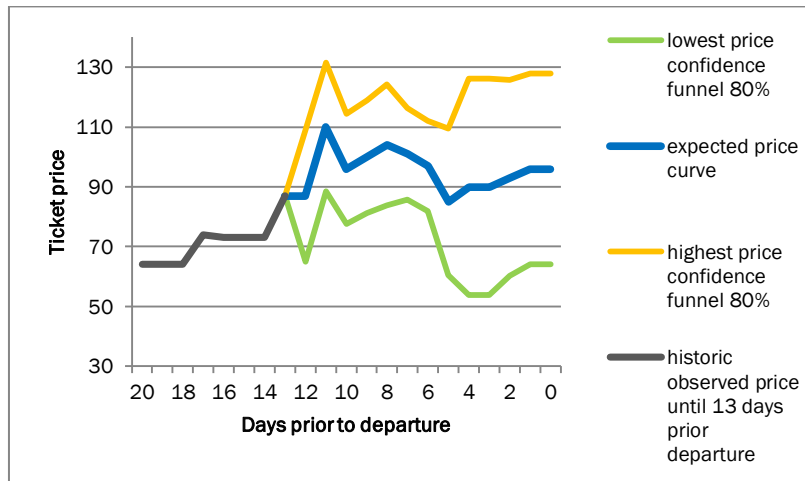


Price Curve Prediction

We predict future price curves! As shown in the example chart below, we have historic prices of a certain flight until 13 days before departure and based on historic data patterns we can compute a forecast of the remaining price curve with probability confidence bounds.



Note that the relatively short future horizon of 13 days is only for the example; but based on data availability, we can of course provide forecasts for multiple weeks/months in advance.

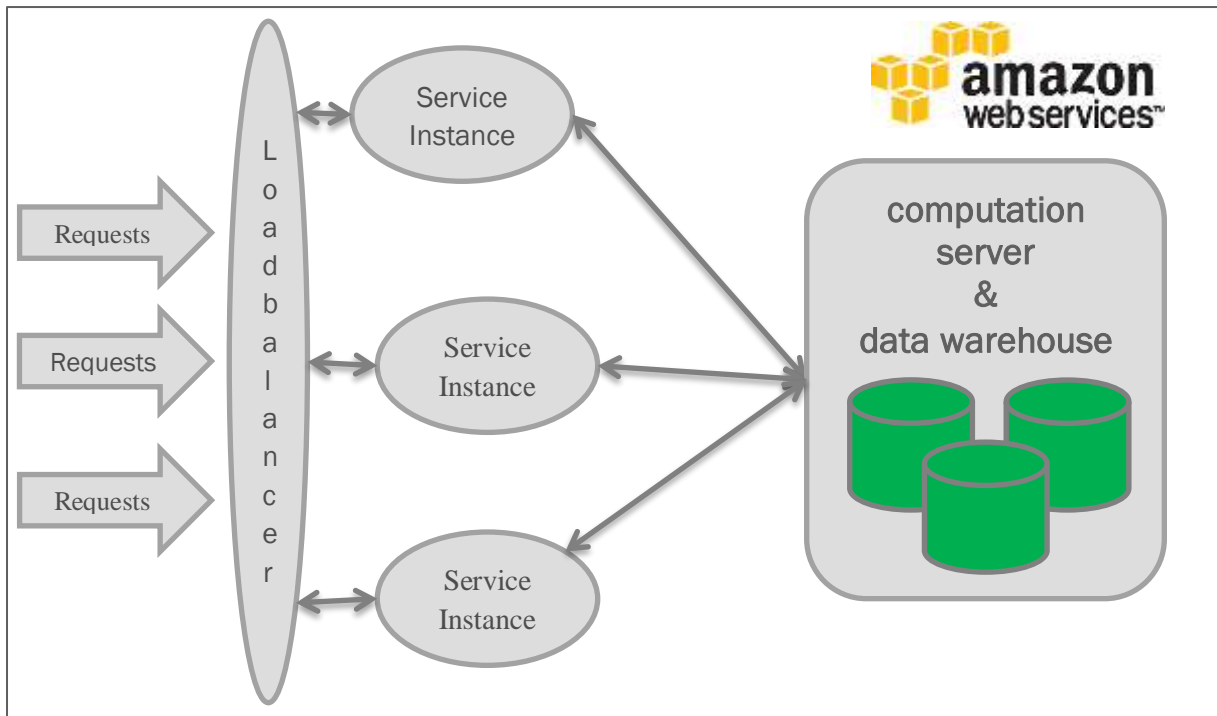
Introduction

Airline ticket prices are very volatile, similar to the financial stock prices. But in contrary to the stock market, prices of flight tickets or similar commodities are mostly resulting from very advanced revenue management algorithms computed by the companies or are set manually by yield management analyst based on his or her gut feeling, experience and the market information provided. In any case the pricing decision of a single product is made by rational and structured controls, which are based on provided information such as: historical booking & price patterns of similar products, competitor prices, available capacity and the demand forecast.

- ⇒ **This means that future price curves can be predicted with a high accuracy!**
- ⇒ **We are providing accurate price forecasts for each day in the remaining booking horizon.**

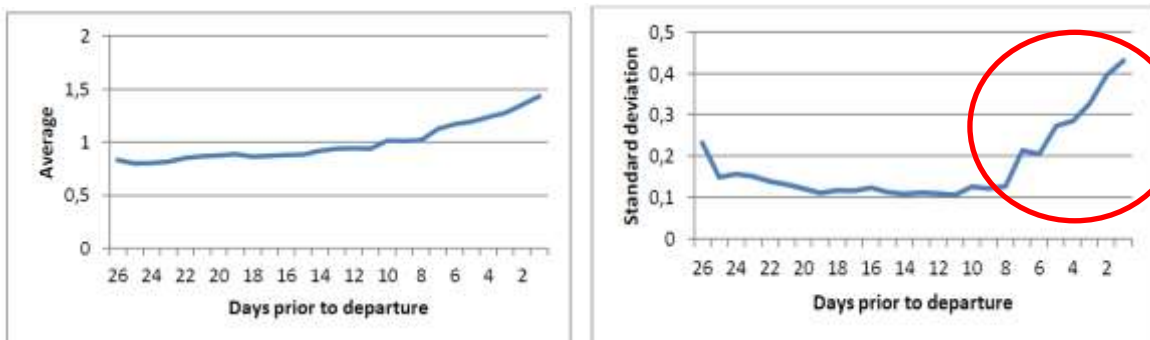
Current System

We have developed a scalable and self-learning forecasting system as a web-service. The current system is running on the Amazon WebServices (AWS) cloud. The system collects ticket price data and stores them into an internal data warehouse. We further apply different data-mining and prediction algorithms to provide raw forecast data for the service instances. Using this input, the service instances can very fast compute (within 10 ms) the forecast of the future expected price curve and the corresponding confidence bounds.



Analytics Background

Already a brief analysis on price curves, see below charts with normalized prices, show that generally the price of a ticket increases towards departure of the plane; this is also assumed by many customers, i.e. 'early booking saves money'. But that is often not true! In fact, as the right chart with the standard deviation shows, the uncertainty in the prices is quite high especially towards the end of the booking horizon.



This is not surprising at all, since from the airline's perspective every empty seat on a flight means costs. So the airlines and their pricing algorithms try to maximize the revenue and the capacity utilization. Prices are set based on demand forecasts, but no forecast is 100% correct, so prices are adjusted to demand realizations and updated forecasts. Also most bookings happen close to the end of the booking horizon; this even intensifies the price volatility.

The combination of statistical methods and machine learning algorithms enables us to compute very accurate price curve predictions.