The project aimed to improve the accuracy of Engineer Hours forecasts for each region inside the UK produced by the Supply Translation team of British Sky Broadcasting (BSkyB).

Due to increasing competition in the pay TV market, accurate forecasting of engineer hours is crucial, since it influences staffing policy and the ability to meet customer demand.

Challenge Overview
BSkyB is the largest pay-TV broadcasting company in the UK and Ireland offering services to more than 10 million customers. However, the forecasting method used by BSkyB is time-consuming because it is conducted manually. The company uses simple forecasting models, which do not capture seasonal patterns. This affects the accuracy of their forecasting of engineer hours.

One possible route to improvement was to investigate whether applying hierarchical methods of forecasting could outperform the current forecasting technique used in the company. Another goal was to develop an automatic model which could simplify forecasting procedures in future.

Solving the Problem
The first step of the analysis was data exploration and preparation which implied recognition of the main patterns and issues with the company’s data. This step also included applying the same format to all datasets that then allows automated model building.

The second step included consideration of main hierarchical methods of forecasting, such as ‘bottom-up’, ‘top-down’, ‘middle-out’ and ‘optimal combination’ which use different direct forecasting models (e.g. naïve, ARIMA, etc) as baseline forecasts. Two hierarchies were analysed: based on regions and based on regions and customer types. Besides, two hybrid models based on the current forecasting method of BSkyB were built.

The final step was to perform accuracy comparisons and determine the best way to improve forecast accuracy.

The project was carried out by using R and Microsoft Excel.

Results and Achievements
It was found that applying hierarchical model based on regions significantly improves the accuracy of forecasts. In this case, the top-down approach with historical proportions, which uses combination model to get baseline forecasts, demonstrated the highest accuracy. This combination model consisted of exponential smoothing, ARIMA and regression models.

The suggested model increases the forecasting accuracy by more than five percentage points over the current solution in place at BSkyB.

Code in R, required for automation of the forecasting process, was provided along with a guideline how to use simplified version of the suggested model in Microsoft Excel.