

# HSLU: Data-driven Supply Chain Management and Logistics

Group assignment „Network modelling“

Lucerne, October 2025

# Case study introduction

Our customer is a US based technology company. Until now, the company has shipped products directly from suppliers to customers, located in 17 different US States. Shipments are tendered to logistics service providers (LSPs) without consolidation using mostly less-than-truckload (LTL) services.

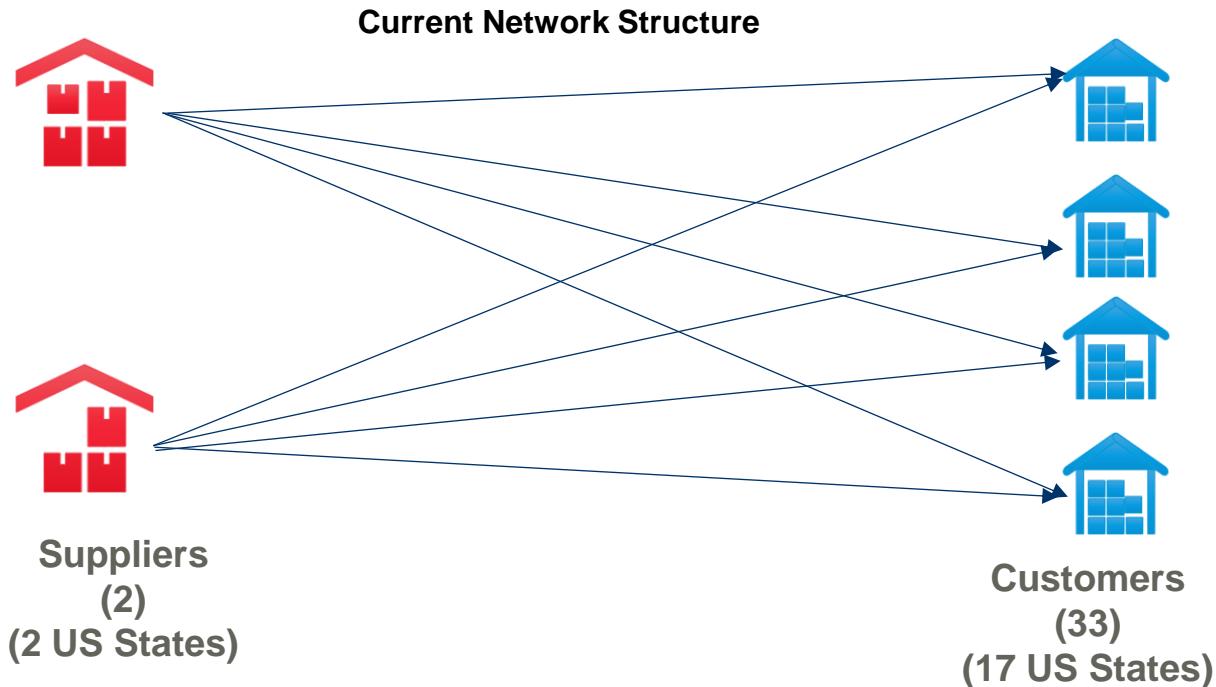
The company would like to evaluate the benefits of routing shipments from its suppliers to customers via a cross-dock and thus increase consolidation.

Your task is to determine the cost of the as-is network, to model a revised network in line with customer expectations and to determine the cost advantage of this network. In addition, you will need to identify additional, qualitative impacts of the proposed network adjustment (lead-times, reliability, risk etc.).

Your case concludes with a clear proposal to company management considering advantages and disadvantages of the updated network.



# Case Study- Stalmart Inc.



## Input

1. "ShipmentData" has current network & shipment level information
2. For Part1: Greenfield Study, Distance, Cost (Fixed and variable) and Capacity related information is shared on "Part1\_Input"
3. For Part2 study, cost information is to be used from "Part2\_Input"

Stalmart Inc. is aiming to redesign their distribution network by introducing cross-docks. They have selected 5 potential locations, but they do not know how many and which ones to be used.

### 1. Part1: Greenfield Study

Identify optimal network structure (number and location of cross-docks) based on approximate total cost including

1. Transportation cost (to and from cross-dock)
2. Inventory processing cost at cross-dock
3. One-off set-up cost per cross-dock

### 2. Part2: Brownfield Study

Based on Part1 output, determine the actual total cost of the new network, considering the aspects listed below:

1. Shipment consolidation (from supplier to cross-dock and from cross-dock to customer, based on same-day shipment) and use of suitable mode (FTL vs. LTL)
2. Cost reduction in year 2 vs.year 1 since set-up cost missing
3. Comparison of to-be cost with current cost

### 3. Part3: General Questions (Qualitative)

1. Does the introduction of cross-docks affect service levels (lead times, on-time performance)?
2. If number of cross-docks to be increased, how would Inventory be affected?
3. What other supply chain areas (which are not mentioned explicitly) will be impacted & how

# Shipment data

## As-Is Shipments

ShipmentID	ShipDate	Origin Zip	Origin State	Origin	Destination	DestinationZip	DestinationState	Weight
1	02-Jan-23	30043	GA	GA30043	GA30303	30303	GA	420
2	02-Jan-23	30043	GA	GA30043	IN46228	46228	IN	730
3	02-Jan-23	30043	GA	GA30043	GA30303	30303	GA	690
4	02-Jan-23	30043	GA	GA30043	GA30303	30303	GA	1260
5	02-Jan-23	30043	GA	GA30043	CT6492	06492	CT	250
6	02-Jan-23	91720	CA	CA91720	GA30303	30303	GA	420
7	02-Jan-23	30043	GA	GA30043	CT6492	06492	CT	450
8	02-Jan-23	30043	GA	GA30043	GA30303	30303	GA	690
9	02-Jan-23	30043	GA	GA30043	FL32099	32099	FL	340
10	02-Jan-23	30043	GA	GA30043	GA30303	30303	GA	250
11	02-Jan-23	91720	CA	CA91720	GA30303	30303	GA	430
12	02-Jan-23	30043	GA	GA30043	IN46228	46228	IN	340
13	02-Jan-23	30043	GA	GA30043	GA30303	30303	GA	2150
14	02-Jan-23	30043	GA	GA30043	IN46228	46228	IN	1270
15	02-Jan-23	91720	CA	CA91720	MI48150	48150	MI	3810

# Part1\_Input

Distance in Km										Fixed Cost of Opening X-Dock (CAPEX)					
1 Supplier to Customer		2 Supplier to X-Dock		3 X-Dock to Customer		X-Dock					NC27695	\$ 9.900.000			
		Supplier		Supplier			NY10006	TX75477	GA30113	IL61849	NY10006	\$ 6.689.000			
		GA30043	CA91720	GA30043	CA91720						TX75477	\$ 8.820.000			
		GA30303	54	3.466	NC27695	575	4.058	GA30303	613	1.362	1.182	100	948	GA30113	\$ 10.820.000
Demand	GA30303	54	3.466		NC27695	575	4.058	GA30303	613	1.362	1.182	100	948	IL61849	\$ 7.820.000
	TX74134	1.302	2.276		NY10006	1.328	4.455	TX74134	1.841	2.156	332	1.166	953		
	IN46228	903	3.297	X-Dock	TX75477	1.238	2.320	IN46228	1.025	1.153	1.350	863	180		
	CT6492	1.474	4.591		GA30113	155	3.403	CT6492	933	152	2.529	1.612	1.470		
	TX78040	1.828	2.173		IL61849	977	3.222	TX78040	2.387	3.110	844	1.750	2.060		
	MO63101	923	2.897					MO63101	1.295	1.531	922	877	329		
	AL35020	314	3.240					AL35020	874	1.571	927	211	878		
	MI49120	1.146	3.345					MI49120	1.203	1.130	1.555	1.107	363		
	TX77001	1.325	2.419					TX77001	1.884	2.607	530	1.247	1.573		
	GA30005	38	3.509					GA30005	595	1.344	1.226	143	969		
	IL60164	1.156	3.191					IL60164	1.330	1.295	1.460	1.110	268		
	NC27602	569	4.057					NC27602	13	795	1.825	707	1.193		
	AL35040	328	3.279					AL35040	888	1.591	971	224	907		
	TX76102	1.366	2.186					TX76102	1.925	2.541	205	1.262	1.434		
	MS39501	695	3.057					MS39501	1.255	2.004	891	646	1.263		
	KY40391	623	3.552					KY40391	735	1.092	1.320	583	513		
	MI48150	1.182	3.607	Demand	MI48150	1.086	995	1.790	1.143	587					
	IN46224	900	3.287		IN46224	1.022	1.150	1.340	861	171					
	AL35601	380	3.156		AL35601	922	1.517	924	246	735					
	GA30026	14	3.509		GA30026	577	1.326	1.225	143	970					
	TN37201	432	3.192		TN37201	868	1.423	960	386	551					
	TN37912	380	3.481		TN37912	587	1.142	1.249	340	743					
	FL32099	579	3.801		FL32099	735	1.503	1.597	627	1.477					
	NC28739	263	3.691		NC28739	392	1.141	1.459	401	939					
	AL36867	226	3.404		AL36867	786	1.535	1.162	193	1.079					
	NY10007	1.328	4.454		NY10007	787	1	2.381	1.465	1.322					
	SC29501	452	3.932		SC29501	243	1.011	1.648	566	1.262					
	VA20170	944	4.231		VA20170	429	397	1.998	1.082	1.110					
	AR72113	904	2.625		AR72113	1.442	1.998	411	767	890					
	AR72703	1.187	2.441		AR72703	1.726	2.104	449	1.051	902					
	IL62702	1.066	3.072		IL62702	1.346	1.476	1.084	1.020	177					
	MO63026	957	2.869		MO63026	1.328	1.565	894	888	363					
	MO63089	990	2.835		MO63089	1.362	1.598	860	927	396					

Variable Cost- Inventory Processing Cost (per kg)	
X-Dock	NC27695 \$ 1,89
	NY10006 \$ 2,02
X-Dock	TX75477 \$ 1,75
	GA30113 \$ 1,25
	IL61849 \$ 1,75

Variable Cost- Transportation (per kg per km)	
	\$ 0,005

Capacity constraints	
Max capacity supplier	US30043 5.000.000
Capacity X-Docks is unlimited	

## Part2\_Input

LTL Rate Card (Per Kg per Km)						
Kilometers	Weight					
	Per Kg per Km					
	0-50	\$ 0.06	\$ 0.05	\$ 0.04	\$ 0.04	\$ 0.03
	50-250	\$ 0.06	\$ 0.05	\$ 0.04	\$ 0.03	\$ 0.03
	250-500	\$ 0.05	\$ 0.05	\$ 0.04	\$ 0.03	\$ 0.03
	500-1000	\$ 0.05	\$ 0.04	\$ 0.04	\$ 0.03	\$ 0.03
	1000-1500	\$ 0.05	\$ 0.04	\$ 0.03	\$ 0.03	\$ 0.03
>1500	\$ 0.05	\$ 0.04	\$ 0.03	\$ 0.03	\$ 0.03	\$ 0.02

FTL Rate Card	
\$ 1.00	per Truck per Km.

*If weight of shipment is 75% utilized, it can be sent via FTL*

FTL Capacity: 7000kg
5250

\*if Distance related information needed, can be used from "Part1\_Input" sheet

# Case study deliverables

- Presentation of as-is network
  - Visualization of network structure
  - Descriptive statistics of shipment structure
  - As-is cost
- Presentation of proposed adjusted network
  - Visualization of network structure and key changes vs. as-is network
  - Descriptive statistics of shipment structure
  - To-be cost
- Recommendation towards company management regarding adjusted network considering
  - Financial aspects
  - Qualitative aspects

Scope group of 2



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