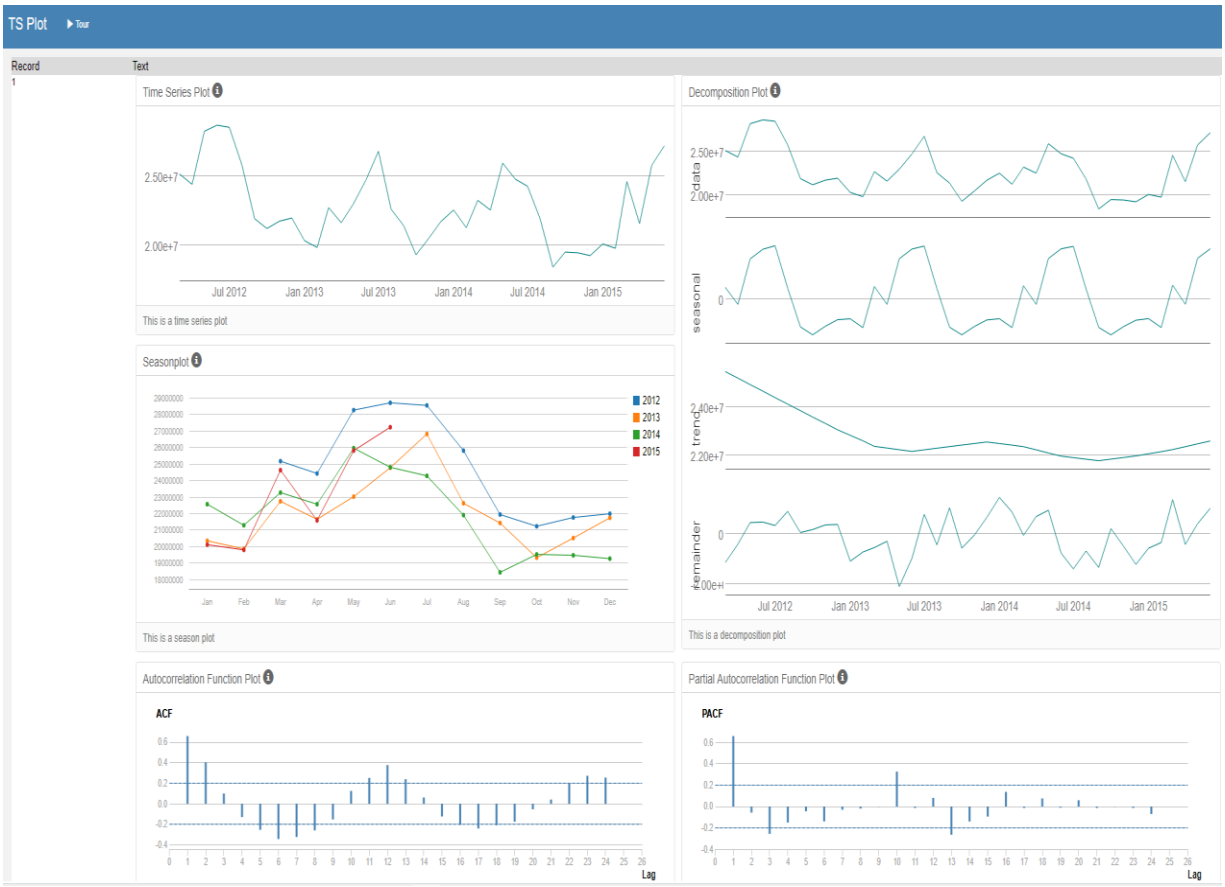
Project: Determining the Format for the New Stores and Forecasting Produce Sales

Task 3: Predicting Produce Sales

To accomplish the Task 3, I first determine what type of ETS or ARIMA model I needed to use for each forecast.

For time series analysis, after initial data investigation, the first business of order is to check the **decomposition plots** below. After evaluating those plots above I concluded that errors fluctuate in magnitude indicating a need for multiplicative method. There does not seem to be a meaningful trend indicating neither of the methods is needed. As for seasonality, there is seasonality which seems to increase over time indicating the need for multiplicative method. As a result, I decided to use ETS (m, n, m) as the best model.



I decided to use ETS models for forecasting rather than ARIMA because when I tested the models ETS(m, n, m) model versus ARIMA, I saw that its relevant values were much better with a better forecasting performance than ARIMA indicating a better fit. Therefore, I used ETS (m, n, m) for forecasting the produce sales throughout 2016. Please refer to the model comparison tool's results below.

Record | Report

1

Comparison of Time Series Models

2

Actual and Forecast Values:

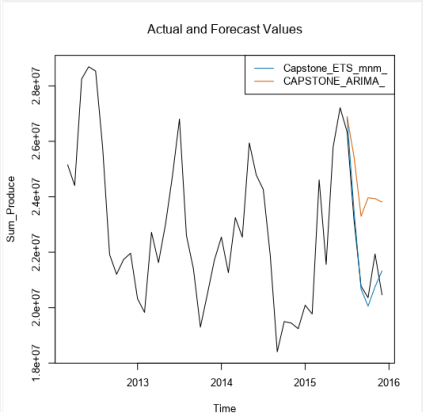
Actual	Capstone_ETS_mnm_	CAPSTONE_ARIMA_
26338477.15	26860639.57444	26893565.95813
23130626.6	23468254.49595	25429430.38016
20774415.93	20668464.64495	23295873.52652
20359980.58	20054544.07631	23965732.12685
21936906.81	20752503.51996	23933281.56973
20462899.3	21328386.80965	23807722.64756

3

Accuracy Measures:

Model	ME	RMSE	MAE	MPE	MAPE	MASE
Capstone_ETS_mnm_	-21581.13	663707.2	553511.5	-0.0437	2.5135	0.3257
CAPSTONE_ARIMA_	-2387049.97	2586025.6	2387050	-11.2233	11.2233	1.4046

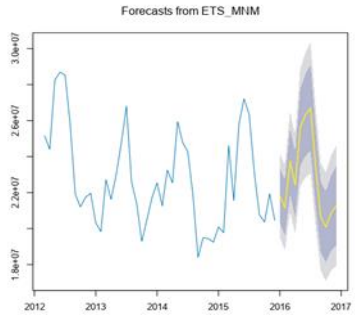
4



Then I created a table of my forecasts for existing and new stores. I also provided visualization the forecasts that includes historical data, existing stores forecasts, and new stores forecasts.

Report

12 Period Forecast from ETS_MNM

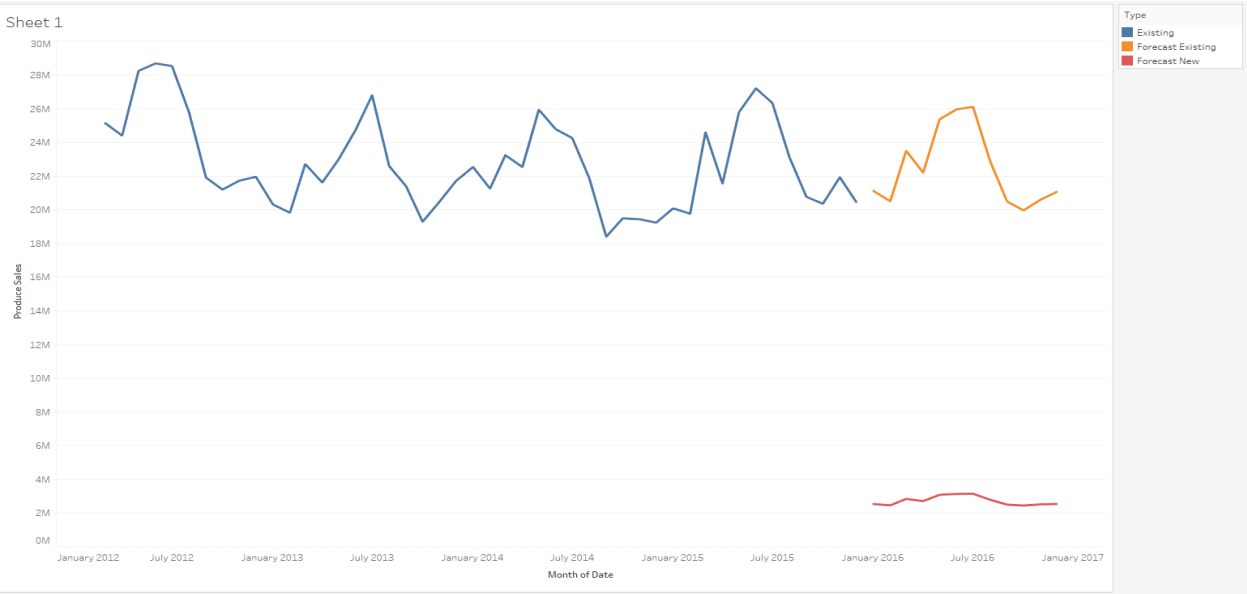


Period	Sub_Period	Existing_Forecast	Existing_Forecast_high_95	Existing_Forecast_high_80	Existing_Forecast_low_80	Existing_Forecast_low_95
2016	1	21829060.031666	24149899.115321	23346575.14138	20311544.921952	19508220.948011
2016	2	21146329.631982	23512577.365832	22693535.862148	19599123.401815	18780081.898131
2016	3	23735686.93879	26517865.796798	25554855.912929	21916517.964651	20953508.080782
2016	4	22409515.284474	25150243.401256	24201581.075733	20617449.493214	19668787.167691
2016	5	25621828.725097	28880596.484529	27752622.431914	23491035.018279	22363060.965665
2016	6	26307858.040046	29777680.067343	28576652.715009	24039063.365084	22838036.01275
2016	7	26705092.556349	30348682.320364	29087507.847195	24322677.265503	23061502.792334
2016	8	23440761.329527	26742106.733295	25599395.061562	21282127.597491	20139415.925758
2016	9	20640047.319971	23635033.372194	22598363.439189	18681731.200753	17645061.267747
2016	10	20086270.462075	23084199.797487	22046511.090727	18126029.833423	17088341.126662
2016	11	20858119.95754	24055437.105831	22948733.269445	18767506.645635	17660802.809249
2016	12	21255190.244976	24596988.126893	23440274.43075	19070106.059202	17913392.363058

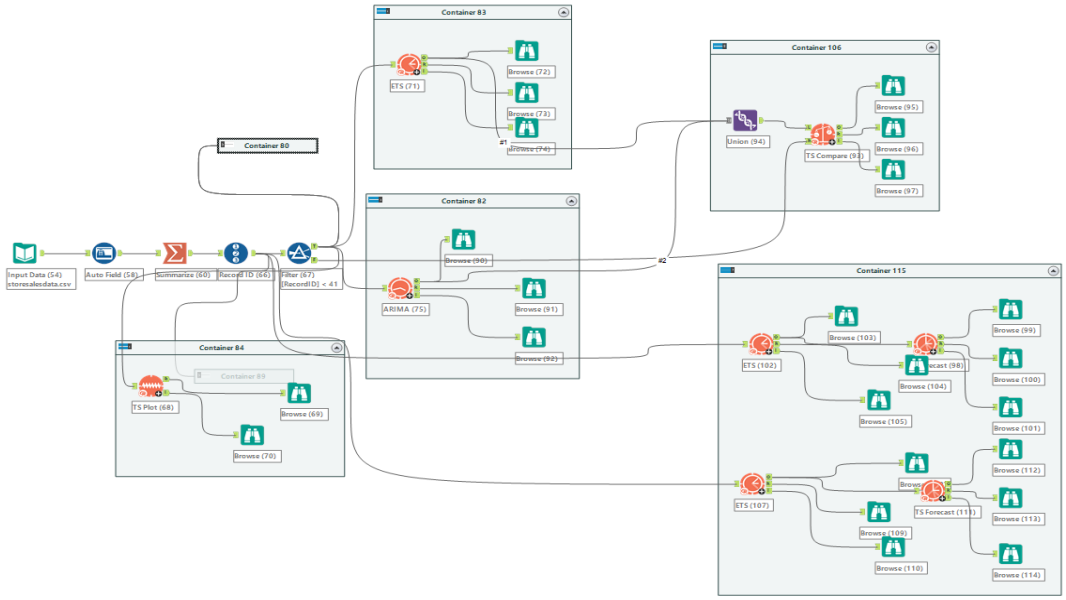
Below are the Forecasting results from Alteryx and the table indicating the existing and new stores' forecasting results. At the bottom you see the Tableau visualization of my forecasts that include historical data, existing stores forecasts, and new stores forecasts.

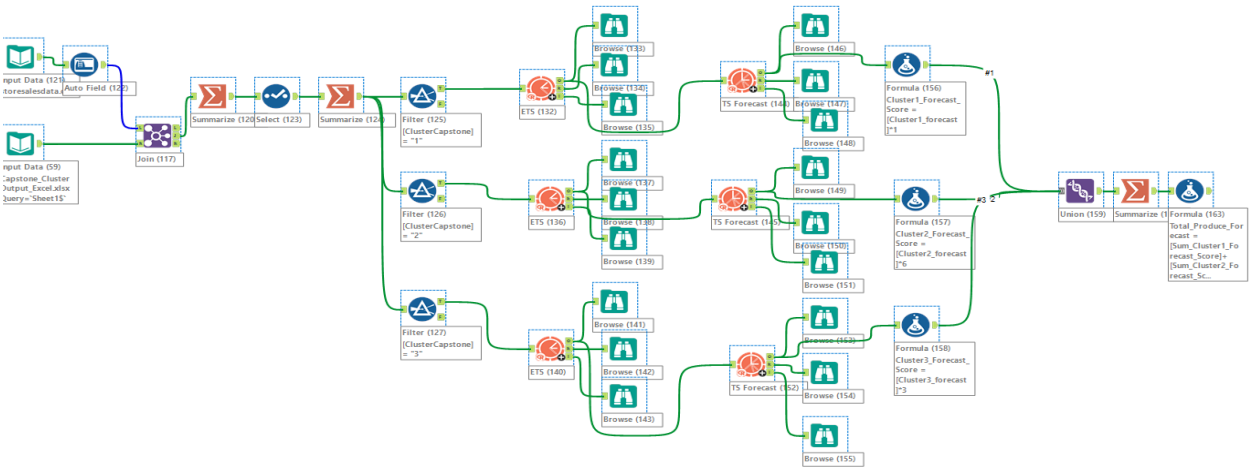
Month	New Stores	Existing Stores
Jan-16	2563357.91004118	21829060.031666
Feb-16	2483924.72756208	21146329.631982
Mar-16	2910944.1456874	23735686.93879
Apr-16	2764881.86969732	22409515.284474
May-16	3141305.86730493	25621828.725097
Jun-16	3195054.20380398	26307858.040046
Jul-16	3212390.95408986	26705092.556349
Aug-16	2852385.7691978	23440761.329527
Sep-16	2521697.18679037	20640047.319971
Oct-16	2466750.89369629	20086270.462075
Nov-16	2557744.58771366	20858119.95754
Dec-16	2530510.80513342	21255190.244976

Below is the visualzation of the existing and nes stores sales forecast.



Below are the Alteryx workflows for the whole analyses.





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