



Inventory Modelling by ITC Infotech

Oct 27-2021



Simulation based inventory modelling for food manufacturing company

Snapshot

Client

An American multinational manufacturer and marketer of branded consumer foods

Industry

Consumer Product Goods

Capability Demonstrated

- Optimization of number of days of internal shelf life ensuring
 - Maximum service level
 - Minimum obsolescence

Client

- ✓ A global food manufacturing company

Business Problem and engagement context

- ✓ Company needed to find the correct internal shelf-life factor which so far had been done based on thumb rule and there was no science/ analytics behind the rule
- ✓ Improve customer service level
- ✓ Minimize obsolescence of products

Our Solution

Optimization of shelf-life factor ensuring maximum service level and minimizing product obsolescence

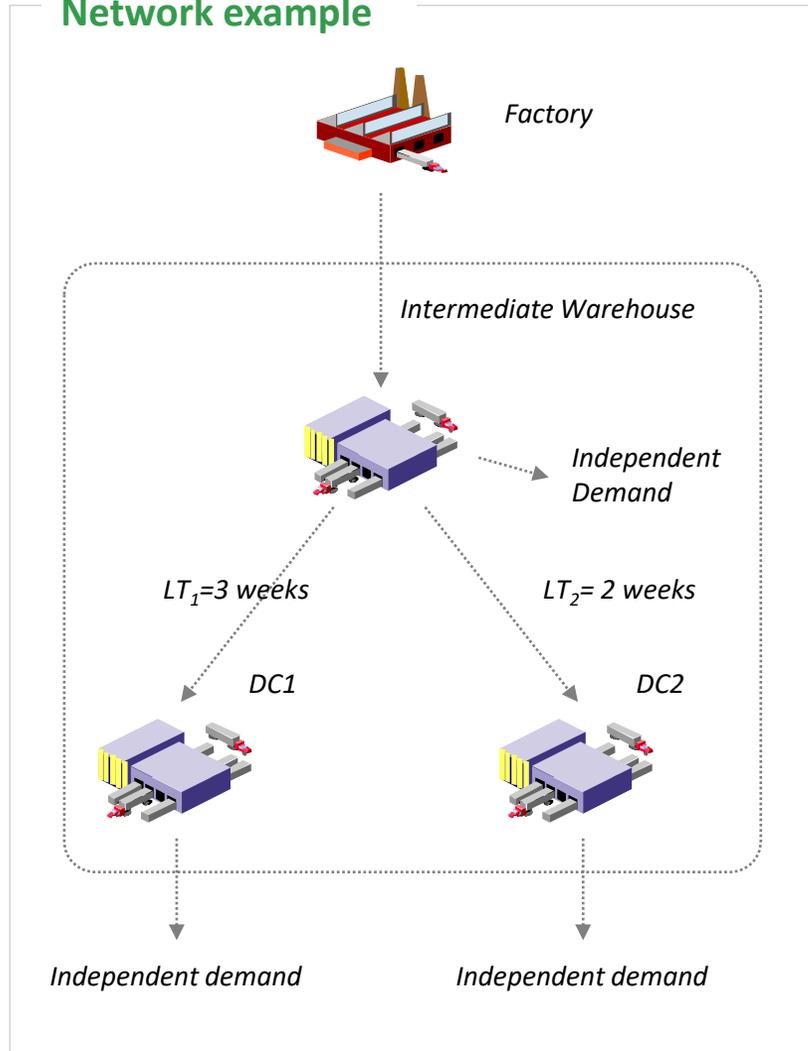
- ✓ Simulation based optimization model to find the factor by which the internal shelf life to be maintained
- ✓ Model will build decision which can avoid product aging/obsolescence that may arise due to over forecast, demand softness etc.
- ✓ Simulation will provide the optimum replenishment and or production frequency to maximize fill rate minimizing wastage

Benefits

- Correct shelf-life factor would help in better pre-build decision
- Better capacity planning hence improved customer service

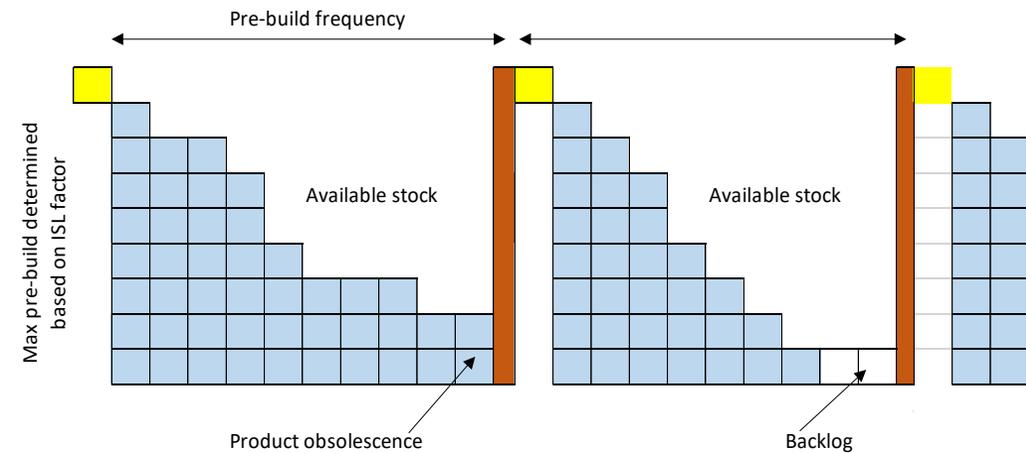
Multi Echelon Inventory Modelling

Network example



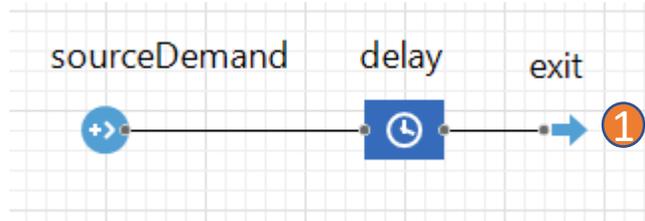
Objective

Combining simulation and optimization to determine inventory norms for a complex multi-echelon distribution network with limited shelf-life of products

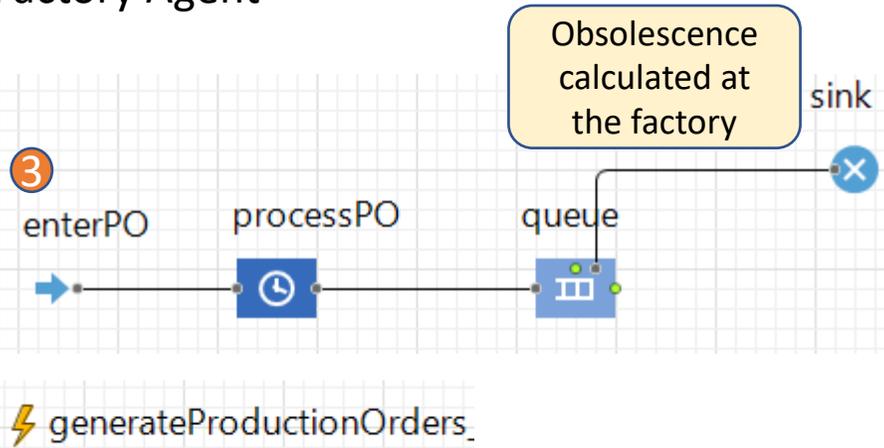


Model Details

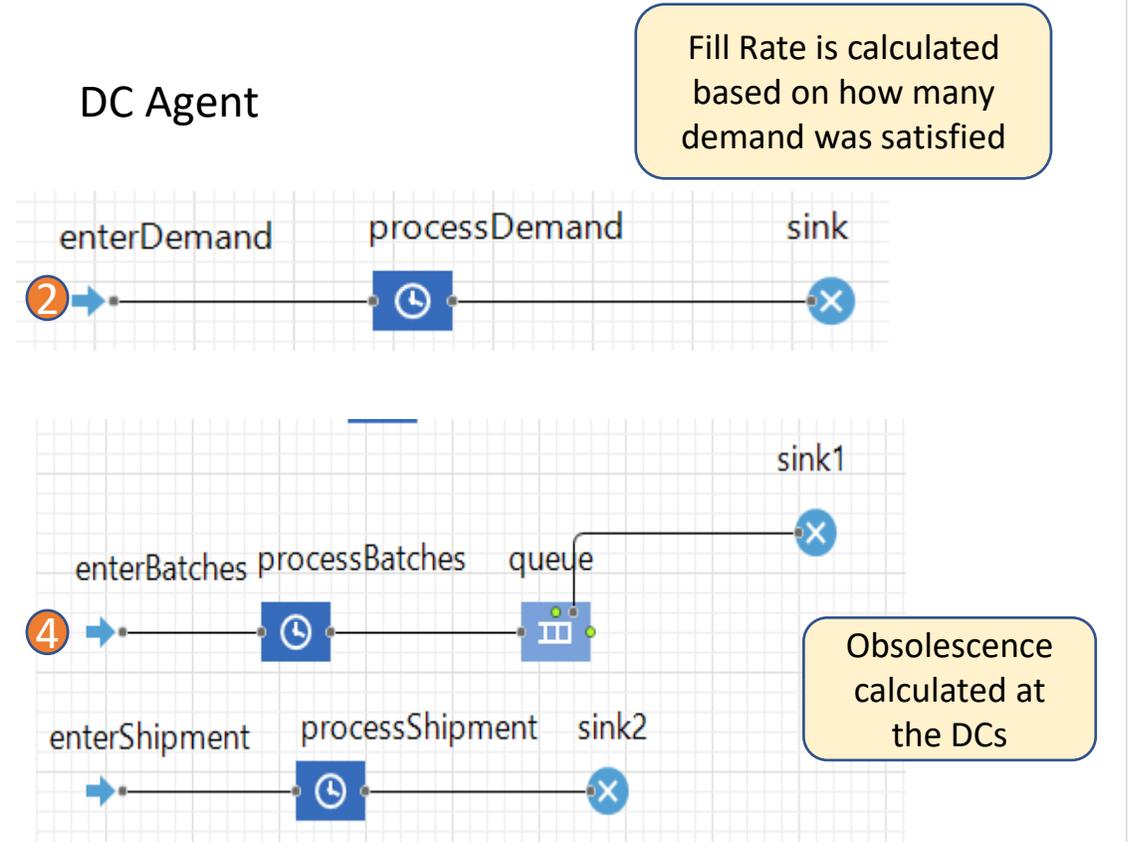
Main Agent



Factory Agent



DC Agent

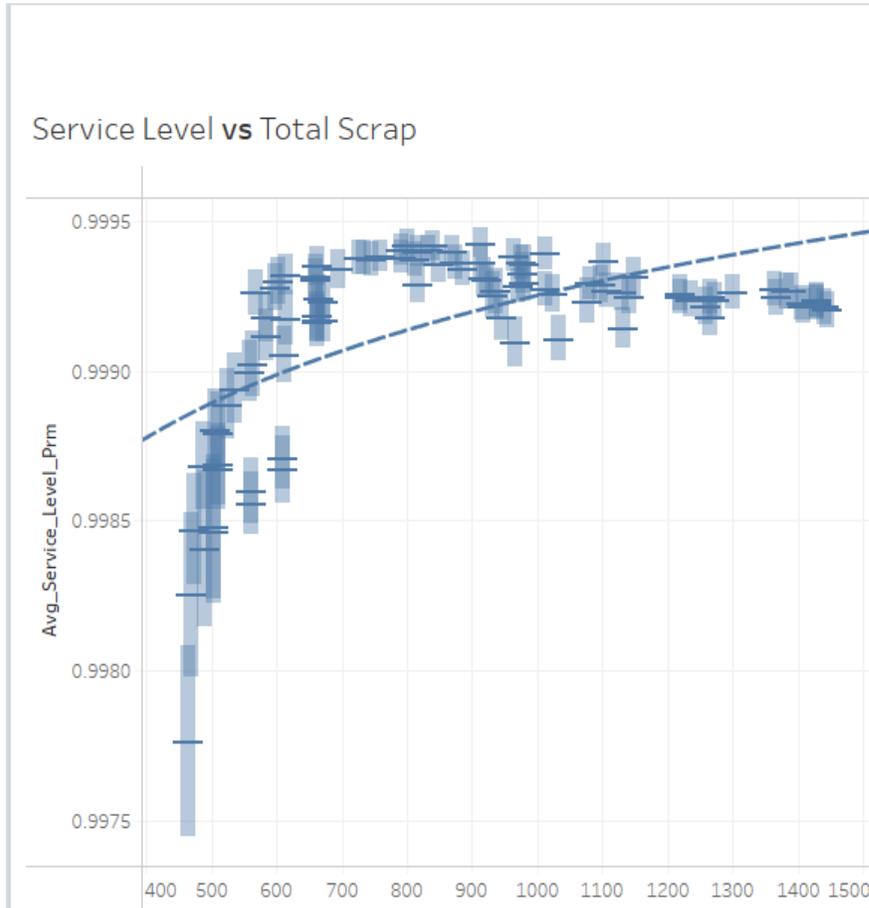


Output Data

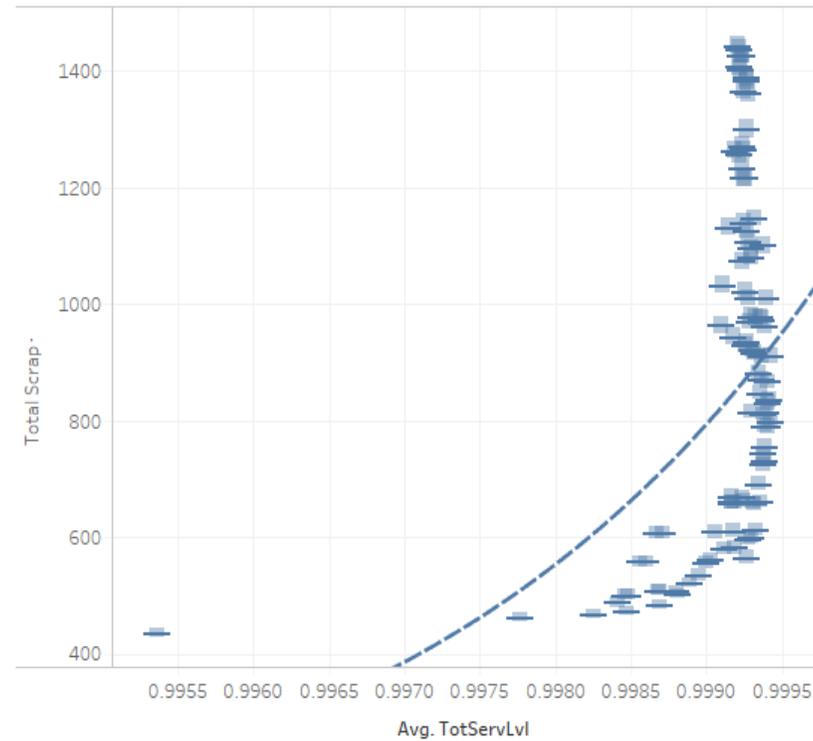
- We ran 100 iterations for each of the shelf life factors
- We see that as the shelf-life factor increases, the fill rate improves. However, we see that the obsolescence also increases
- This is obvious as increasing shelf-life factor means increase in production which will ensure better service level but will increase risk of obsolescence
- So, we plotted the trade off curve between fill rate and obsolescence to let the business take a decision on which shelf-life planning factor to choose which will determine the quantity of production

iteration num	sku id	planning factor	obsolescence	fill rate
1	10614000	0.5	0	99.55
2	10614000	0.6	10720.82	99.57
3	10614000	0.7	17132.76	99.57
4	10614000	0.8	23107.56	99.78
5	10614000	0.9	33777.45	99.86

Output : Service level vs obsolescence tradeoff



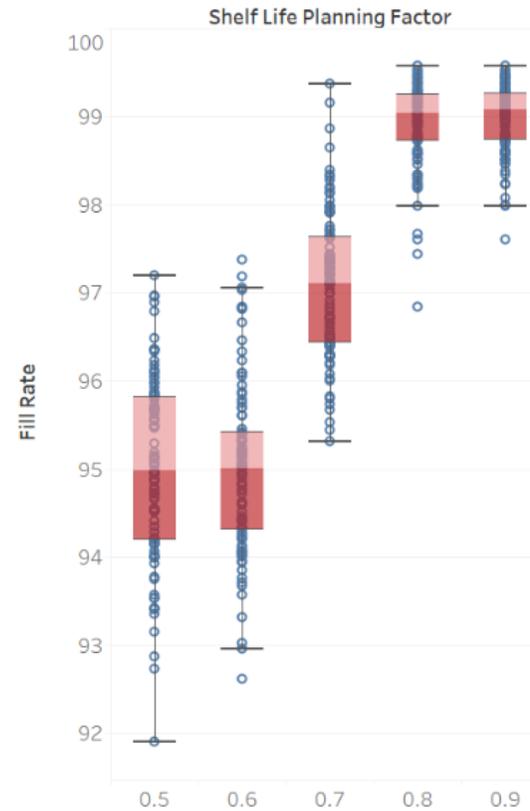
Service Level vs Total Scrap



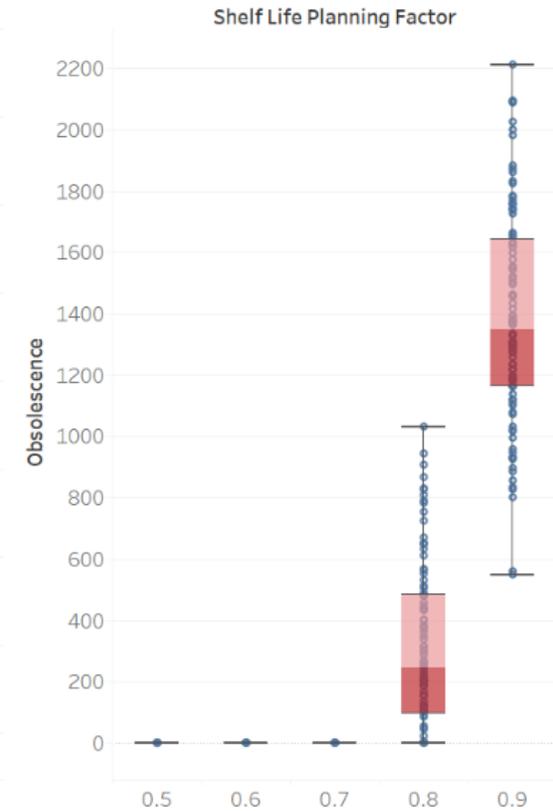
Output: Contd.

We also provided the spread of the value obtained over the 100 iterations for each of the shelf-life planning factors as can be seen on the right-side of this diagram which will help business to come to a decision of the optimum shelf-life planning factor they want to choose

ISL_vs_Service level



ISL_vs_Obsolence



Thank You