DATA ANALYTICS WITH COGNOS

WEBSITE TRAFFIC ANALYSIS – PHASE 3

INTRODUCTION

In Phase III of website traffic analysis, the dataset of traffic data has been loaded to the Cognos tool. By this, Visualization of dataset has been done by creating dashboard and data module using the Cognos tool.

Dataset link: https://www.kaggle.com/datasets/bobnau/daily-website-visitors

ABOUT THE DATASET (Already clean hence no preprocessing required)

- **Row (Type : Integer)** : Denotes the row number which is used to uniquely identify a particular data entry.
- **Day (Type : String)** : Consists of the day of the week that pertains to that row.
- **Day_of_week (Type : Integer)** : Denotes the day of the week in numerical form (numbered from 1 through 7 for each day of the week in that respective order).
- **Date (Format : dd/mm/yyyy)** : Denotes the date of entry (The entire data ranges over a period of 5 years).
- **Page Loads (Type : Integer)** : No. of page loads handled by the web server on that particular day on a daily basis.
- **Unique visits (Type : Integer)** : Daily number of visitors from whose IP addresses there haven't been hits on any page in over 6 hours. A visit is classified as "unique" if a hit from the same IP address has not come within the last 6 hours.
- **First time visits (Type : Integer) :** Number of unique visitors who do not have a cookie identifying them as a previous customer. Returning visitors are identified by cookies if those are accepted.
- **Returning visits (Type : Integer)** : Number of unique visitors minus first time visitors

ANALYTIC INSIGHTS

- **Trend Analysis:** Identify long-term and short-term trends in page loads, unique visitors, and other metrics to understand how your website's popularity and performance change over time.
- **Day-of-Week Analysis:** Determine which days of the week receive the most traffic. This can help you schedule content updates or marketing campaigns for optimal days.
- **Seasonal Patterns:** Recognize seasonal trends(daily, monthly and yearly page loads and unique visits etc…) or recurring patterns in website traffic, which can guide your content and marketing strategy.
- **Page Load Time Analysis:** Correlate page load times with changes in page loads and visitor behaviour.
- **Forecasting:** Use time series data to make predictions about future website traffic, allowing for better resource allocation and planning. The dataset consists of time series data from 14.09.2019 to 19.08.2020. We use the IBM Cognos tool to visualize the forecast of page_loads, first_time_visits and returning_visits from 20.08.2020 onwards

**VISUALISATION USING COGNOS:**

1.Count of Page Loads, Unique Visits, First Time Visits, Returning Visits

Used the summary visualisation to get a summary of page loads, unique visits, first time visits, returning visits.

| Page.Loads	Unique.Visits	First.Time.Visits	Returning.Visits
8.92M	**6.38M**	**5.27M**	**1.11M**
Page.Loads	Unique.Visits	First.Time.Visits	Returning.Visits
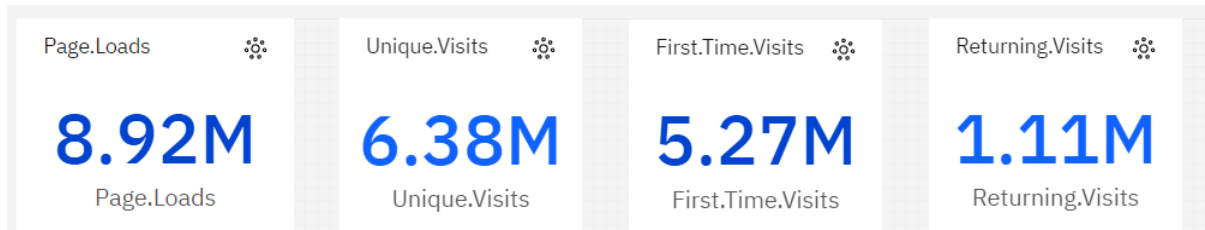
2. Page Loads vs Row

The below line graph is used to visualise the trend followed by the no. of page visits on the website.
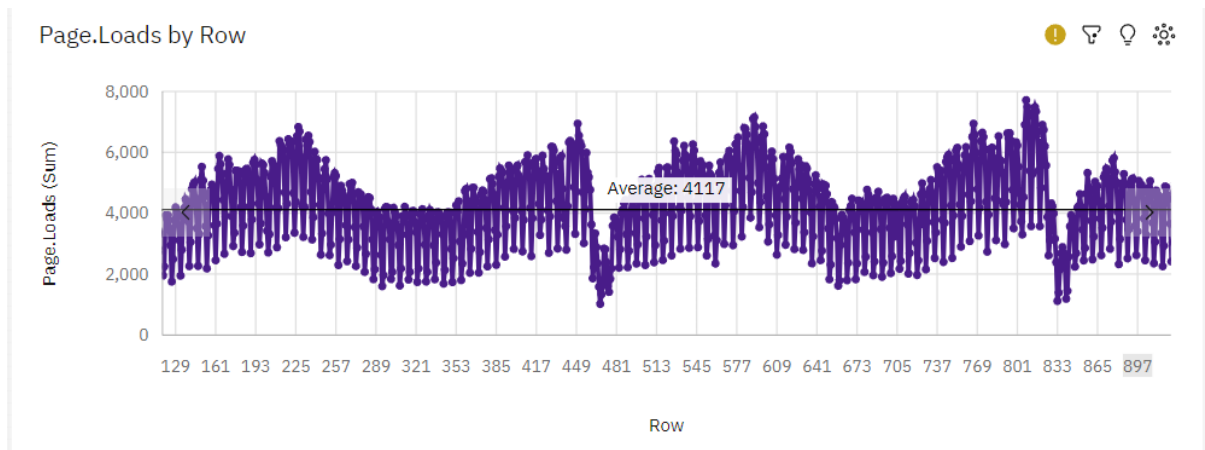
OBSERVATIONS:

- Row 1320 has the highest total Page Loads due to Day Wednesday.

- Day Tuesday has the highest Page Loads at over 1.5 million, out of which Row 808 contributed the most at over 7500.

- Across all rows, the sum of Page Loads is over 8.9 million.

- Page Loads ranges from over a thousand, when Row is 103, to nearly eight thousand, when Row is 1320.
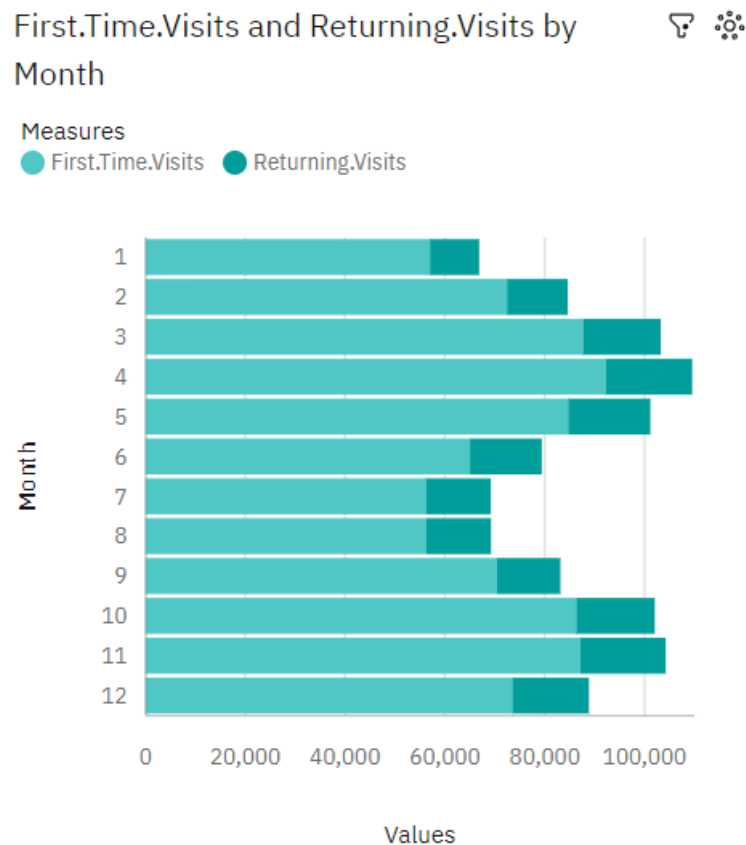
3. First Time Visits and Returning Visits by Year

First.Time.Visits and Returning.Visits by Year

Measures
● First.Time.Visits ● Returning.Visits
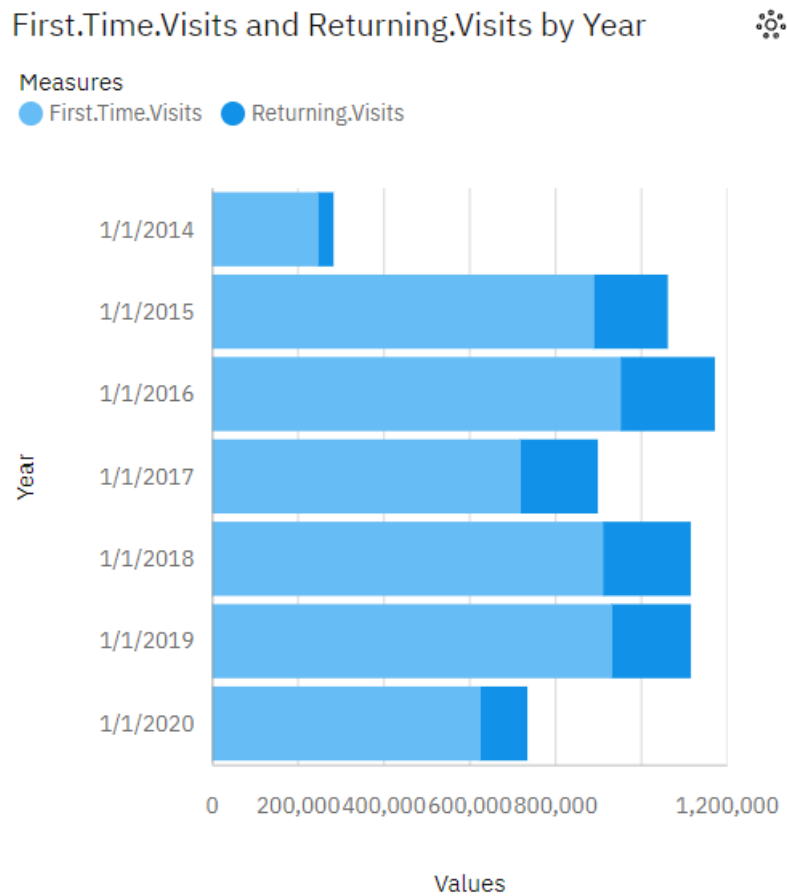
OBSERVATIONS
- Year 2016 has the highest values of both First Time Visits and Returning Visits
- First Time Visits is unusually low in 2014.
- Based on the current forecasting, Returning Visits may reach over 87 thousand by Day Monday+1.
- 2016 (16.9 %), 2019 (16.8 %), 2018 (16.8 %), 2017 (16.8 %), and 2015 (16.8 %) are the most frequently occurring categories of Year with a combined count of 1826 item with First Time Visits values (84.3 % of the total).
- 2016 (16.9 %), 2019 (16.8 %), 2018 (16.8 %), 2017 (16.8 %), and 2015 (16.8 %) are the most frequently occurring categories of Year with a combined count of 1826 items with Returning Visits values (84.3 % of the total).
- Overall years, the average of First Time Visits is almost 2500.
- Overall years, the average of Returning Visits is 511.8.
- The total number of results for First Time Visits, across all years, is over two thousand.
- The total number of results for Returning Visits, across all years, is over two thousand.
- First Time Visits ranges from over 246 thousand, in 2014, to over 951 thousand, in 2016.
- Returning Visits ranges from over 36 thousand, in 2014, to nearly 220 thousand, in 2016.

4. First Time Visits and Returning Visits by Month

First.Time.Visits and Returning.Visits by Month

Measures
● First.Time.Visits ● Returning.Visits

[Horizontal stacked bar chart showing First Time Visits and Returning Visits by Month (1-12), with Values on the x-axis ranging from 0 to over 100,000.]

OBSERVATIONS:

- Month 4 has the highest values of both First Time Visits and Returning Visits.
- Based on the current forecasting, Returning Visits may reach nearly 13 thousand by Day Monday+1.
- 1 (8.5 %), 12 (8.5 %), 3 (8.5 %), 5 (8.5 %), and 7 (8.5 %) are the most frequently occurring categories of Month with a combined count of 155 items with First Time Visits values (42.5 % of the total).
- 1 (8.5 %), 12 (8.5 %), 3 (8.5 %), 5 (8.5 %), and 7 (8.5 %) are the most frequently occurring categories of Month with a combined count of 155 items with Returning Visits values (42.5 % of the total).
- Over all months, the average of First Time Visits is almost 2500.
- Over all months, the average of Returning Visits is 473.
- The total number of results for First Time Visits, across all months, is 365.
- The total number of results for Returning Visits, across all months, is 365.
- First Time Visits ranges from over 56 thousand, when Month is 7, to over 92 thousand, when Month is 4.
- Returning Visits ranges from nearly ten thousand, when Month is 1, to over seventeen thousand, when Month is 4.
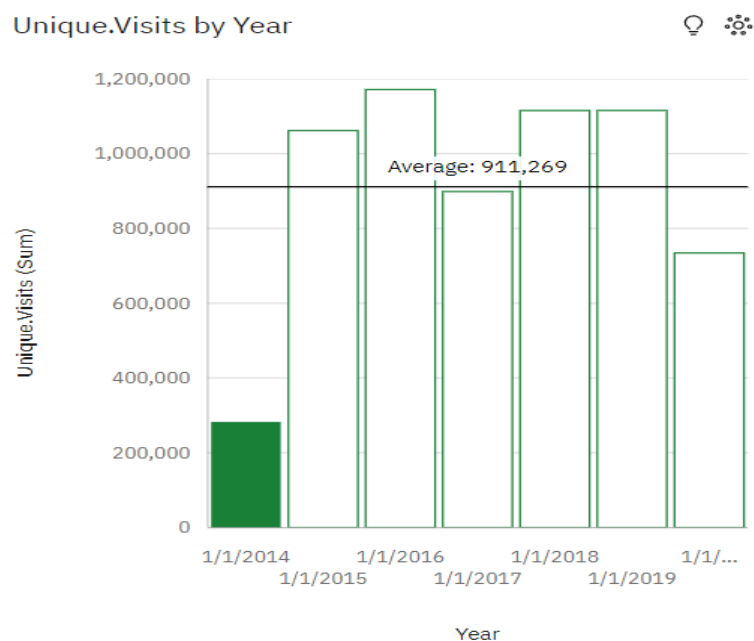
5. Unique Visits by Month

Unique.Visits by Month
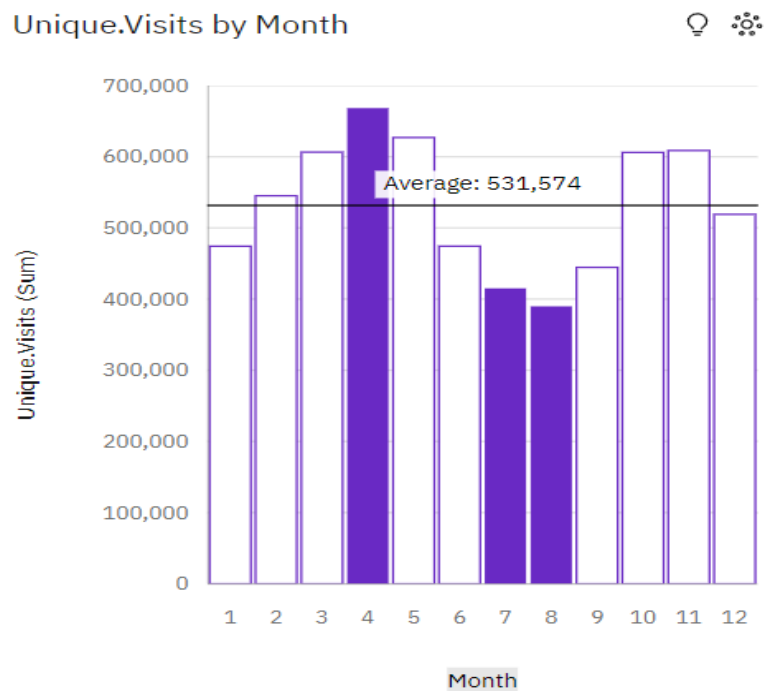
OBSERVATIONS:

- Unique Visits is most unusual in 8, 4 and 7.
- It is projected that by Monday+1, 2 will exceed 6 in Unique Visits by over 3500.
- Over all months, the sum of Unique Visits is almost 6.4 million.
- Unique Visits ranges from nearly 390 thousand, when Month is 8, to over 668 thousand, when Month is 4.

5. Unique Visits by Year

Unique.Visits by Year

OBSERVATIONS:

- It is projected that by Monday+1, 2016 will exceed 2017 in Unique Visits by almost 3500.
- Across all years, the sum of Unique Visits is over 606 thousand.
- Unique Visits ranges from almost 76 thousand, in 2017, to over 118 thousand, in 2018.
- For Unique Visits, the most significant values of Year are 2018, 2016, 2019, and 2015, whose respective Unique Visits values add up to almost 445 thousand, or 73.4 % of the total.
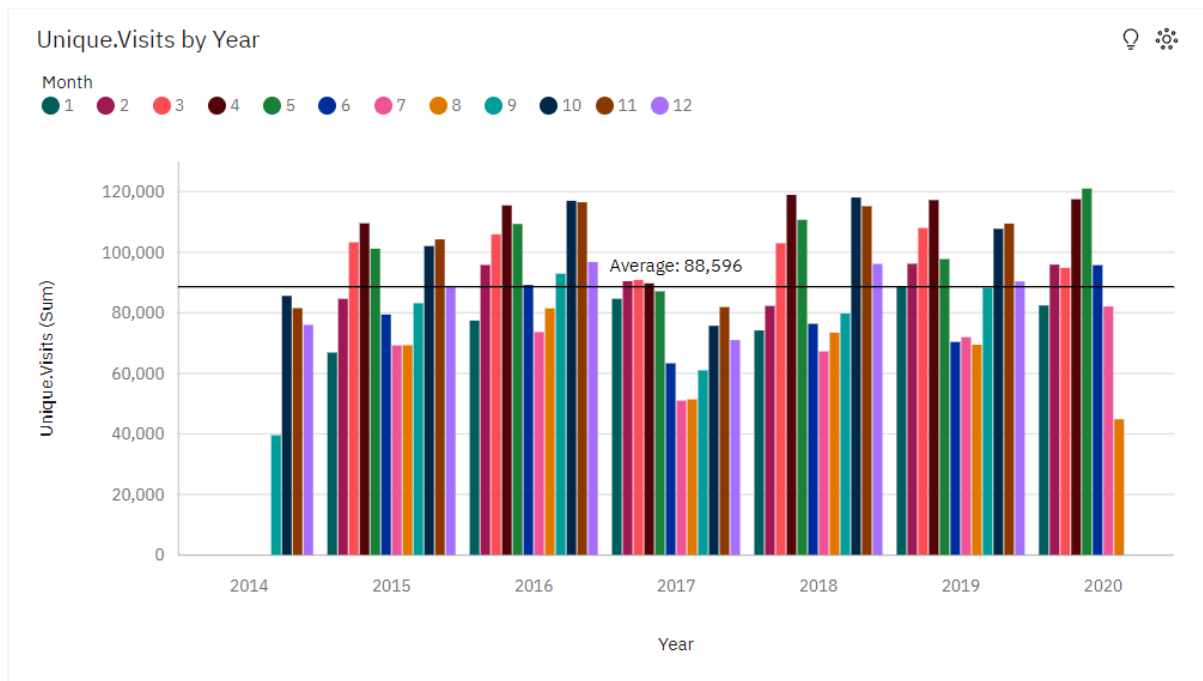
5. Unique Visits by Day
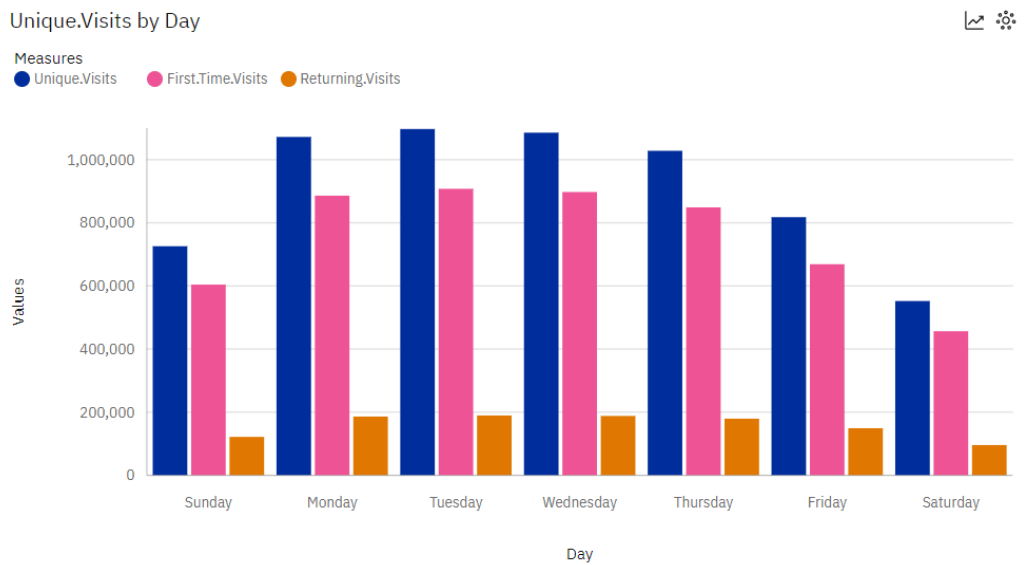
OBSERVATIONS

- Unique Visits is unusually low when Day is Saturday.
- Based on the current forecasting, Unique Visits may reach almost 481 thousand by Day Monday+1.
- Monday (14.3 %), Sunday (14.3 %), Wednesday (14.3 %), and Tuesday (14.3 %) are the most frequently occurring categories of Day with a combined count of 1240 items with First Time Visits values (57.2 % of the total).
- Monday (14.3 %), Sunday (14.3 %), Wednesday (14.3 %), and Tuesday (14.3 %) are the most frequently occurring categories of Day with a combined count of 1240 items with Returning Visits values (57.2 % of the total).
- Monday (14.3 %), Sunday (14.3 %), Wednesday (14.3 %), and Tuesday (14.3 %) are the most frequently occurring categories of Day with a combined count of 1240 items with Unique Visits values (57.2 % of the total).
- Over all days, the average of First Time Visits is almost 2500.
- Over all days, the average of Returning Visits is 511.8.
- Over all days, the average of Unique Visits is nearly three thousand.
- The total number of results for First Time Visits, across all days, is over two thousand.
- The total number of results for Returning Visits, across all days, is over two thousand.

- The total number of results for Unique Visits, across all days, is over two thousand.
- First Time Visits ranges from over 456 thousand, when Day is Saturday, to nearly 908 thousand, when Day is Tuesday.
- Returning Visits ranges from almost 96 thousand, when Day is Saturday, to over 189 thousand, when Day is Tuesday.
- Unique Visits ranges from over 552 thousand, when Day is Saturday, to nearly 1.1 million, when Day is Tuesday.

## 6. Unique Visits by Year

OBSERVATIONS

- Unique Visits is most unusual in 8, 4 and 7.
- Unique Visits is unusually low in 2014.
- It is projected that by Monday+1, 2 will exceed 6 in Unique Visits by over 3500.
- Month 4 has the highest Unique Visits at over 668 thousand, out of which Year 2018 contributed the most at almost 119 thousand.
- Year 2016 Unique Visits from Month 10 is nearly 117 thousand, whereas 2019 is only almost 108 thousand.
- Year 2016 has the highest total Unique Visits due to Month 10.
- 2020 has a Unique Visits of over 121 thousand for Month 5.
- Overall years and months, the sum of Unique Visits is almost 6.4 million.
- The summed values of Unique Visits range from nearly 40 thousand to over 121 thousand.
- For Unique Visits, the most significant value of Month is 4, whose respective Unique Visits values add up to over 668 thousand, or 10.5 % of the total.
- For Unique Visits, the most significant values of Year are 2016, 2019, 2018, 2015, and 2017, whose respective Unique Visits values add up to almost 5.4 million, or 84.1 % of the total.

7. Forecast of page loads, first time visits and returning visits by date

Page.Loads, First.Time.Visits and Returning.Visits by Date
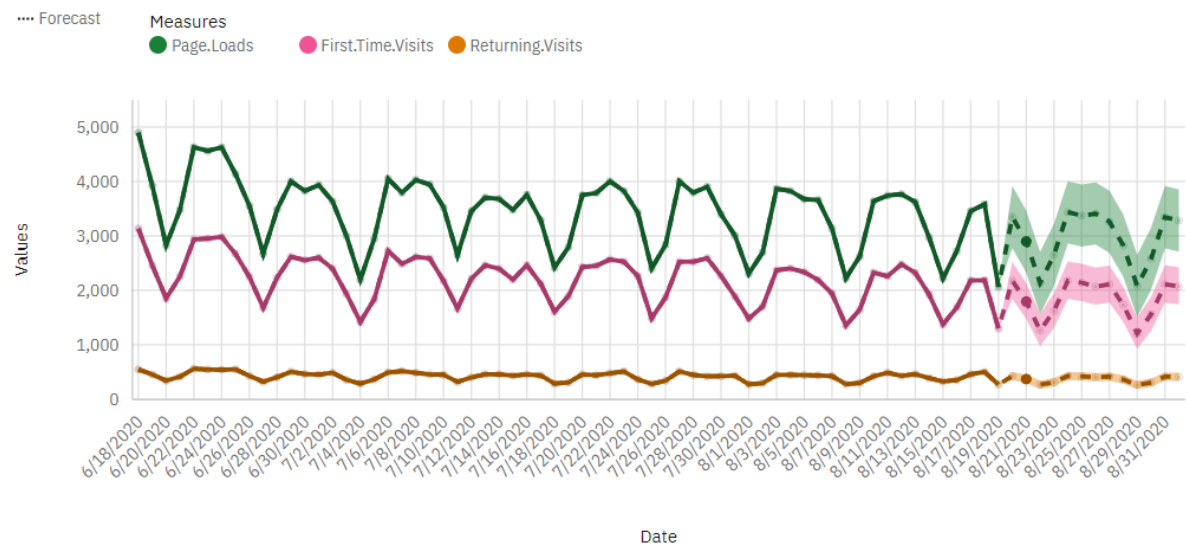
OBSERVATIONS

- Page Loads has a strong weekly trend. The largest values typically occur on Thursday, whereas the smallest values on Saturday.
- Page Loads has a moderate downward trend.
- Based on the current forecasting, Page Loads may reach almost 3500 by Date 2020-09-01.
- The value of Page Loads at the last observed time 2020-08-19 is unusual. This may indicate incomplete data or a recent event that might require investigation.
- Page Loads has an unusually low value at time point 2020-08-19.
- Over all dates, the sum of Page Loads is almost 217 thousand.
- Page Loads ranges from over two thousand, when Date is 2020-08-19, to nearly five thousand, when Date is 2020-06-18.

CONCLUSION

   Data visualisations for the time series analysis were obtained using IBM cognos tools and various analytics insights were inferred. By collecting and analyzing data related to how users interact with a website, this would help stakeholders gain valuable insights and make informed decisions to improve visitors online presence.