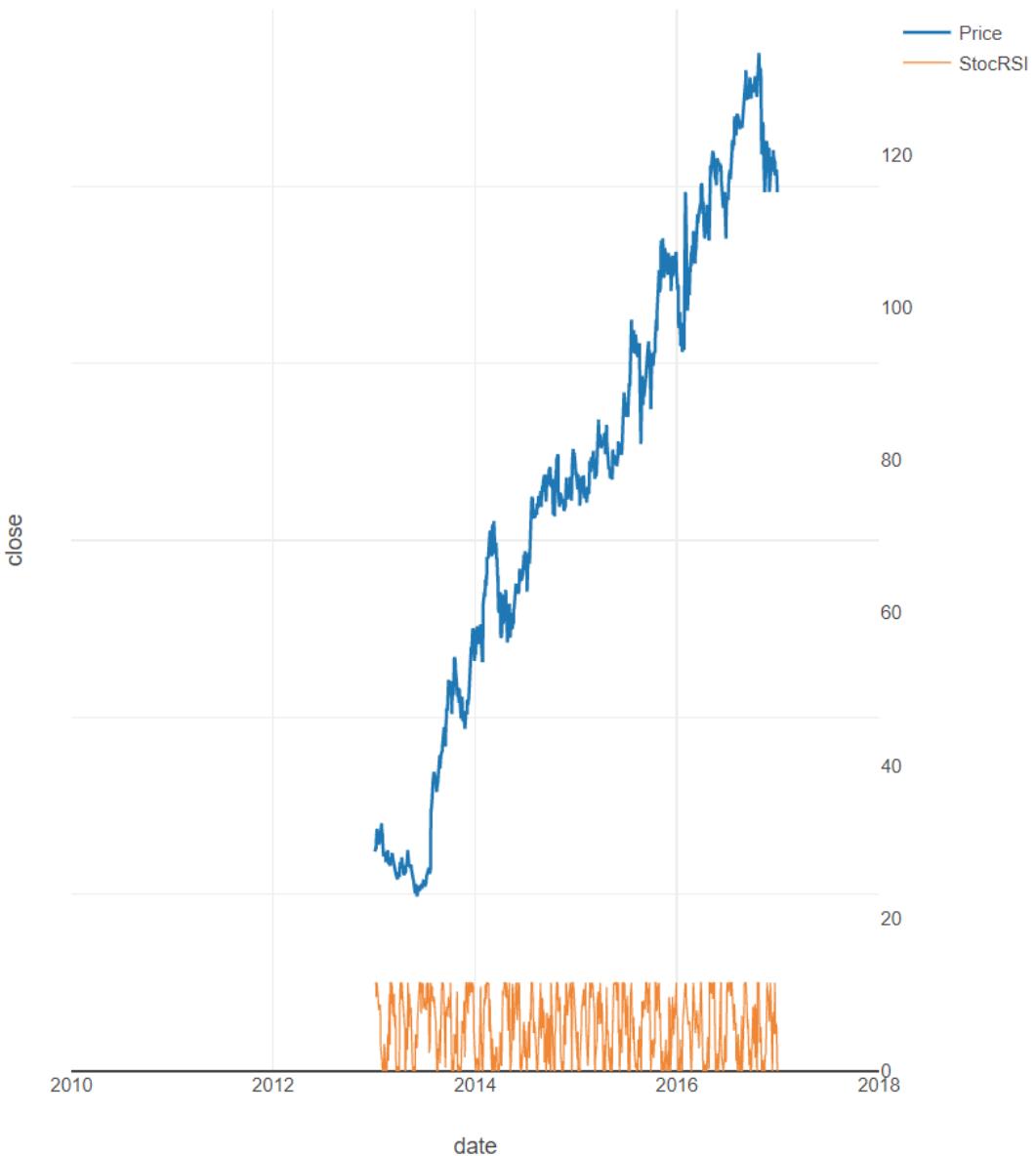


Lastly we use the Render tool to output the files:

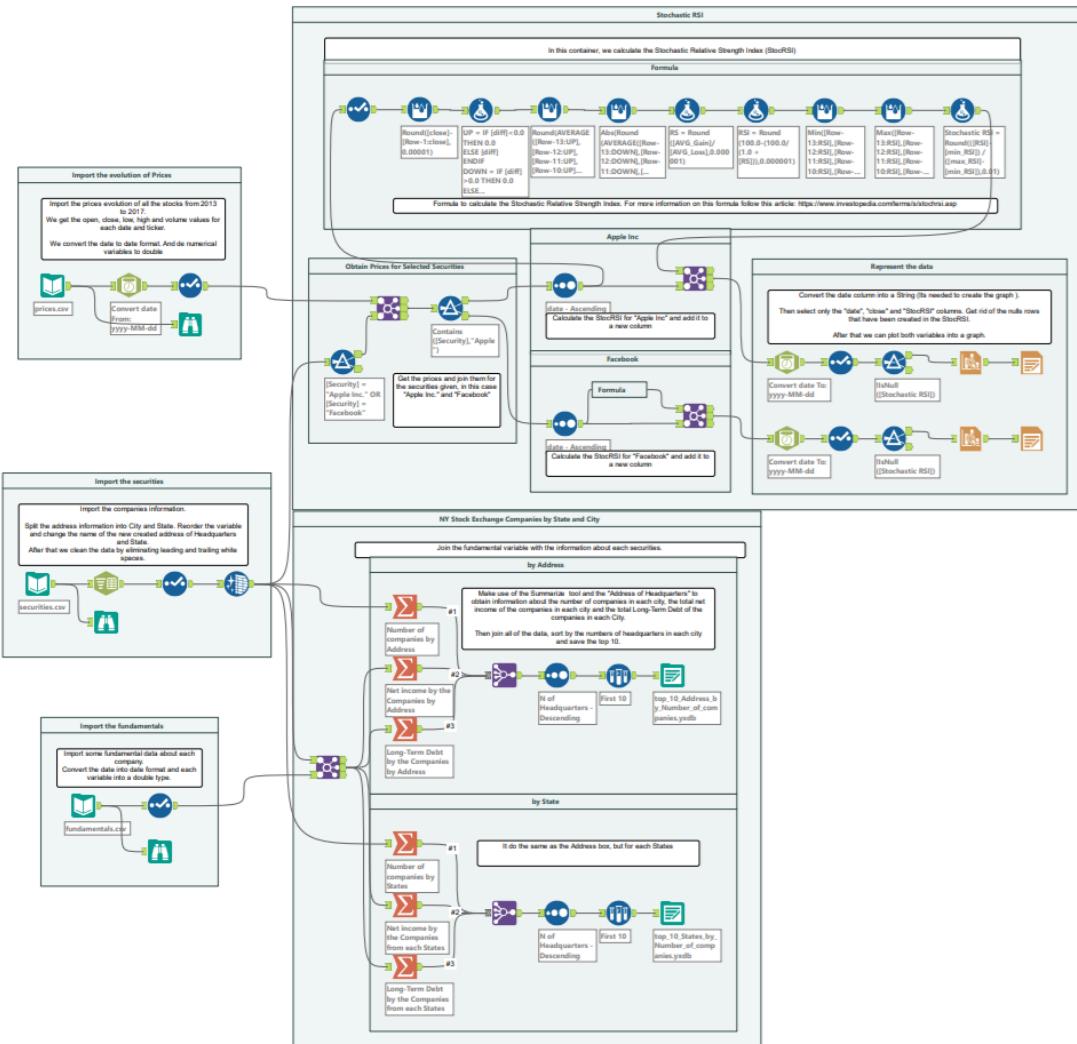


Getting the following files:





### 3. Review



1. In/Out Category
  - a. Input Data (1)
  - b. Output Data (2)
2. Preparation Category
  - a. Select (3)
  - b. Data Cleansing (4)
  - c. Filter (5)
  - d. Sort (6)
  - e. Sample (7)
  - f. Formula (8)
  - g. Multi-row formula (9)
3. Join Category
  - a. Join Multiple (10)
  - b. Join (11)
4. Parse Category

- a. DateTime (1)
- b. Text to columns (2)

There are 4 formulas used, the first one includes 2 conditionals if statements

Apart from that I have also used:

- 1. Reporting Category
  - a. Interactive Chart
  - b. Render
- 2. Transform Category
  - a. Summarize