

Logistics optimization of a shipping network



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Introduction

New Frontier Solutions Pte. Ltd. (NFS) is a management resultant firm. The word resultant embodies the nature of our firm: a result-driven company specializing in planning/scheduling, managing the execution and providing logistics project management tools with an emphasis on logistics in complex situations, such as oil rig movements under extreme situations and large passenger shipping networks.

Shipping networks

Logistics for shipping networks can be very complex. One should take into account what the demand of the passengers is, how then to match a shipping network to that, and which vessels to deploy on which routes. In addition, the vessels need to be scheduled for maintenance, while the company should minimize this impact on schedule execution. Adding to that, these complex decisions should be made while keeping in mind how the company can minimize its costs.

Case studies Passenger shipment

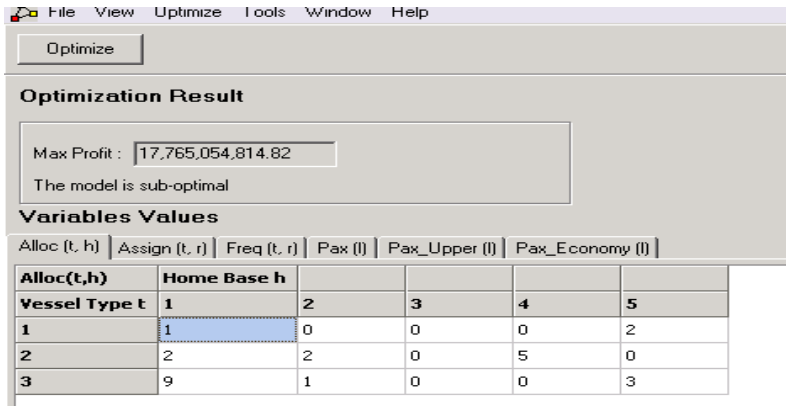
A large consulting firm in Indonesia was advising their client, a passenger shipping firm, on the best shipping network to meet all passenger travel demand and simultaneously to minimize costs. New Frontier Solutions consultants developed a logistics model that allowed the client to determine

1. Which routes to include in the commercial network of the shipping firm;
2. Which ports to be used for harboring the vessels for maintenance
3. Time-tables to meet the passenger demand



Using advanced mathematics, we were able not only to calculate the best solution for the Client, but also to simulate “WHAT-IF” scenarios. These “WHAT-IF” scenarios prepared the client in their operations by knowing which decisions to make in case of increased fuel price, decreasing passenger demand and other unforeseen factors. Moreover, the client was able to make such strategic decisions, as which vessel type should be purchased in the future to maximize its net present value, given the anticipated passenger demand and fuel prices.

The model was translated into a Decision Support System that allows for periodical studies. For



Optimization Result

Max Profit : 17,765,054,814.82
The model is sub-optimal

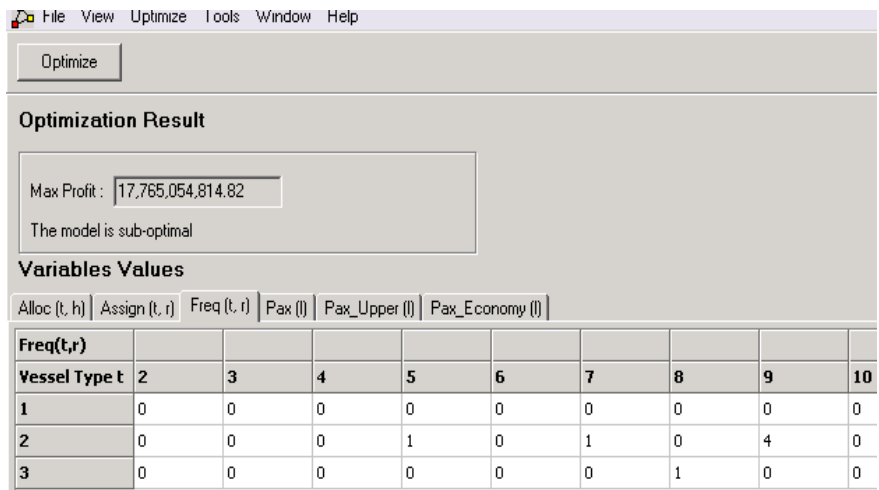
Variables Values

Alloc (t, h) | Assign (t, r) | Freq (t, r) | Pax (l) | Pax_Upper (l) | Pax_Economy (l)

Alloc(t,h)	Home Base h	1	2	3	4	5
Vessel Type t	1	1	0	0	0	2
1	1	0	0	0	0	2
2	2	2	0	0	5	0
3	9	1	0	0	0	3

example: the left screen shows that Location 1 should harbor 9 vessels with a capacity of 2000 passengers (vessel type 3). For each port, the optimal solution is calculated.

On the left side, it is seen that route number 2 (should be eliminated from the network). This insight allowed the client to significantly reduce costs, while still being able to re-route the passengers. A requirement from the client was that the alternative route should not increase the travel time. Such constraints can be adopted in the logistics model.



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Alloc (t, h) | Assign (t, r) | Freq (t, r) | Pax (l) | Pax_Upper (l) | Pax_Economy (l)

Freq(t,r)	2	3	4	5	6	7	8	9	10
Vessel Type t	2	3	4	5	6	7	8	9	10
1	0	0	0	0	0	0	0	0	0
2	0	0	0	1	0	1	0	4	0
3	0	0	0	0	0	0	1	0	0

New Frontier Solutions' services and work approach

NFS is in a position to assist you with solving complex logistics problems. Depending on your organization and specific needs a customized solution will be offered. Our work approach is to carry out a 10-day assessment, followed by a workshop. During the assessment, we will discuss the needs and present a project approach during the workshop. Depending on the results of the assessment-workshop, a commercial proposal will be provided that may include offerings of systems and/or consulting services.

If you are interested to know more, contact one of our representatives at one of the below offices:

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