

# Understanding Forecasts

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Some reports in NocTel Insight will generate a Forecast plot for some future time interval relative to the current zoom level if there is enough historical data in the current view. For example, if selecting a period of data that covers a month with a zoom level set to by day, NocTel Insight will render the Forecast plot for the next few days beyond the **end date of the working data set**. How many additional points Insight will forecast (or if it will even generate the Forecast) is all dependent on the current zoom level and breadth of available data.



Be aware that the forecast date/time intervals projected are *relative* to the last available date/time's data. That is, if you specify a date range of 2019-01-01 to 2019-01-31 with a zoom level by day, but the actual available data extends well into 2019-03 the forecast will project the next few days relative to the constraint resulting in the first few days' worth of data being forecast for February. This occurs because the current view knows nothing about the February and March data that actually exists. The Forecast analysis can only consider data that's valid in the current View.

Generally, Insight needs the following historical data (relative to the date range) for the following zoom levels to minimally produce a Forecast:

- By Hour: 48 hours
- By Day: 14 days
- By Week: 4 weeks
- By Month: 4 months
- By Quarter: 4 quarters
- By Year: 3 years

Because the Forecast is a statistical projection, *more data yields better accuracy*. With more data to compare to detect outliers and establish recurring patterns with higher confidence, the result is a Forecast that's more likely to be in line with reality (or the future) barring any significant deviations to date.

For example, let us say that the typical week for Customer A looks like this for the number of inbound calls on the account:

- Sunday: 0
- Monday: 445
- Tuesday: 378
- Wednesday: 376
- Thursday: 321
- Friday: 349
- Saturday: 122

If there were no observed holidays where Customer A is closed or has shortened hours, we would expect to see the above trend continue closely in the forecast. With a very large working data set over the zoom level of interest, one off or infrequently occurring large deviations in either direction are given less overall bearing causing the Forecast to normalize.



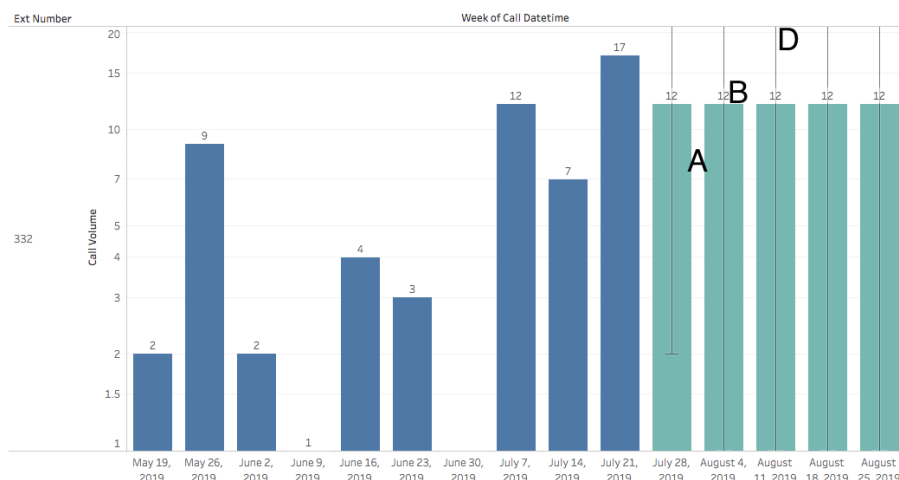
It's recommended that if you wish to utilize Forecasts in reporting to set the date range to result in an even measurement relative to the zoom level. That is, if Forecasting monthly then use date ranges that encompass only full months and not include partial months. If the date range used does not result in a very large data set to perform statistical analysis on, the partial time period may have had an exaggerated effect on the Forecast.

Partials of date groupings (zoom level) can create unwanted skew. This effect is more pronounced when you are generating a Forecast with the minimum acceptable set of data. At worst, the Forecast may not generate as the partials make the analyzed set too volatile.

## Reading the Forecast

Consider the following example Report that includes a Forecast:

Call Volume by Extension Chart



Account Number 2002	Status active
Ext Number 332	Call Direction (All)
Ext Lower Bound 0	Start Date 2019-05-01
Ext Upper Bound 9,999,999	End Date 2019-08-01
Ext Description (All)	Timezone Pacific
Class (All)	DST Toggle True
Type (Multiple values)	Forecast Indicator Actual Estimate

Each plotted point of the Forecast will consist of four primary components referenced above:

- **The Forecast Plot (A)**, which is the displayed bar for each data point the Forecast provides. In the above example these are the teal plots.
- **The Forecast Value (B)**, which is displayed above the bar for each data point the Forecast provides and is the value corresponding to the data point/plot.
- **The Forecast Legend (C)**, which is displayed in the bottom right hand corner of the visualization where the filters and parameters are located. The Forecast plots will be shaded differently from the actual data plots for easy distinguishing.
- **The Forecast Max Projection (D)**, which is a whisker plot that extends beyond the Forecast plot's boundaries. This indicates roughly what the *max plausible value* may be for that data point. No corresponding plot is drawn for the minimum projection as the lowest anticipated projection is always zero. In the example above, the Max Projection actually establishes the Y-Axis (Call Volume) upper limit (in this case 21 extending slightly from the last tick mark at 20).

## Exporting the Forecast

When displayed in the visualization, Forecast projections are included in the export data from Insight. The forecast data rows are easily distinguished from the actual data as they will both be marked with an identifying column indicating either Actual or Forecast.

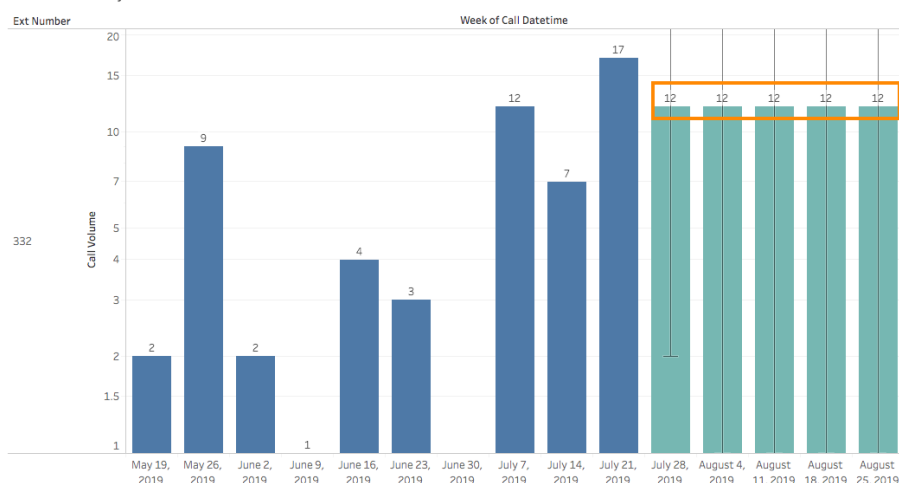
If you do not wish to use the Forecast data in exports, simply filter out the rows or delete them from the resulting Excel or CSV file.

## Forecast Responsiveness

Like the resulting data and calculation displayed after modifying filter and parameters, the Forecast also responds to changes made. Depending on how the changes made to filters and parameters affect historical data used in the Forecast, you may see noticeable changes in the resulting values.

For example, consider the following Forecast, which looks at data in a Weekly grouping perspective which generates a rudimentary forecast:

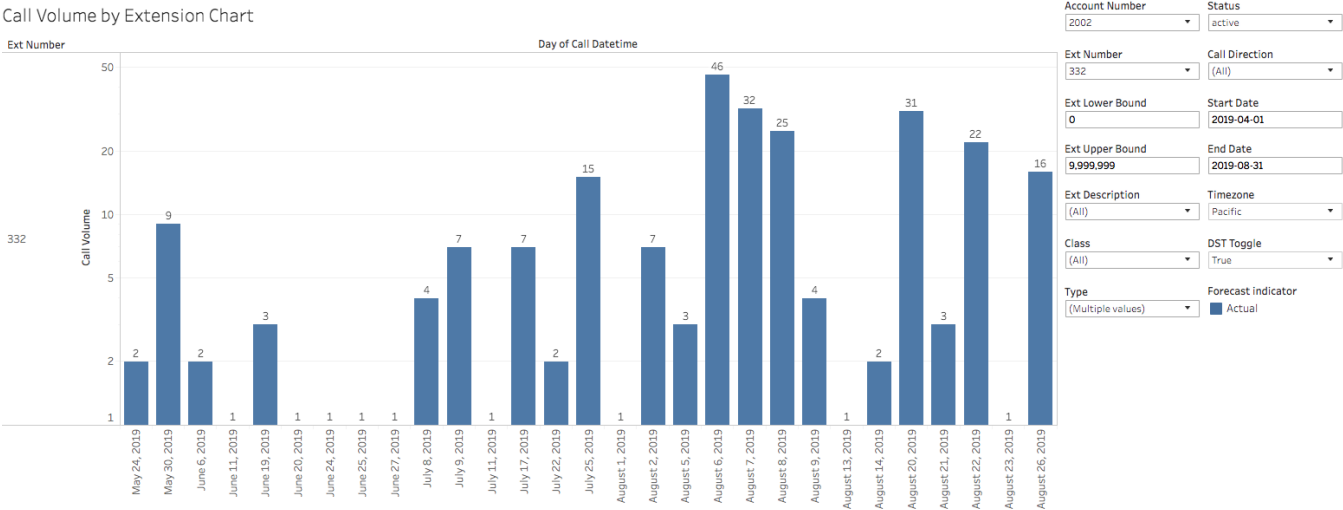
Call Volume by Extension Chart



Account Number 2002	Status active
Ext Number 332	Call Direction (All)
Ext Lower Bound 0	Start Date 2019-05-01
Ext Upper Bound 9,999,999	End Date 2019-08-01
Ext Description (All)	Timezone Pacific
Class (All)	DST Toggle True
Type (Multiple values)	Forecast Indicator Actual Estimate

What happened here? We can see that the Forecast values have changed - from 12 to 33 given an additional 4 weeks data. In particular, we see that the two weeks with 110 and 57 calls occurred in August which were previously *not considered* in our original View of the data. Notice how the Forecast also extended from five weeks out from last known interval to *seven* because there is more historical data to analyze.


What happens if we change the grouping perspective in the zoom level to be by Day instead but keep our April 2019 through August 2019 date range?



We see that *no Forecast* is generated. What is going on here? Despite there being more *individual* data points due to a finer granularity of time perspective, the data is *more erratic*. Note the multiple points (days) in which there were only 1 call on the Extension in question. Given the wide variance between those single call days and the high volume days (relatively speaking, 15+ calls/day), Insight determined the data to not establish a pattern that meets a minimal confidence interval. If we presume the Extension being Forecasted against belongs to an individual who works a typical Monday-Friday 8-5 schedule, we would see one or zero calls on weekend days as a normal pattern. However, we see the actual data is very erratic.

At a much wider scale, such as expanding the date scope to 6 months or even a year might change that Forecast assessment where Insight picks up on seasonal patterns. From the example above with no Forecast, we might get a Forecast at the day perspective if we had greatly expanded that date range to expose a local seasonal pattern or a pattern that was given too much consideration by Insight.

Attentive users may have noticed that despite our examples above *including* April, we see the first data points start on May 24th. Insight *will not* render or include Null data that does not explicitly exist as a zero count in the data. A real world reason why the individual assigned to Extension 332 didn't have any calls until near the end of May would be a mistake on our account of not knowing that individual had just started working at the organization at the end of May. Naturally this would mean no data prior to the individual's start date would exist.



While the example above uses **explicit date ranges**, Forecasts also work with relative dates/times provided the zoom level is set appropriately on the date/time field and that the relative date/time interval is sufficiently large enough to generate the Forecast.

When utilizing Forecasts, approach the data with an open mind and a curiosity regarding why the data is - you might find interesting occurrences or patterns you might otherwise not have considered!

### Last Considerations of Forecasts

Forecasts can be very powerful and useful, but NocTel Insight itself is *not* a statistical engine so its statistical models and considerations are relatively rudimentary compared to full fledged engines and services with this primary focus.

If you require more detailed and powerful statistical analysis on NocTel service data for your account, we recommend you export the data in the finest granularity available and process it in a separate engine or application suited for the purpose.