

Developers Manual:

What problem our project solves?

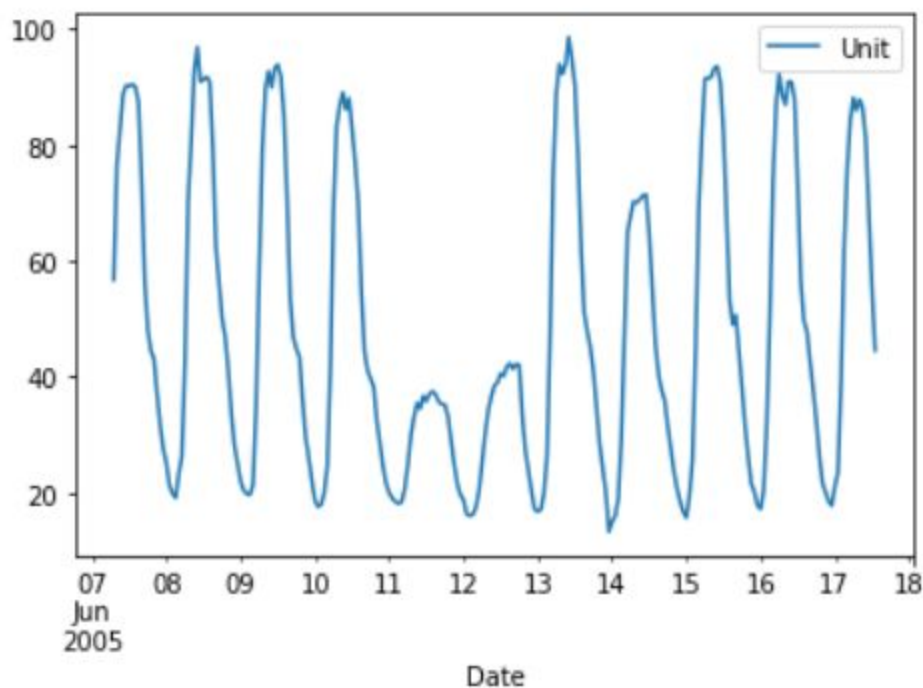
Errors like server crash, application volume overflow occurs during network operations. Currently these errors occur and then someone is assigned to look after it. That's a reactive approach to solve the problem. Our idea takes a proactive action that prevents the happening of any kind of such error. It is completely based on the past data and the patterns in it.

How it does?

1. **Descriptive Analysis:** Analyzing data like network data, billing data, server data and looking for errors or exceptions that occurred.
2. **Diagnostic Analysis:** Analyzing data and identifying reasons behind the occurrence of the errors or exceptions.
3. **Predictive Analysis:** Building a model that can predict the chances of occurring of an exception or error.
4. **Prescriptive Analysis:** This step takes the proactive action once error is predicted so it does not occur in future. Since the reasons are known for the occurrence of an error we just have to prevent the cause from occurring.

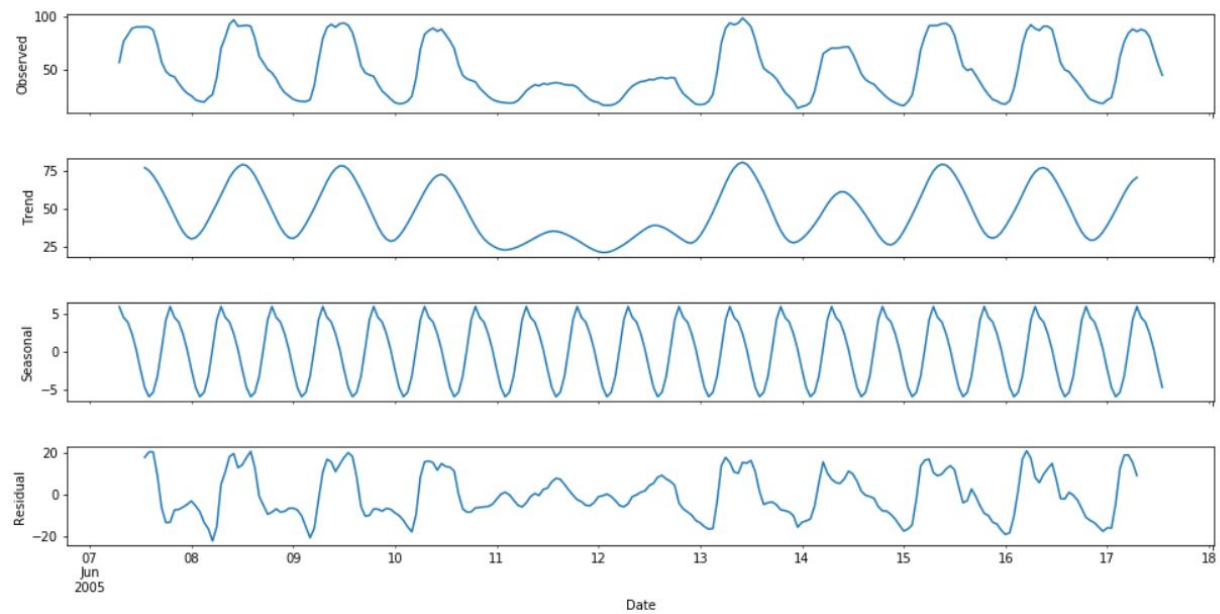
Like consider the case of Server crash due to overload at particular time in a day. What our project does is analysis the past data of each server's usage and predicts usage for the future by building a **Time Series model** . Time series is also used in stock market to predict the stocks. Suppose there are 5 servers and our model predicts that in the next hour server 2's usage will exceed (so it will crash) and it also predicts that server 5's usage will be 30% at that time . Our model will **prescribe (proactive action)** to move more processes to server 5 compared to server 2. This way server crash during the network operations can be prevented.

Time Series forecasting on server data:



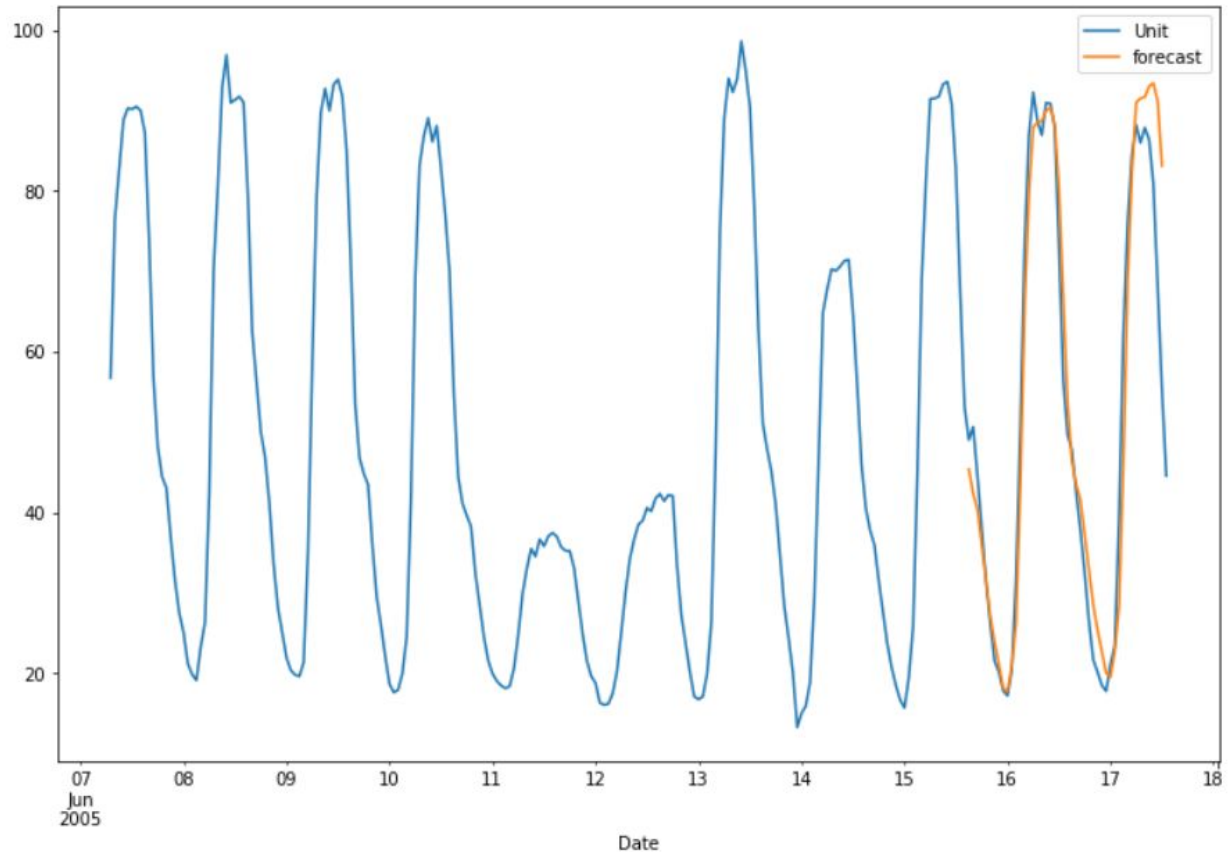
Server data on which time series forecasting was applied.

Decomposing data into trends, seasons and residue.



Making predictions based on SARIMA model :

There are varieties of model namely AR(Autoregressive), MA(Moving Averages), ARIMA and SARIMA. Our project has used SARIMA model to make the predictions for the server usage and is shown in the following figure:



Idea Simulation :

Done using html, css and javascript. But it used the time series model that was established.

Code Links:

<https://github.com/itsabhijeet/Server-usage> contains code for simulation as well as time series model python notebook.