

Your first job as the Logistics analyst supports the new VP of Supply Chain Logistics at CheckSum Electronics. Your objectives in the first 180 days include developing a strategy to rationalize the logistics and supply chain network and identify savings opportunities for the corporation that can be implemented over the next 24 months.

Over the years due to the growth in e-commerce and competition, the pattern of orders has changed, and the new shipment pattern is shown below, with 50% of the load being next day delivery service.

Area	New daily tons	Old daily tons
New York, NY	75000	23000
Atlanta, GA	115000	65000
San Francisco	85000	105000
Houston, TX area	69000	45000
Chicago, IL	95000	105000

Warehouse footprint and logistics:

The current warehouse footprint of the company includes 10 locations across the country. With 80% of the shipment being air freight from all the locations except Lebanon, KS which is 100% truck shipments. The company has access to third-party logistics providers (3PL) that have the ability to provide air freight and truck shipments from each of the locations. Average inventory held at the warehouse is 50% of the warehouse capacity, and holding costs are \$1/ton. In addition to transport costs all material transported through the warehouse incurs additional handling costs shown on the table. Within your budget you have the ability to expand one warehouse to a maximum capacity of 100,000 tons at a cost of \$5/ton.

Next day delivery via truck is only possible where the warehouse location from customers is 24 hours or less. Whereas, next day delivery by air is possible to all locations within the continental US. Truck routes only exist where the distance between the locations can be covered in 24 hours or less (Assume average truck speed is 55 mph). Rail transportation and intermodal is not currently under consideration by the company.

Your report to the VP of Supply Chain Logistics should at minimum include a discussion of the following:

1. Your recommendation of the 24-hour delivery network. Network matrix diagram(s), cost (\$/ton) along links (without warehouse expansion), mode of transport.
2. What is the minimum number of warehouses needed to meet all the 24-hour delivery demand and what is the cost (without expansion)?
3. What is the minimum number of warehouses needed to meet the total demand and what is the total cost (without expansion)?
4. Are there any constrained warehouses (i.e at maximum capacity) which are they?
5. Do you recommend that they expand any? Which one and why? What other opportunities might exist?
6. What non-financial considerations need to be taken into account?
7. Are there any savings to be realized from inventory pooling?

Location	Zipcode	Warehouse Capacity (tons)	Warehouse handling \$/ton
Pomona, CA	91768	125000	10
Reno, NV	89501	100000	6.5
Casper, WY	82601	75000	4.25
Dallas, TX	75201	75000	8
Lebanon, KS	66952	50000	4.25
Little Rock, AR	72201	75000	5.5
Denver, CO	80201	50000	8
Eugene, OR	97401	100000	7
Albuquerque, NM	87107	50000	6.5
Cedar Rapids, IA	52401	50000	5.5

The costs per ton-mile are as follows

Truck	\$ 0.37
Rail	\$ 0.03
Air	\$4.63
Water	\$0.1