



Delaware Valley Goods Movement

Task Force Delaware Valley Regional Planning Commission

January 2004



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Research and Career...Transportation...

- South Shore Railroad, Indiana
- US Navy (Reserve)
- MBA, Transportation & Logistics, University of Tennessee
- Burlington Northern Railroad – Operations; Strategic Planning; VP Marketing & Sales (Intermodal; Automotive & Machinery; Forest Products)
- Ph.D. Transportation & Logistics, University of Tennessee
- Smith School of Business, University of Maryland – Transportation Courses; International Trips
- Intermodal Freight Transportation, 5th Edition (co-author with Gerhardt Muller, US Merchant Marine Academy)



Cut Flowers Imported from Chile

(7.1 million stems)



The Central Region

- Fertile Land:
 - The Central region encompasses the country's vineyards and land used to grow flowers and fruit.
- Economic & Cultural Hub:
 - Santiago, Valparaiso, Concepcion



La Moneda Palace

Top Imported Flowers

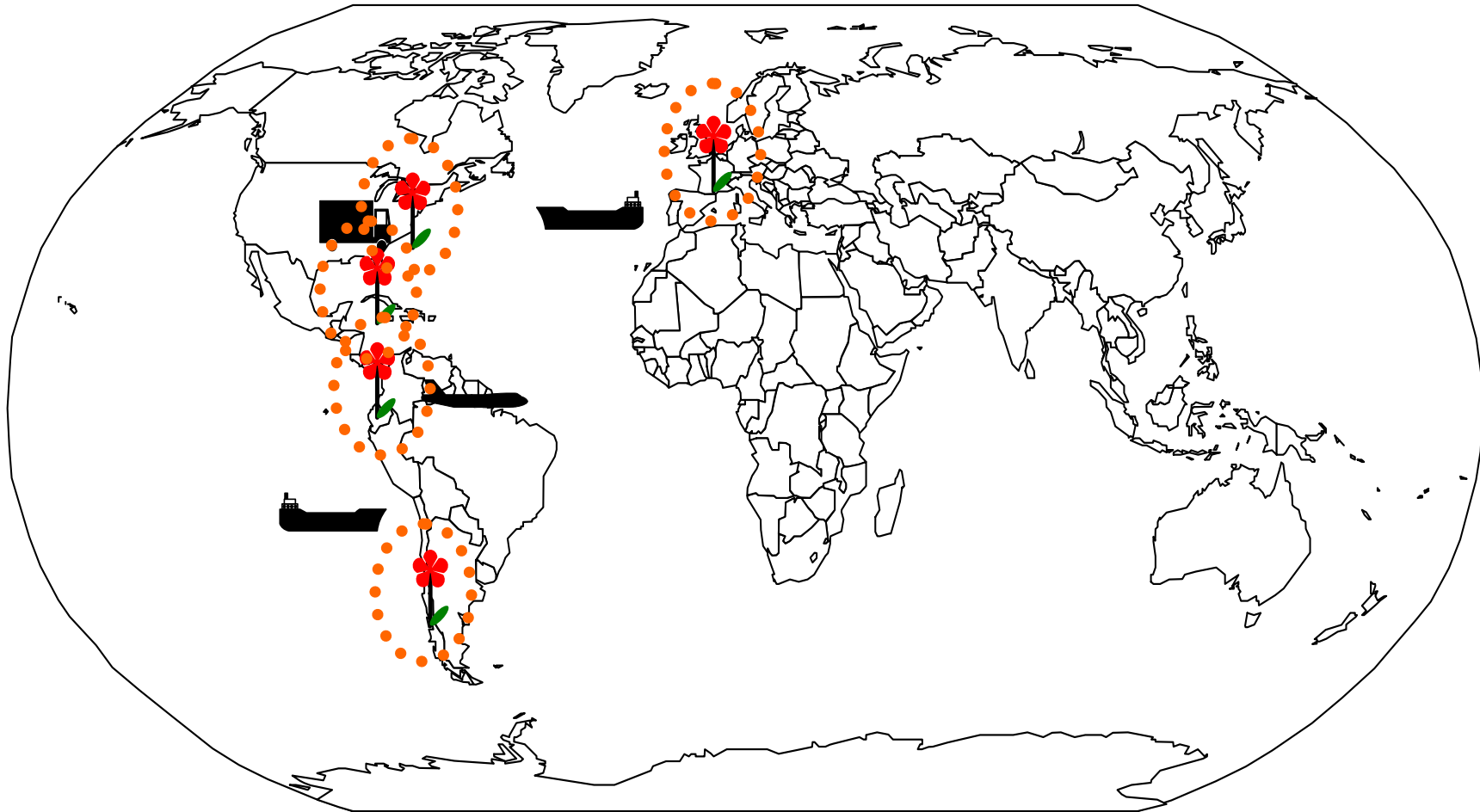
Lilies – 5 million



Tulips – 2 million



So Now... What do the Netherlands, Panama, Chile and Miami Have to Do With Flowers for Mother's Day?...



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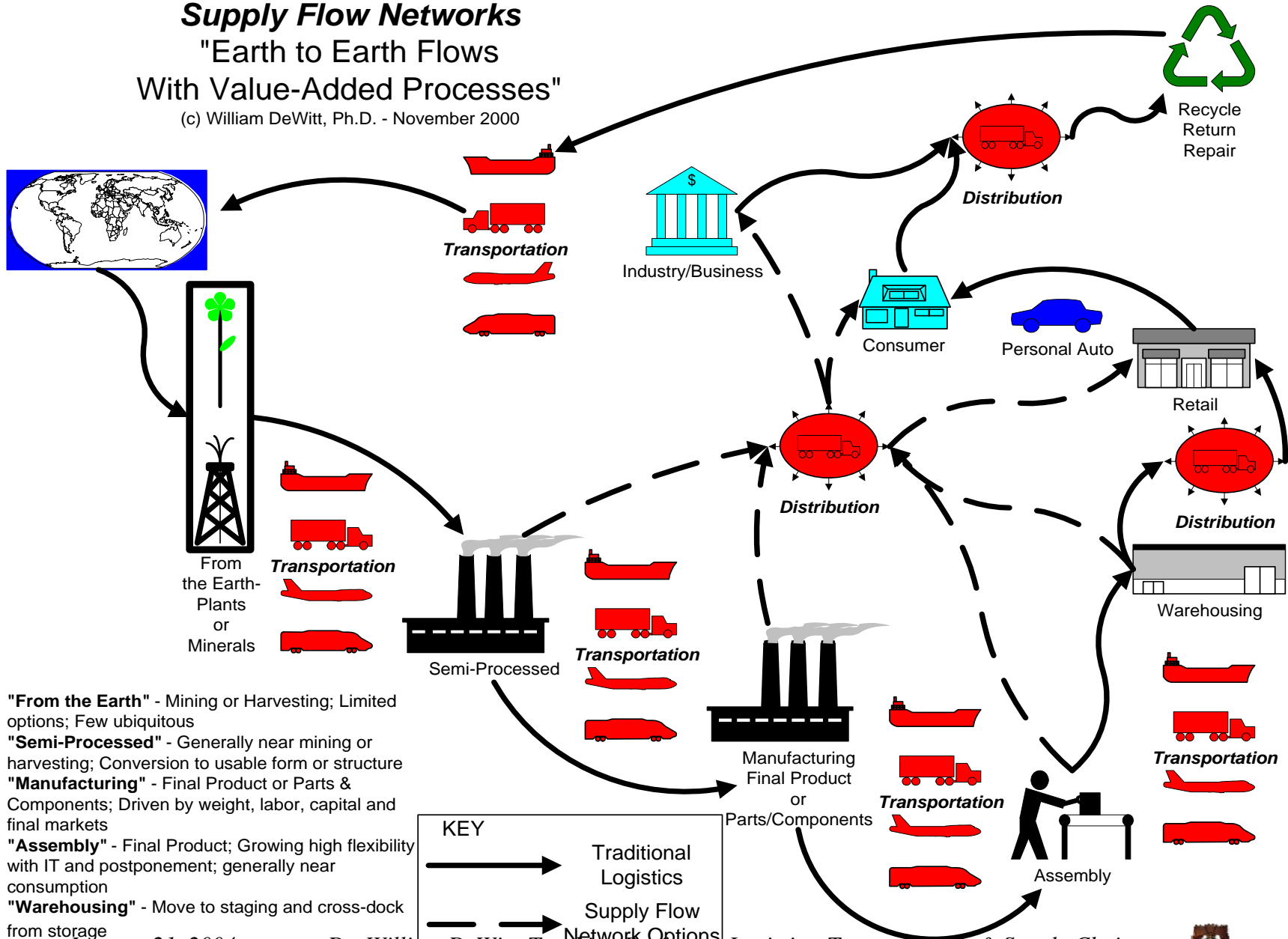
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Supply Flow Networks

"Earth to Earth Flows With Value-Added Processes"

(c) William DeWitt, Ph.D. - November 2000



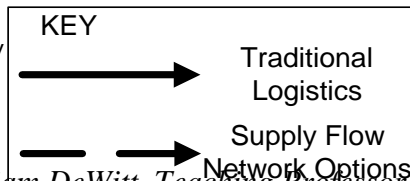
"From the Earth" - Mining or Harvesting; Limited options; Few ubiquitous

"Semi-Processed" - Generally near mining or harvesting; Conversion to usable form or structure

"Manufacturing" - Final Product or Parts & Components; Driven by weight, labor, capital and final markets

"Assembly" - Final Product; Growing high flexibility with IT and postponement; generally near consumption

"Warehousing" - Move to staging and cross-dock from storage



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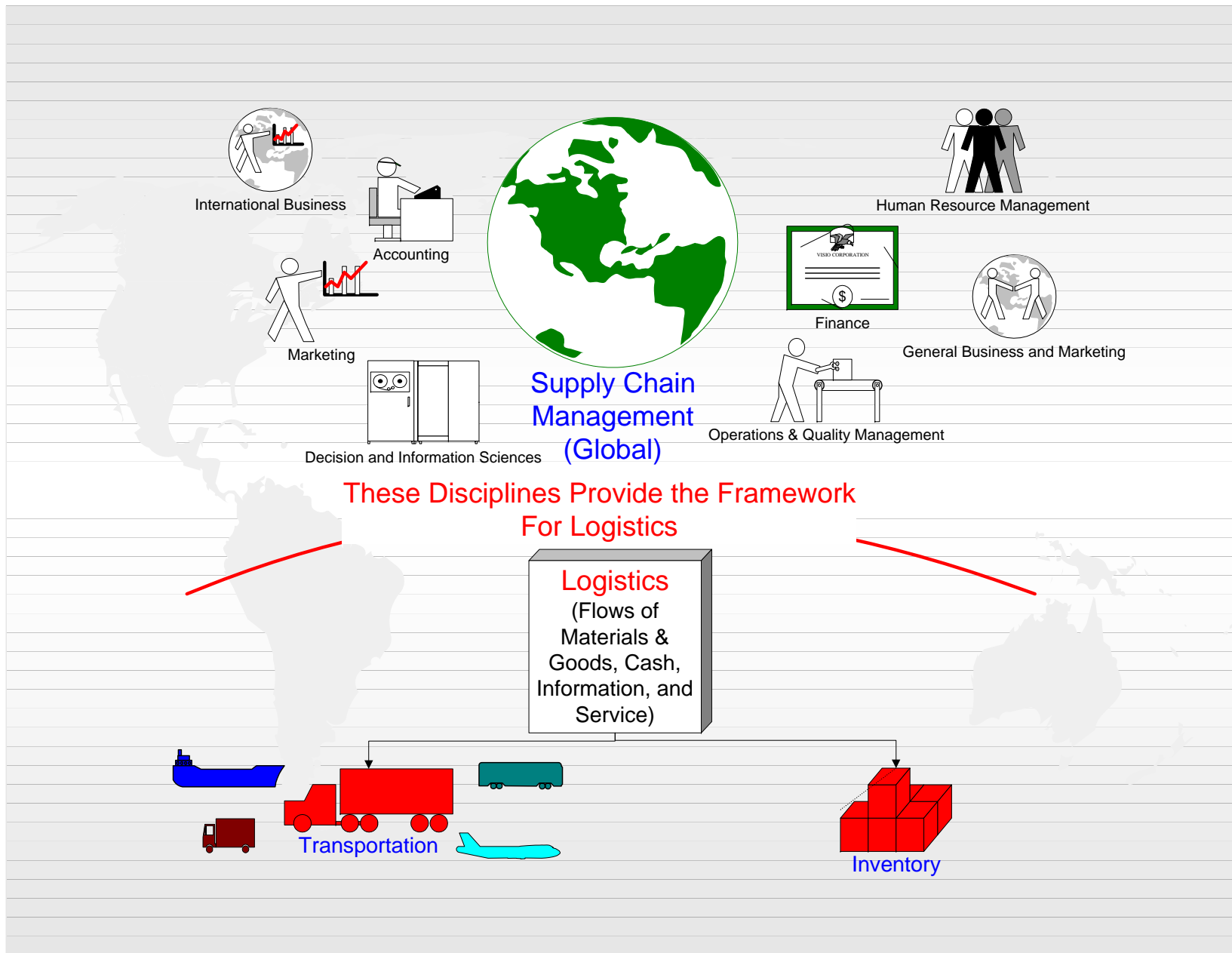
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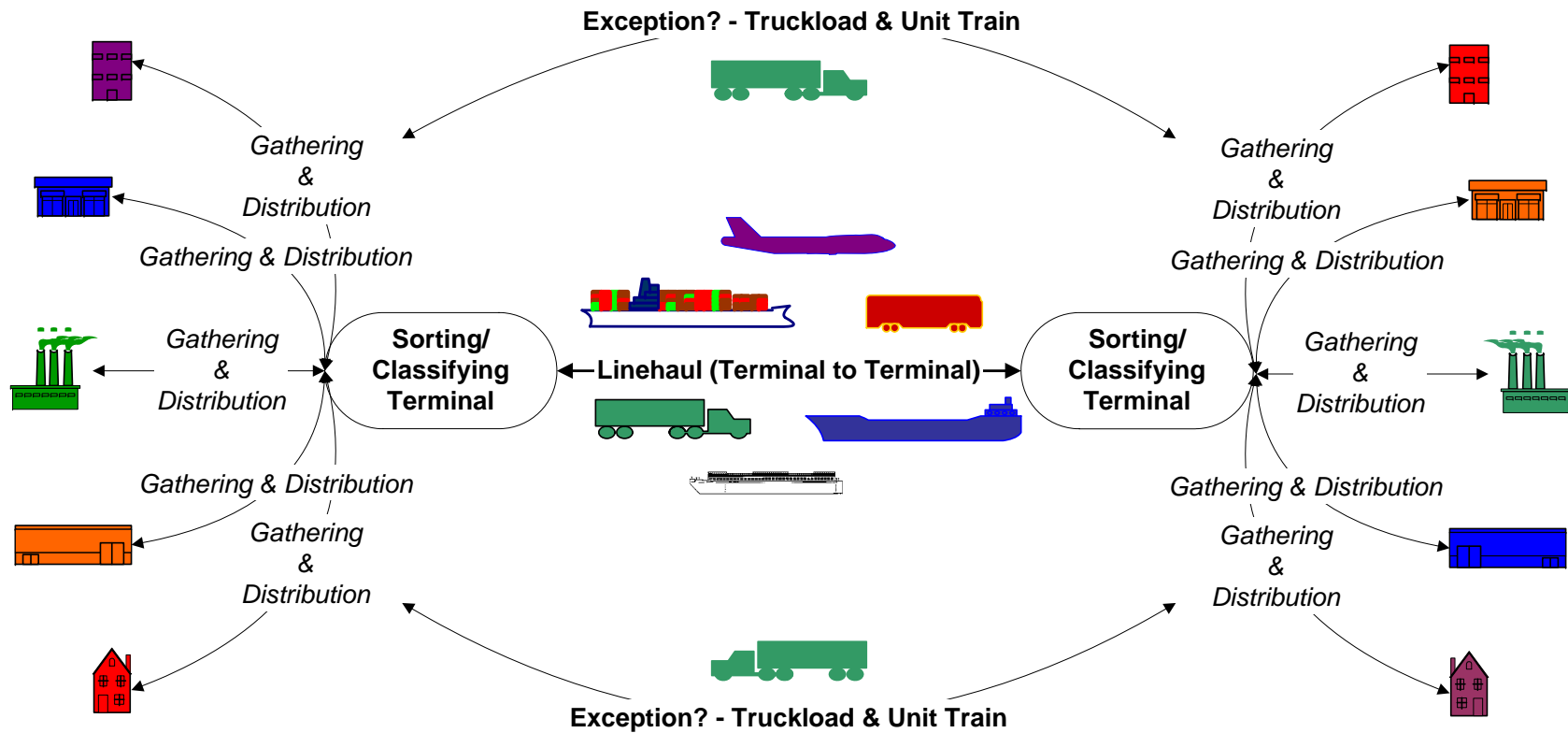
Significance of Supply Flow *Networks*

- **Raw Materials sourcing is fixed and limited** in scope for most materials; Related weight/bulk shedding semi-processing is similarly limited
- **Manufacturing, Assembly and Warehousing are value-added exercises**; CAD/CAM and postponement making them more variable in the flow
- **As Channels of Distribution change**, i.e., wholesalers, jobbers, distributors, retailers, driven by ecommerce, transportation requirements change dramatically
- **Consumption is relatively fixed**, but growing





Transportation Processes



Freight Transportation

Few, if any materials, parts, or products move directly by a single mode of transportation from source to destination.

Freight Transportation - "the carrying of materials or goods from one point to another utilizing mechanical, electrical or animal muscle of some type."

This definition would not only include conventional modes, but also materials handling capabilities such as conveyor belts, augers, clam shells, forklifts, people, etc.



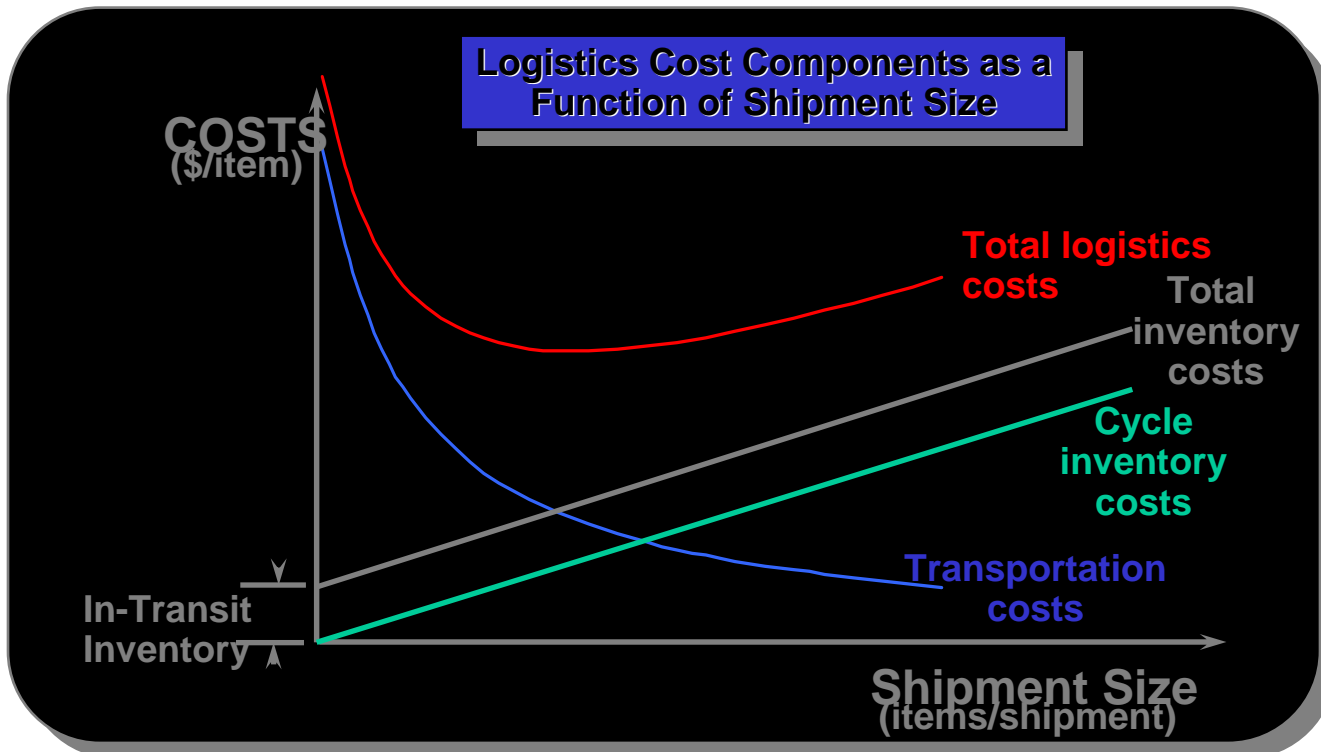
Changing Role for Transportation in Supply Chains/Supply Flow Networks

- Integral and Essential Link for Global Supply Networks (Sine Qua Non)
- Major Cost of Logistics – 40 to 60%
- Increased Sourcing and Market Distance Mean Increased Transportation (Offset by Regional Trading Areas – NAFTA, EU, MERCOSUR, ASEAN?)
- Increased Information and Communications Systems for Transportation and Logistics (Netcentricity in the Digital Economy)
- Inventory Role from Replenishment to Primary, Static to Dynamic
- Growing Transportation Complexity/Options and Trade-offs (Customization and Multimodal)
- Increased Speed of Transportation Process and Systems
- Linehaul Capacity and Urban Congestion + Residential Patterns
- Transportation Moving From Commodity to Differentiator

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Logistics
Can Be
Measured
!

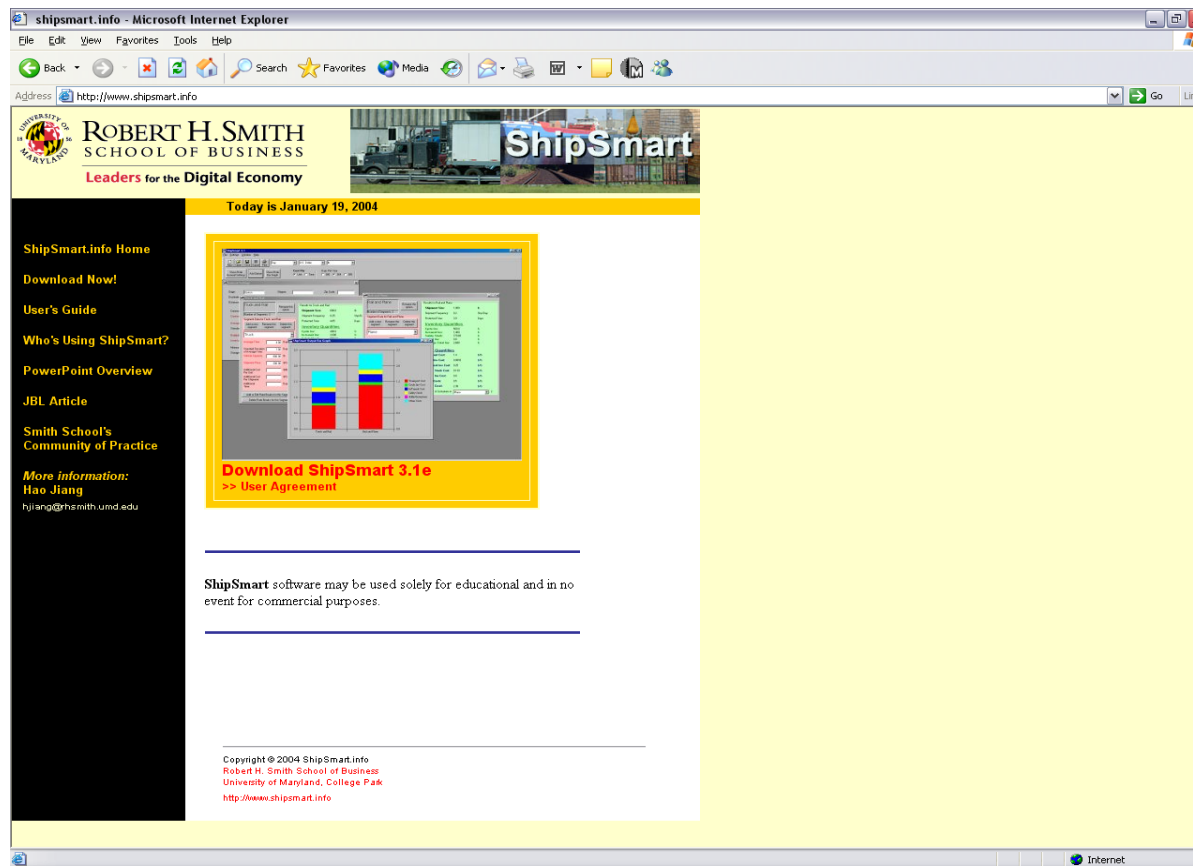
- + Transportation Costs
 - + Cycle Inventory Costs
 - + In Transit Inventory Costs
 - + Safety Stock Costs
 - + Other Costs
-
- Total Logistics Cost**



ShipSmart

Total Logistics Costs Model

www.ShipSmart.info



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FedEx Logistics Services

File Edit View Theme Source Destination Dist.Center Chain Tables Window Help

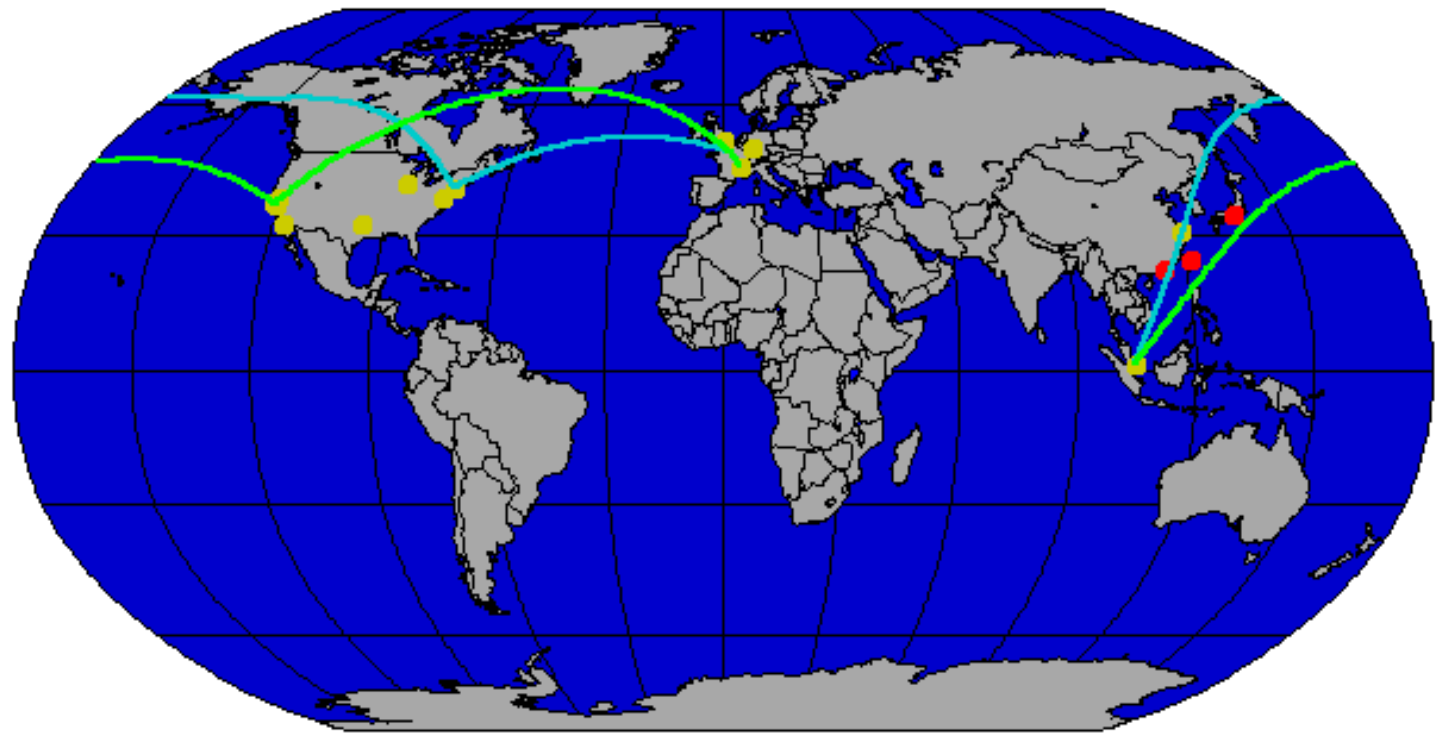


Scale 1: 215,311,370

8,520,630.43
4,778,005.94

Distribution Map

- current
- Other
- FedEx Routing
- Destination
- Distribution Center
- Source
- AsiaOne
- AsiaOne Network
- Global
- FedEx
- Domestic Routes
- Cities
- Lakes
- IPD Countries

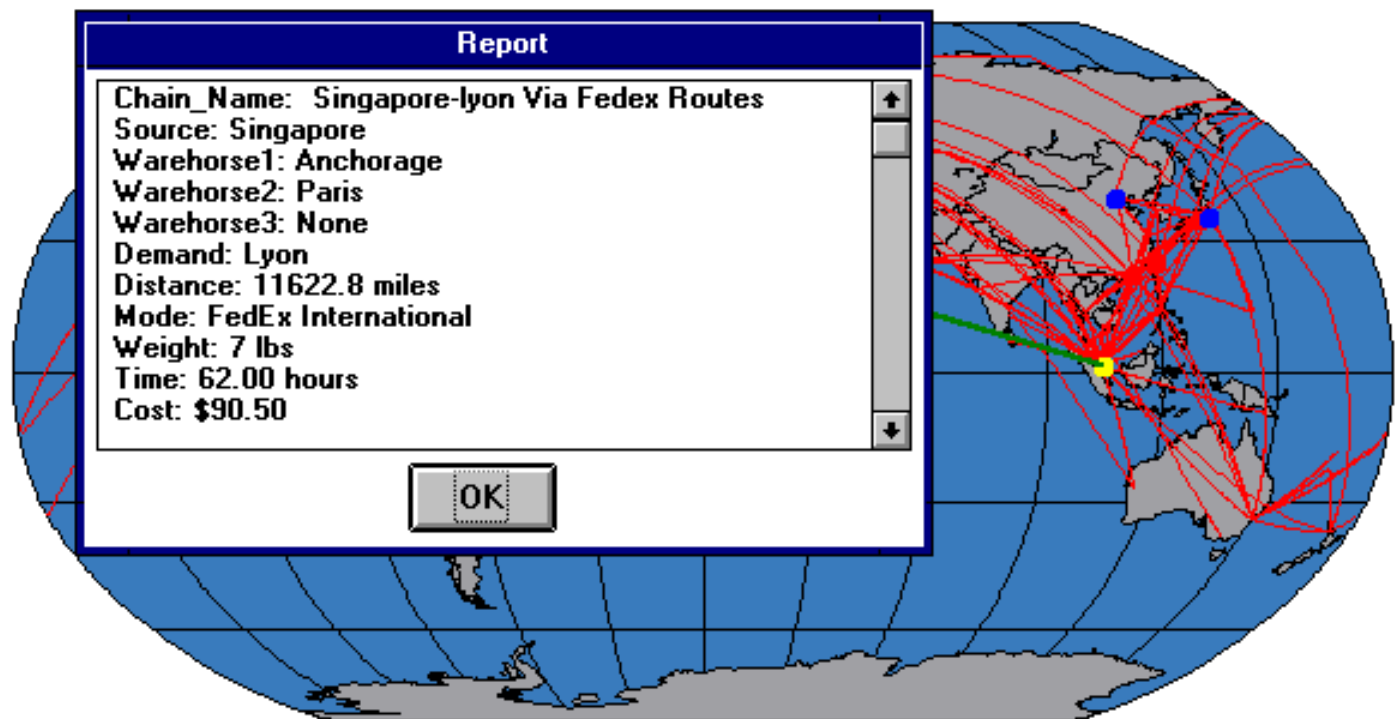




Scale 1: 223,134,690 -6,700,794.63 ↔
 12,840,729.80 †

Distribution Map

- fedex.shp
- Destination
- Source
- Distribution Center
- Asia 1 Cities
- Domestic Routes
- GSP
- FedEx International
- Cities
- Lakes
- IPD Countries
- Countries
- World3D



Report

Chain_Name: Singapore-lyon Via Fedex Routes

Source: Singapore

Warehorse1: Anchorage

Warehorse2: Paris

Warehorse3: None

Demand: Lyon

Distance: 11622.8 miles

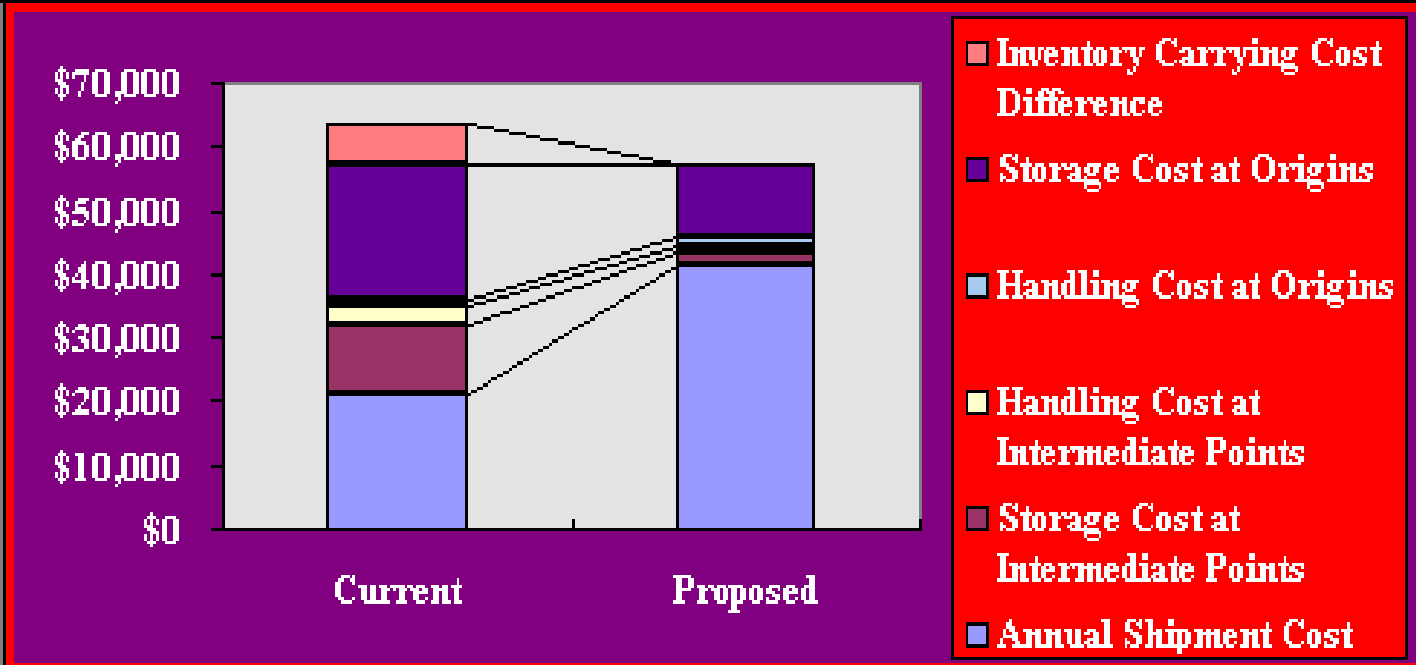
Mode: FedEx International

Weight: 7 lbs

Time: 62.00 hours

Cost: \$90.50

OK

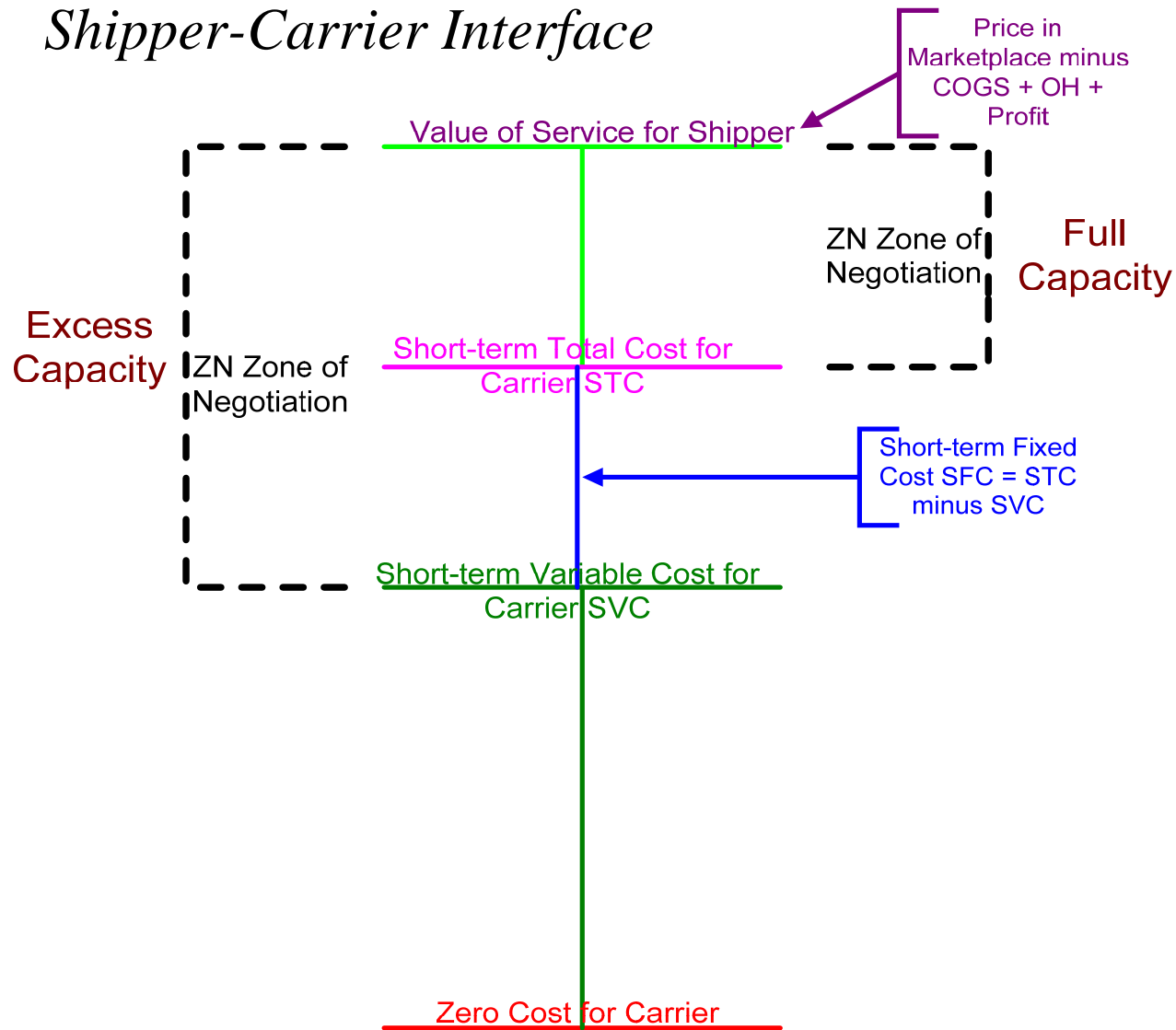


Return

Cost Categories (\$1000s)	Current	Proposed
<i>Annual Shipment Cost</i>	\$21,320	\$41,600
<i>Storage Cost at Intermediate Points</i>	\$10,920	\$1,950
<i>Handling Cost at Intermediate Points</i>	\$2,660	\$650
<i>Handling Cost at Origins</i>	\$1,300	\$1,430
<i>Storage Cost at Origins</i>	\$20,930	\$11,700
<i>Inventory Carrying Cost Difference</i>	\$6,500	\$0
<i>Average Cycle Time</i>	14 days	2 days
Total (\$1000s)	\$63,630	\$57,330

Logistics Zone of Negotiation

Shipper-Carrier Interface

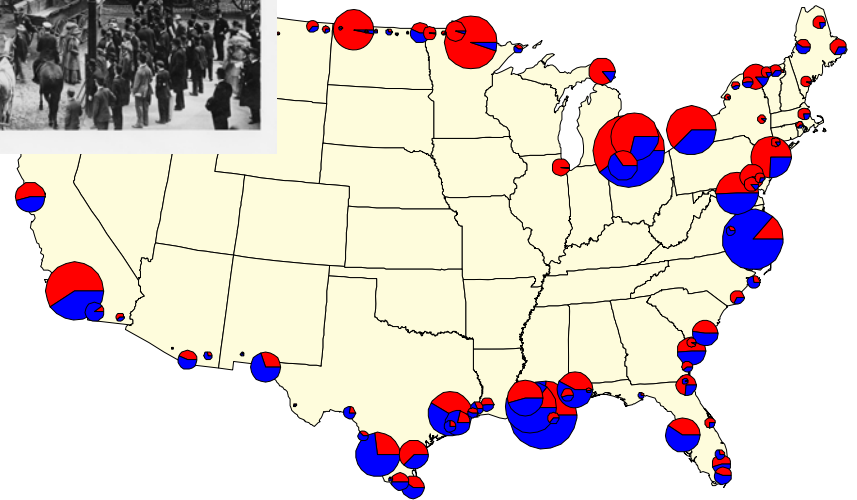
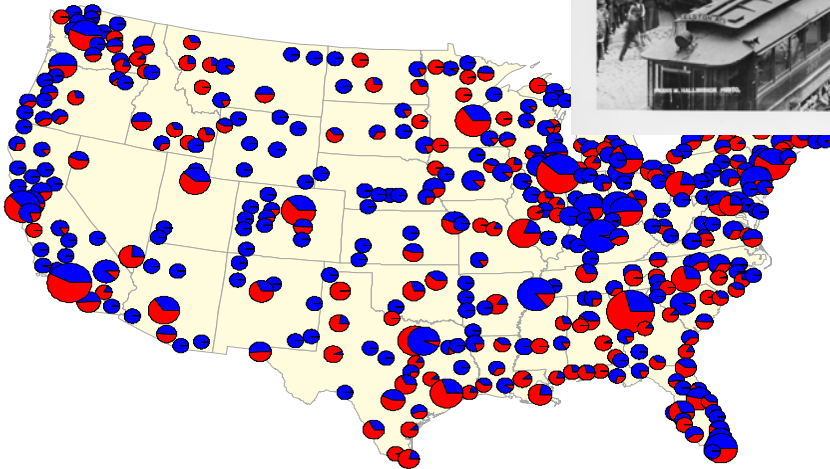
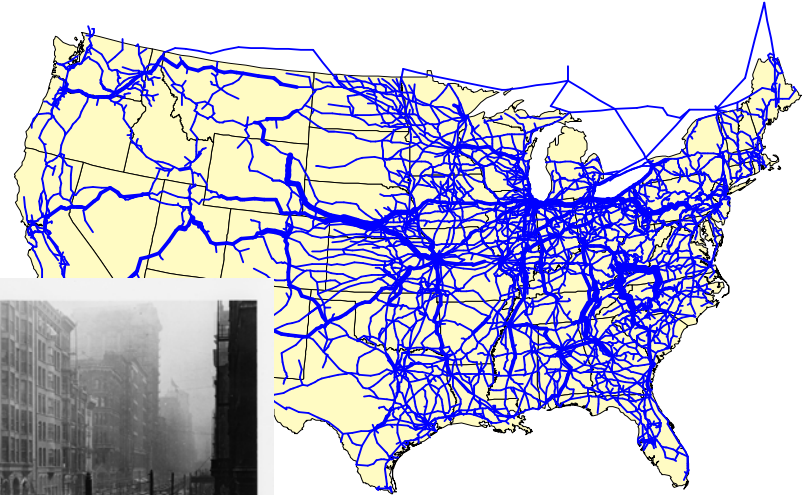
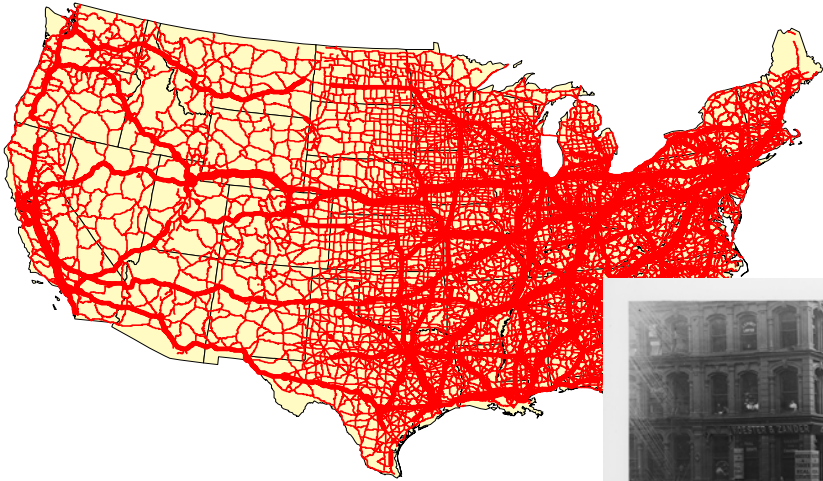


Some Observations From Career and Research...

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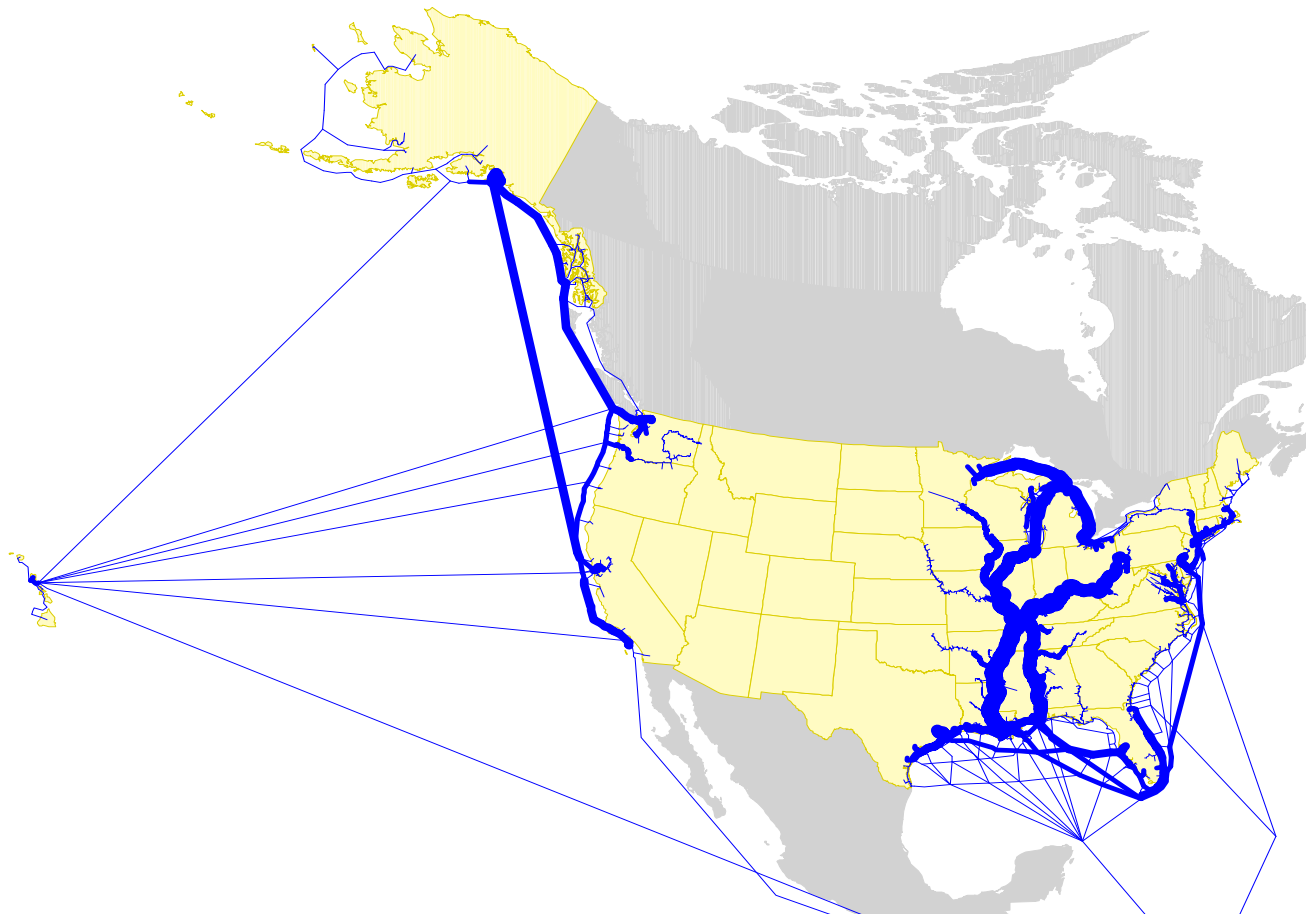
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Inland Waterway Freight Flows

FHWA Office of Freight Management and Operations, USDOT www.ops.fhwa.dot.gov/freight



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Cargolifter CL 160



Lift Capacity – 160 metric tons

Range – 10,000 km

Terminal – Load/unload at 100 m

Carrying Platform – 50m x 8m x 8m

Speed – 90 km/h



Hong Kong – Conventional, River Terminal (Pearl River Delta), and Mid-Stream

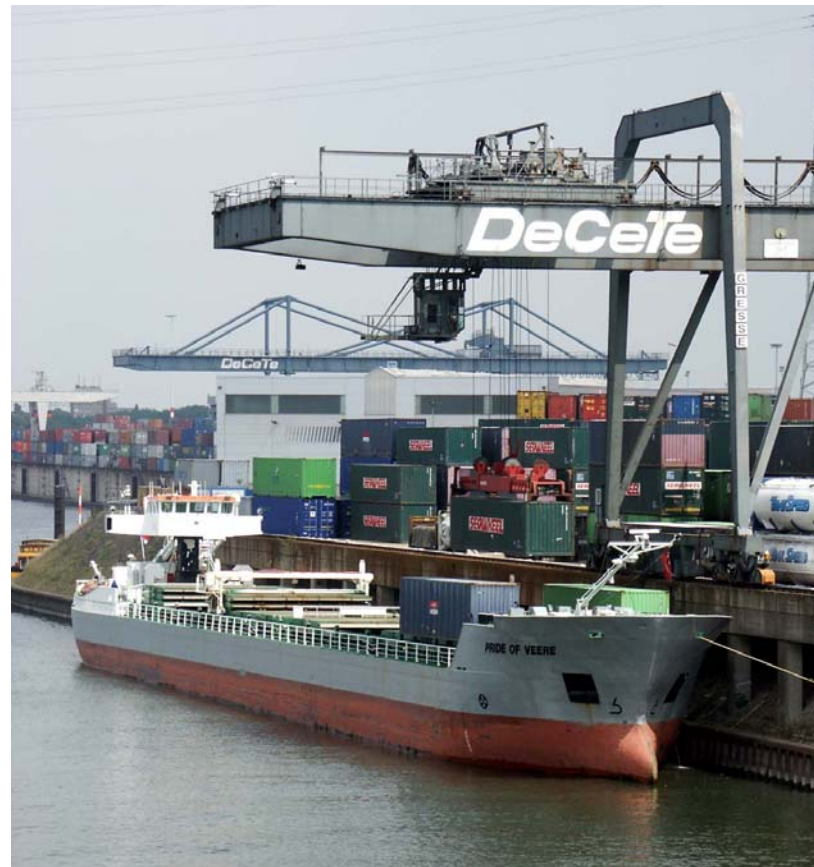


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Duisburg, Germany (World's Largest Inland Port-Rhine River)



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Five Vessels in Rotterdam... on the Screen and on the Water...



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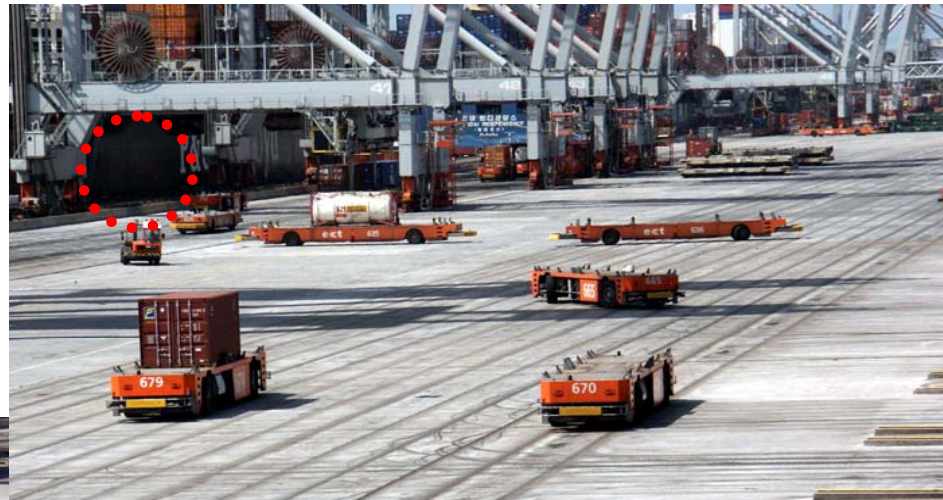
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And Delta Terminal at Rotterdam Has Automated Guided Vehicles to Move the Containers...

Three People to Load a Vessel...

A Crane Operator, A Checker (OCR issue), and a Person on Board to Lash the Containers...



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Vessels – Big & Small...



Short Sea Vessel...
200-300 TEUs



Post-Panamax Vessel...

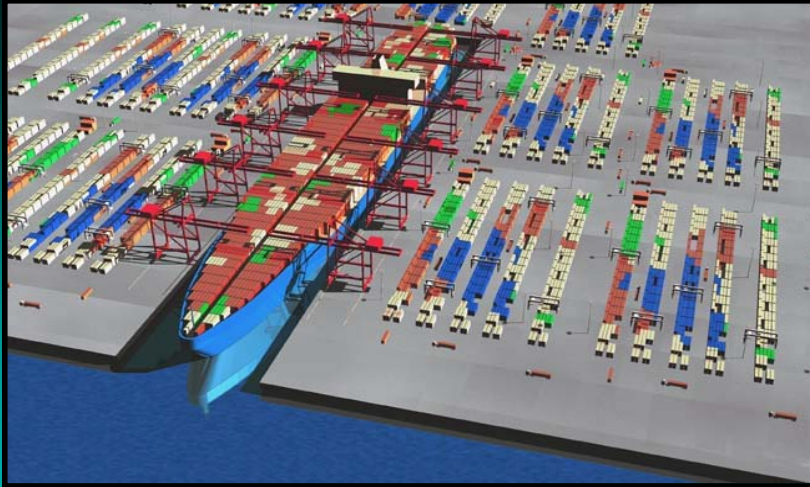
6,000 TEUs – 17 Containers Wide

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Container Ship-in-a-Slip Concept



TRANSYSTEMS
CORPORATION

High Speed Ships 40-60 Knots FastShip Incorporated (FSI)



TRANSYSTEMS
CORPORATION

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Air



Boeing 747-400F
248,300-pound (112,627 kg) payload
5,010-mile (8,060 km) range
additional 520 nm or 22,000 lbs



Airbus 380
555 passengers - 8,150 nm (15,100 km)
Freighter 300,000 lb - 5,650 nm (10,410 km)



Boeing SonicCruiser
Mach 0.95 or faster - save about one hour for
every 3,000 miles flown... Range about 9,000
nautical miles (16,668 km)

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3PL – Carrier Options List

Carriers By Mode		
<u>Mode</u>		<u>%</u>
Truckload	691	44%
Flatbed	265	17%
LTL	231	15%
Refer	110	7%
IM	61	4%
Cartage	46	3%
Air	28	2%
Sm Pack	26	2%
Bulk	26	2%
DDS	24	2%
Warehouse	18	1%
Rail	12	1%
Pool	8	1%
Vessel	8	1%
B Bulk	4	0%
Lumper	1	0%
	1559	

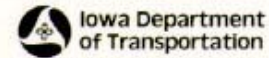
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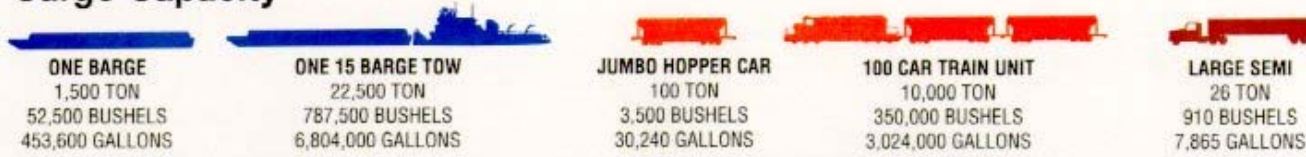
Iowa Modal Comparison Chart

Compare...

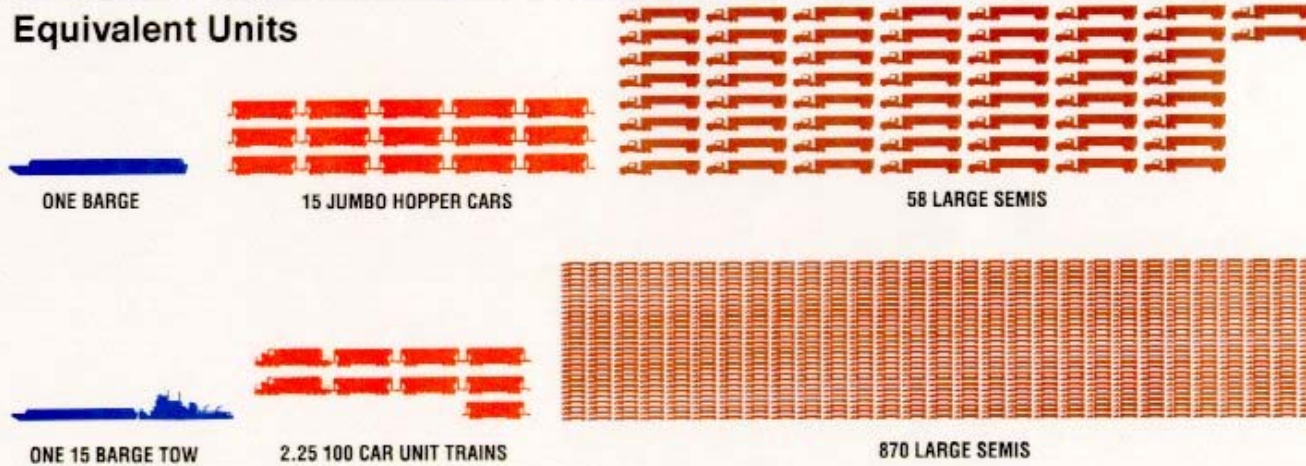


Source: Iowa Department of Transportation - 800 Lincoln Way - Ames, IA 50010 - 515-239-1372

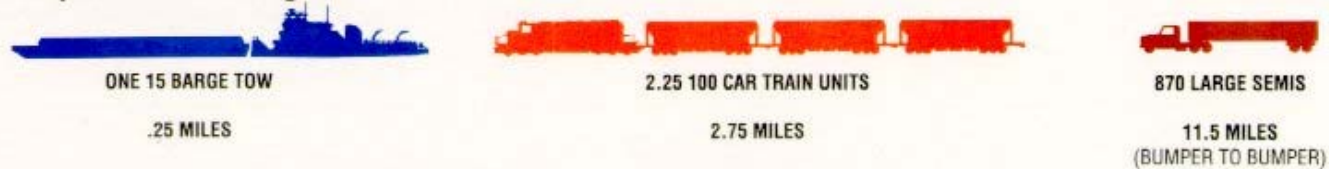
Cargo Capacity



Equivalent Units



Equivalent Lengths



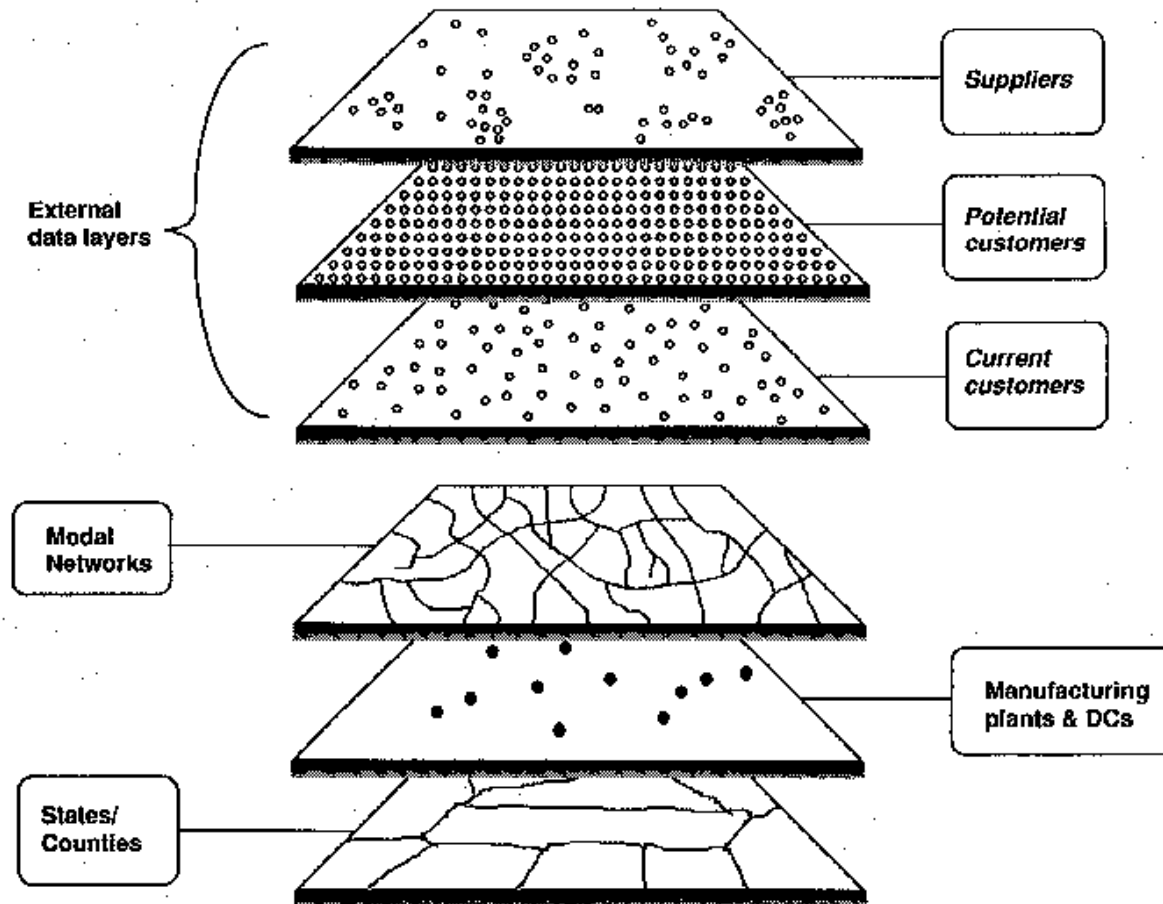
FM 444 12-21-04

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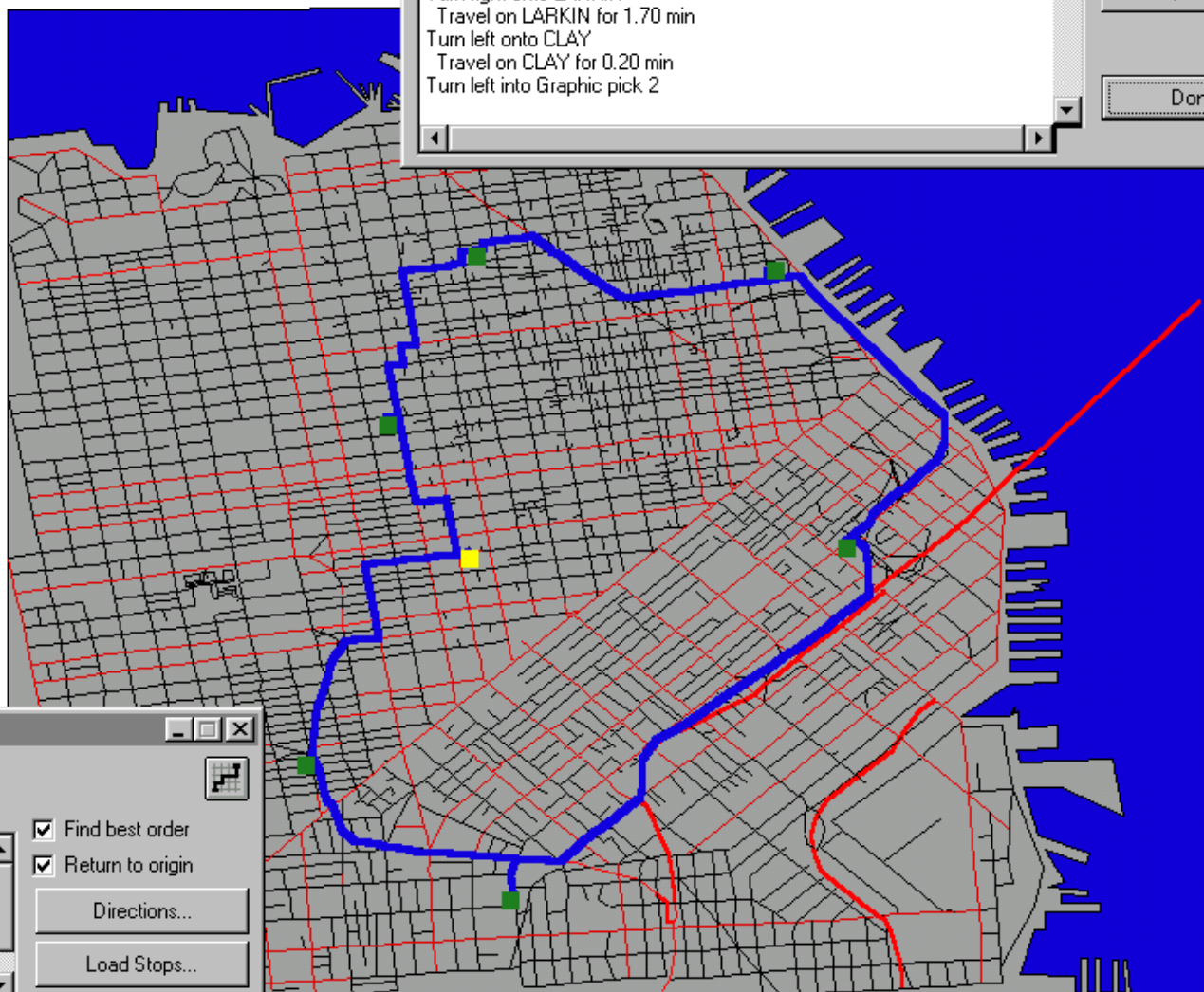


GIS Layers





- Route1
- S_fran.shp
 - 1
 - 2
 - 3
 - 4
 - 5
 - 6
- Hospital.shp
- Del_loc.shp
- Customer.shp
- Shorelin.shp
 - 1
 - 2



Directions

Starting from Graphic pick 1
Turn left onto DFARRELL
Travel on OFARRELL for 0.15 min
Turn right onto HYDE
Travel on HYDE for 1.06 min
Turn left onto SUTTER
Travel on SUTTER for 0.48 min
Turn right onto LARKIN
Travel on LARKIN for 1.70 min
Turn left onto CLAY
Travel on CLAY for 0.20 min
Turn left into Graphic pick 2

Print...
Save as...
Properties...
Done

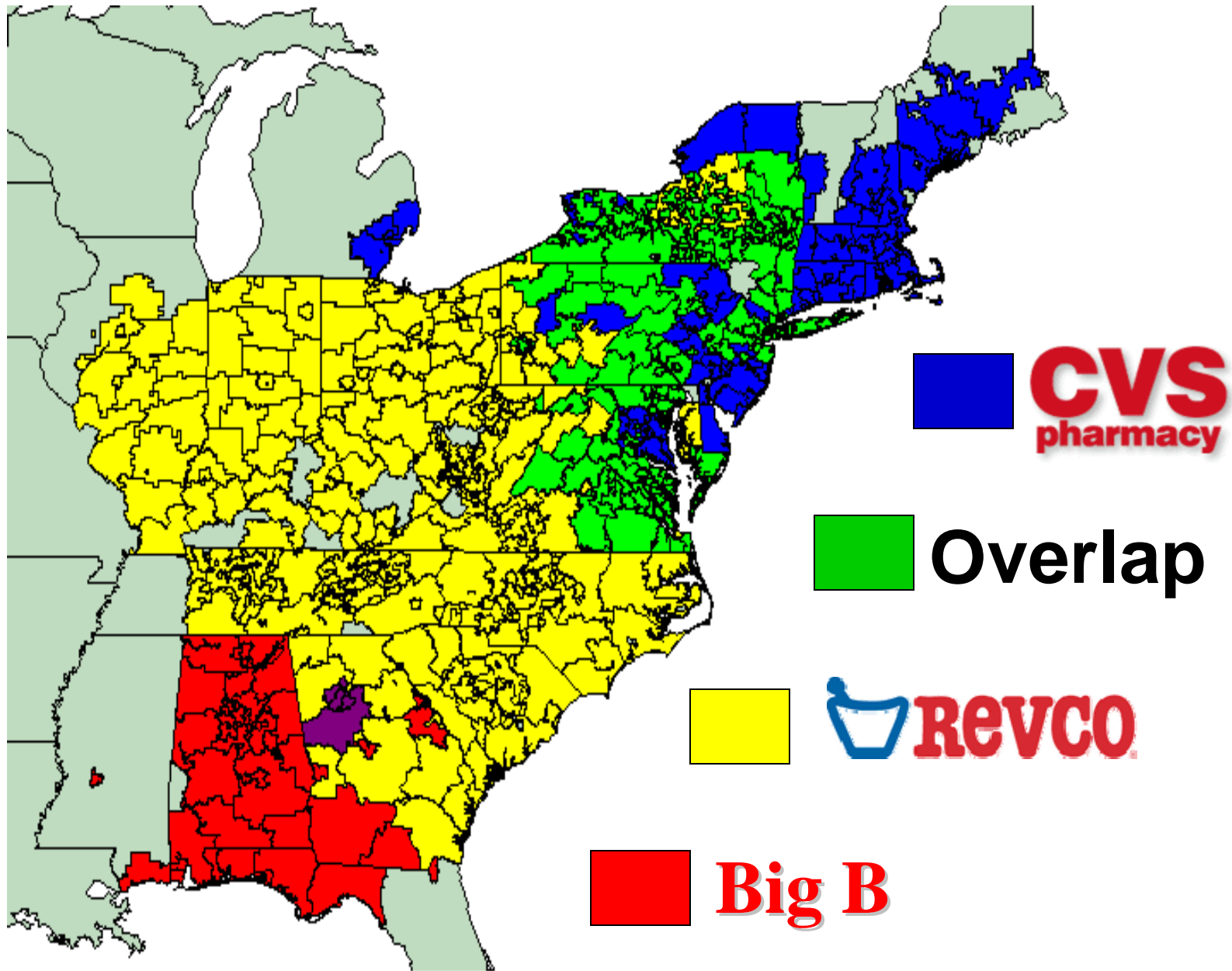
Route1

total route cost: 34.50 min

Label	minutes
Graphic pick 1	0.00
Graphic pick 2	3.59
Graphic pick 3	8.38
Graphic pick 4	13.70
Graphic pick 5	19.23
Graphic pick 6	25.62

- Find best order
- Return to origin

Directions...
Load Stops...
Save Stops...
Properties...

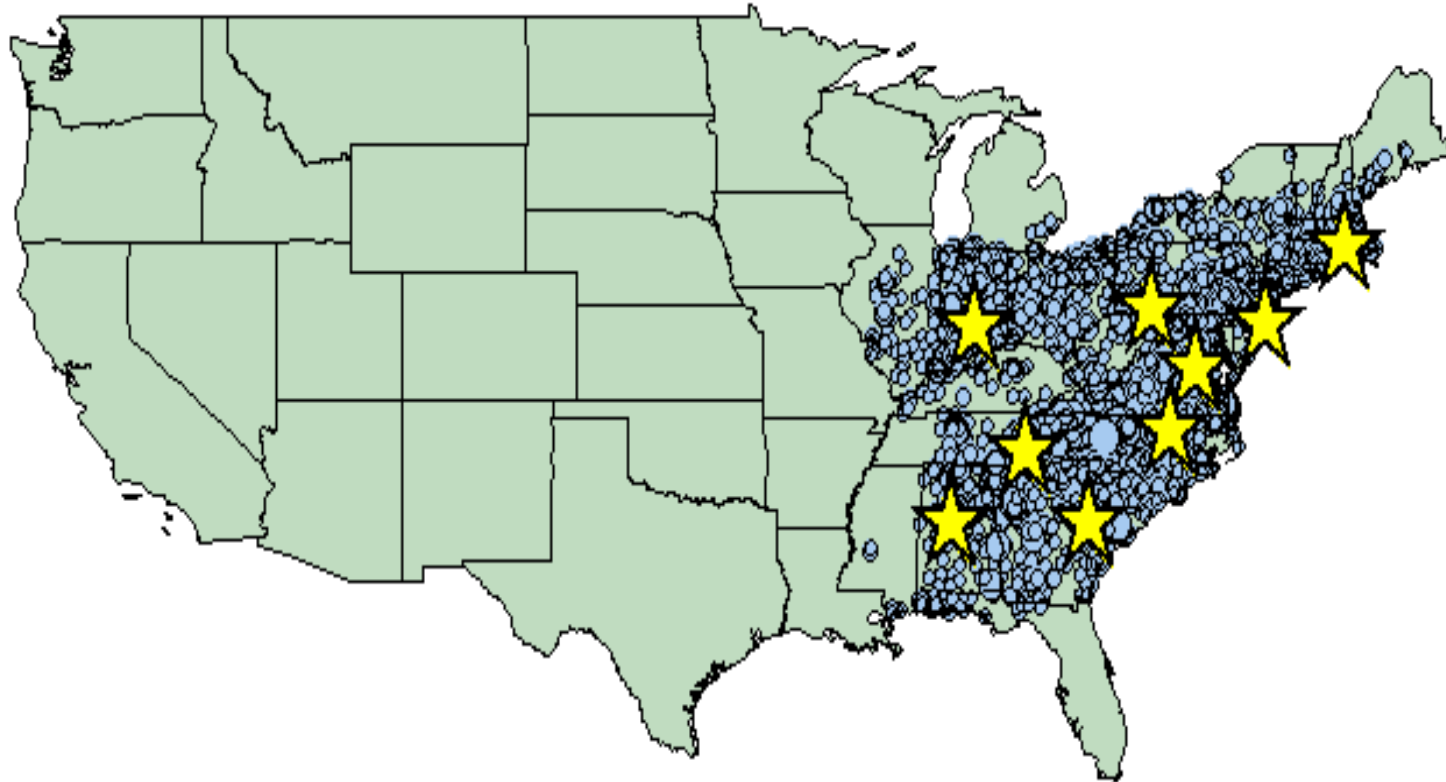


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Combined System



4000 Stores

23 States

9 DC's



Major Industry Players



**CANADIAN
PACIFIC
RAILWAY**



BNSF



Kansas City
Southern Railway



**CSX
CORPORATION**



**Union Pacific
Corporation**

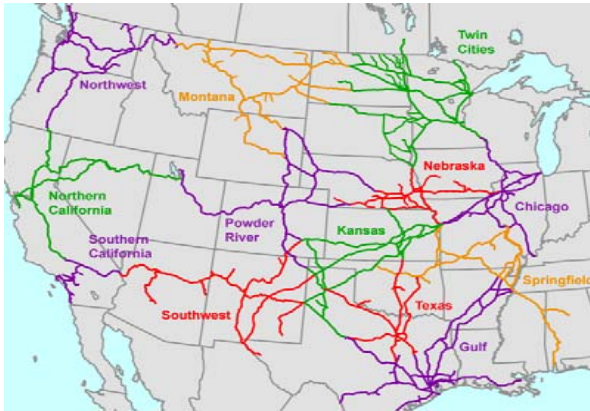


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Mergers?



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Unit Coal Train

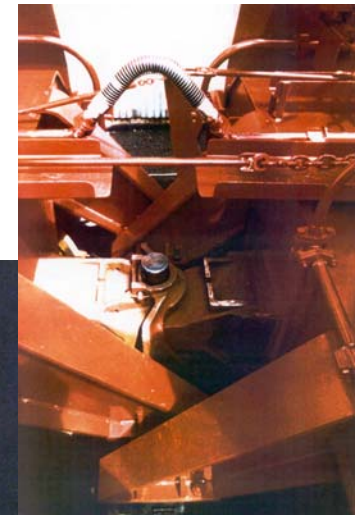


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Double-Stack vs. Conventional Flatcars



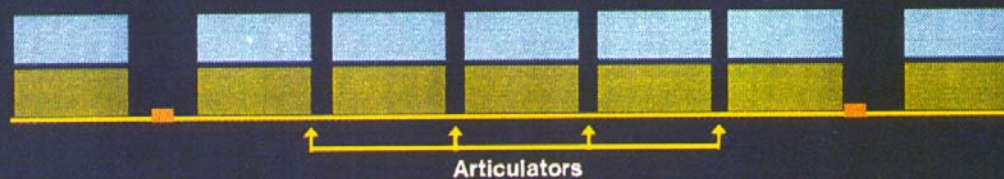
DOUBLE-STACK vs. CONVENTIONAL SLACK COMPARISON

Conventional Car



50 Car Train (4700' Train Length) = 60' 5" Slack

Double-Stack



16 Car Train (4725' Train Length) = 6' 8" Slack

Double-Stack 89% Less Train Slack

■ Slack Points

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MARK  T.M.

RoadRailer®

EXTERIOR

HEIGHT.....13' 3"
LENGTH.....48' 0"
WIDTH.....102"
FLR. HGT...53 5/8"

INTERIOR

HEIGHT.....8' 7"
LENGTH....47' 4 3/4"
WIDTH.....98 3/8"
VOLUME...3,452 CU. FT.

WEIGHTS

TARE WEIGHT: HWY 14,500 LBS.
TARE WEIGHT: RAIL 23,000 LBS.
MAX. RAIL
GROSS WEIGHT: 73,000 LBS.
MAX. PAYLOAD: 50,000 LBS.



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RoadRailer



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Double-stack and RoadRailer

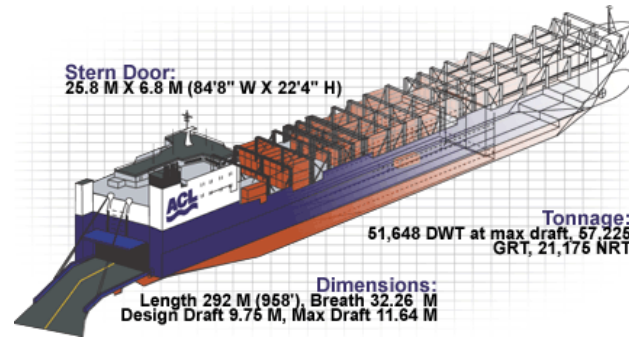
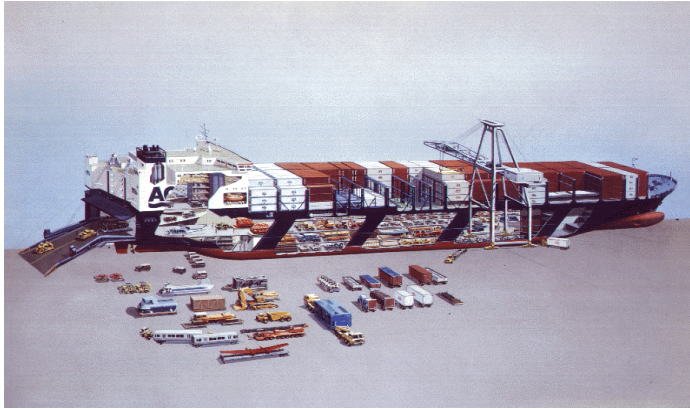


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RoRo Ships



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TOP 15 CONTAINER CARRIERS RANKED BY OPERATING CAPACITY

RANK 2001	CARRIER	COUNTRY	2002 TEU CAPACITY	2001 TEU CAPACITY	% 2002/ 2001	#. OF OWNED SHIPS	#OF CHARTER SHIPS
1	Maersk Sealand	Denmark	754,619	659,459	14%	125	187
2	P&O Nedlloyd	UK/Netherlands	414,876	396,088	5%	40	127
3	Evergreen	Taiwan	401,907	375,006	7%	121	26
4	MSC	Switzerland	391,001	252,938	55%	103	74
5	Hanjin	South Korea	315,605	319,715	-1%	22	65
6	APL	Singapore	255,000	243,455	5%	n/a	0
7	Cosco	China	236,680	224,936	5%	111	1
8	CMA CGM	France	208,712	151,660	38%	26	74
9	MOL	Japan	202,492	161,221	26%	32	43
10	NYK	Japan	179,775	151,481	19%	18	57
11	"K" Line	Japan	171,383	137,497	25%	5	55
12	Zim	Israel	170,656	145,460	17%	25	0
13	CP Ships	UK	164,400	170,700	-4%	31	42
14	OOCL	Hong Kong	158,649	142,541	11%	16	36
15	China Shipping Cntr Lines	China	144,823	126,000	15%	n/a	0

total 4,170,578 3,658,157 16%

average 278,039 243,877 16%

Janu From: American Shippers, October 2002

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Swapbodies



Source: Balt Containers

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