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THE NEW PANAMA CANAL IN A GLOBAL CONTEXT

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THE NEW PANAMA CANAL IN A GLOBAL CONTEXT

PRESENTER: HERMAN L. BOSCHKEN

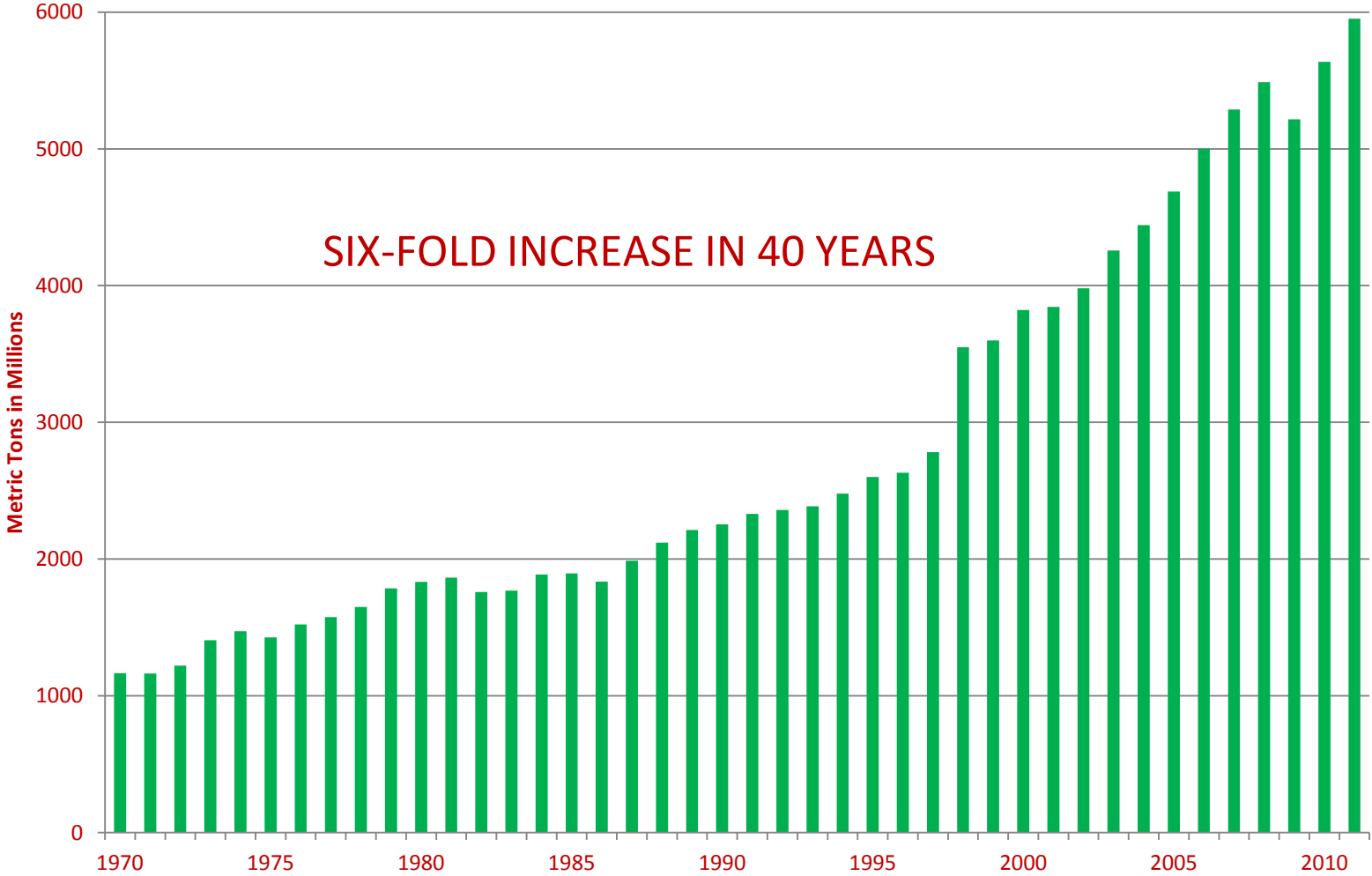
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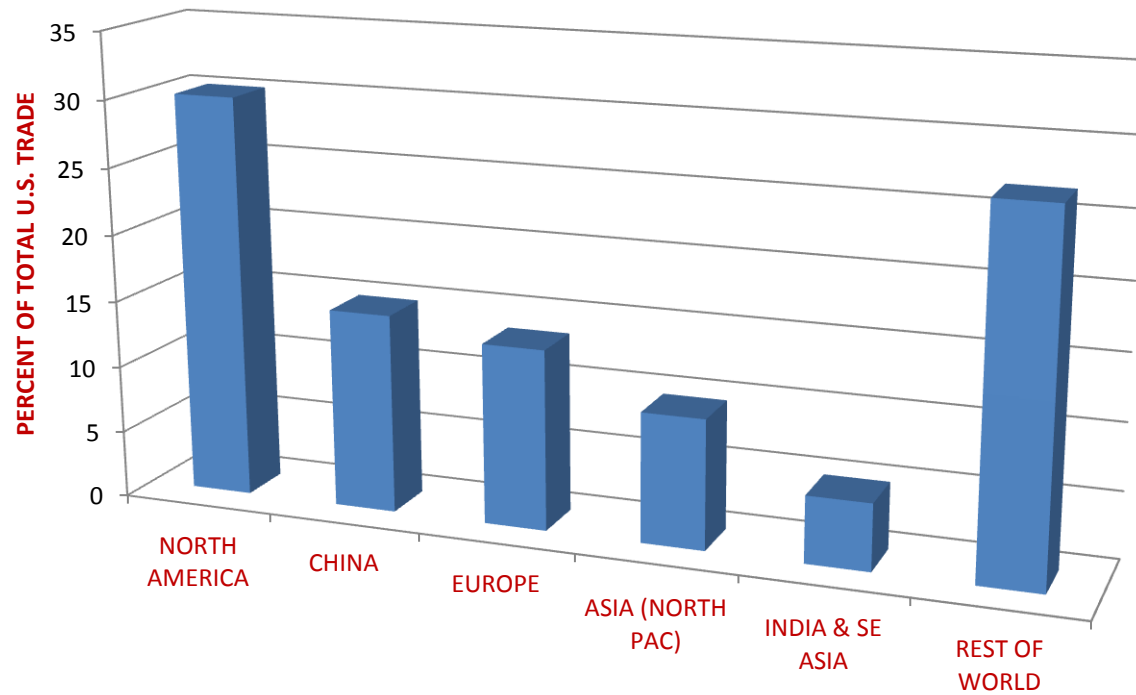
THE COMMONWEALTH CLUB OF CALIFORNIA,
SAN FRANCISCO, JUNE 11, 2015

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WORLD CONTAINERIZED WATERBORNE COMMERCE



GLOBALIZATION REMAINS REGIONALIZED: EXAMPLE OF U. S. TRADING PARTNERS BASED ON DOLLARS IN 2014



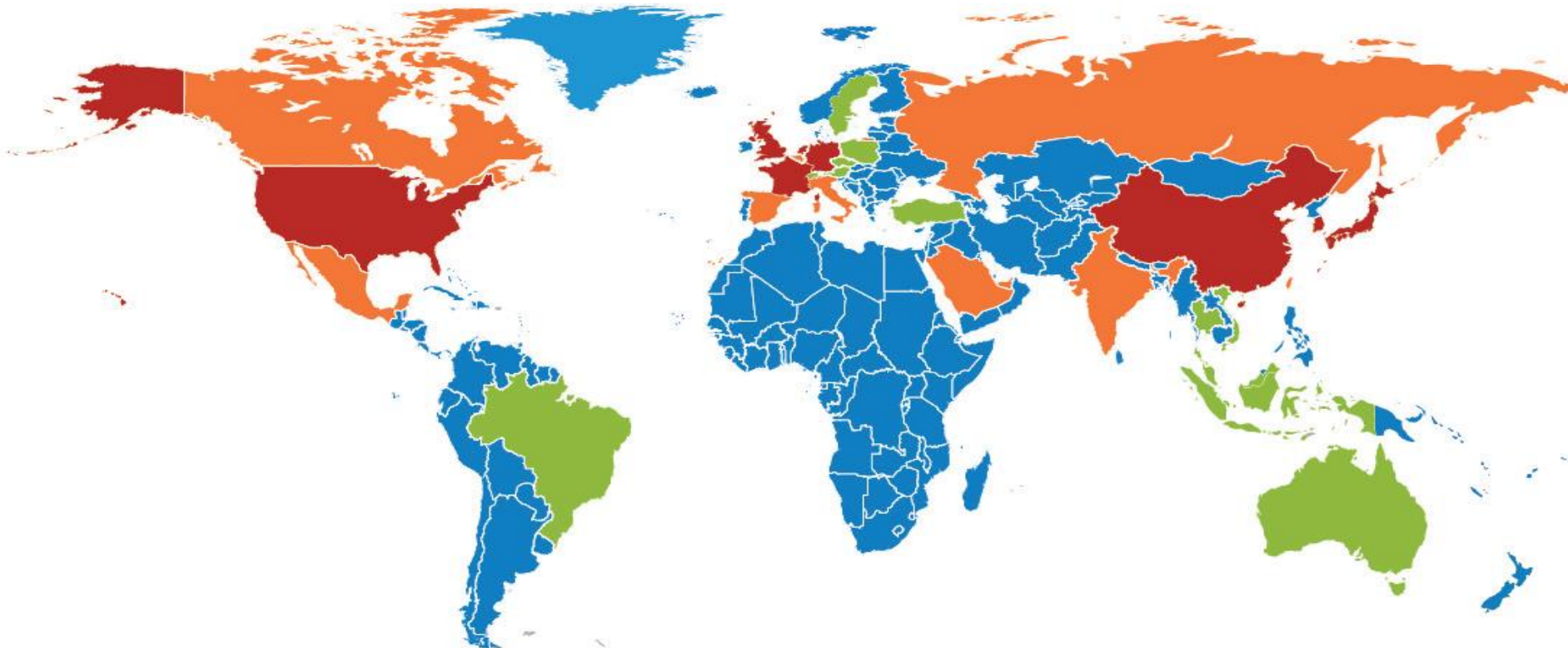
FIVE DETERMINANTS OF CONTAINERIZED GLOBAL SHIPPING ROUTES

1. **ROUTE DESTINATIONS:** WORLD CONSUMPTION GROWTH IS SHIFTING FROM MOSTLY U.S. AND EUROPE PHENOMENON TO GLOBAL-WIDE SCENE:

- PRIOR TO 1980: APPROXIMATELY 80 PERCENT OF WORLD CONSUMPTION OCCURRED WITHIN THE NORTH ATLANTIC COMMUNITY (ABOUT 20 PERCENT OF WORLD'S POPULATION AT THE TIME)
- SINCE 1980: WORLD CONSUMPTION DISTRIBUTED MORE WIDELY AROUND THE GLOBE
- SINCE 2000, CHINA BECOMES MAJOR CUSTOMER OF ITS PRODUCTS, BUT REQUIRES REGIONAL & GLOBAL SOURCING OF RAW/SEMI-FINISHED MATERIALS
- SINCE 2010, SOUTHERN HEMISPHERE ENTERS THE AGE OF CONSUMPTION (ESP. BRAZIL AND AUSTRALIA)

RESULT? EXPANDING GLOBAL TRADE; DIVERSIFYING ROUTE DESTINATIONS

ECONOMIES BY SIZE OF MERCHANDISE TRADE IN 2013



US\$ billion

FIVE DETERMINANTS OF CONTAINERIZED GLOBAL SHIPPING ROUTES

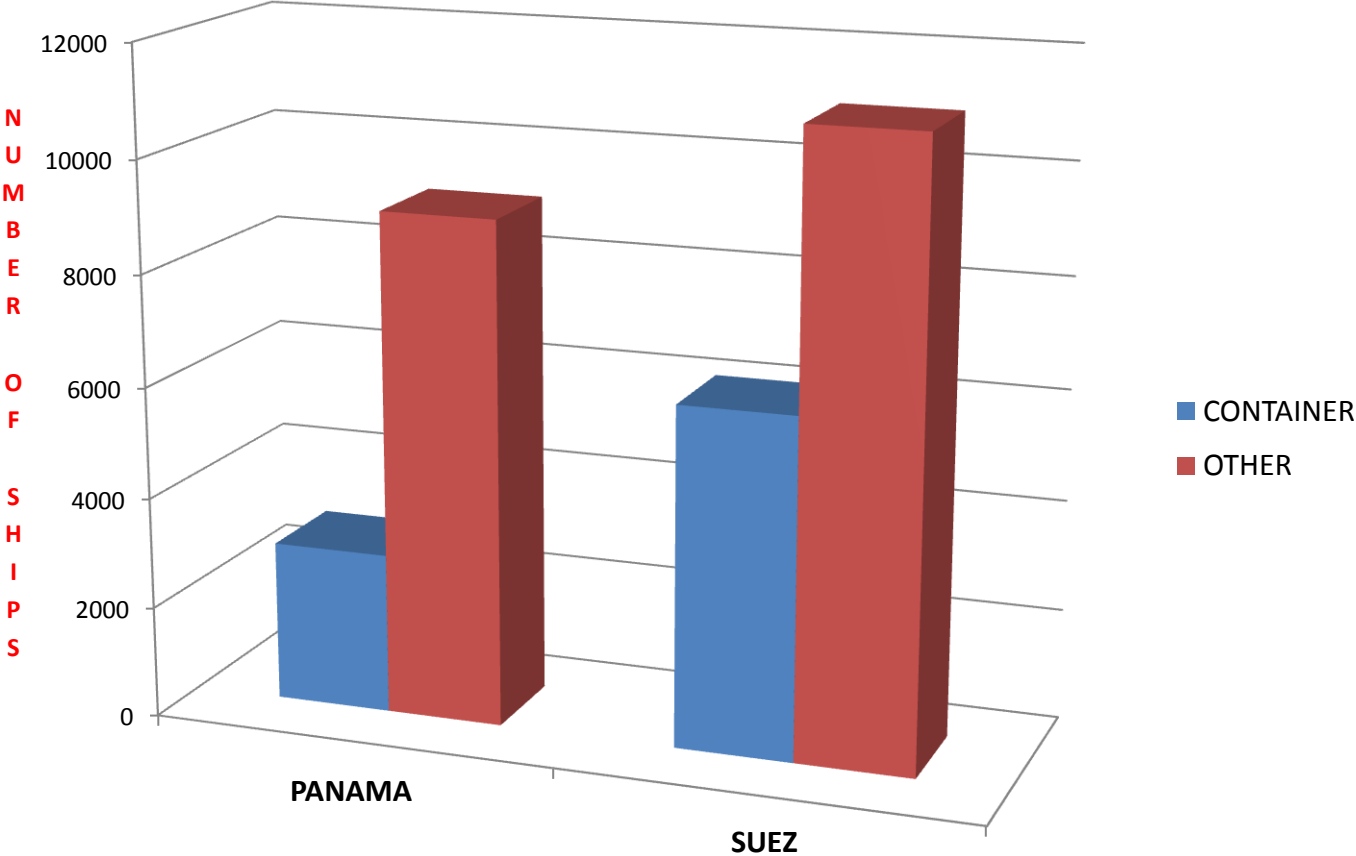
2. **ROUTE ORIGINS**: DYNAMIC SHIFTS IN ASIAN LOCATIONS OF WORLD PRODUCTION CAPACITY:

- **1950-1980**: PRODUCTION CAPACITY HEAVILY CONCENTRATED ABOVE TROPIC OF CANCER IN NORTH PACIFIC (E.G., JAPAN, KOREA, TAIWAN)
- **1980-2000**: LOCUS SHIFTS TO SOUTH CHINA SEA (E.G., SINGAPORE, THAILAND, PHILIPPINES, MALASIAN PENINSULA, VIETNAM)
- **SINCE 2000**: EMERGENT PRODUCTION CAPACITY DISTRIBUTED BETWEEN SOUTH ASIA (INDIA) AND MAINLAND CHINA
- **FUTURE**: GLOBAL SOURCING LIKELY TO INCLUDE SIGNIFICANT PRODUCTION CAPACITY IN SOUTHERN HEMISPHERE (ESP, SOUTH AMERICA, AFRICA)

SHIFTING LOCATIONS IN THE CONCENTRATION OF WORLD PRODUCTION CAPACITY



PANAMA & SUEZ COMPARISON: ANNUAL SHIP TRAFFIC (2014)



FIVE DETERMINANTS OF CONTAINERIZED GLOBAL SHIPPING ROUTES

3. **SHIPPING FIRMS' CRITERIA FOR SELECTING OPTIMAL ROUTES:**

A. **OLIGOPOLISTIC** INDUSTRY MARKET STRUCTURE: TWO SHIPPING CONSORTIUMS DOMINATE INTER-CONTINENTAL GLOBAL TRADE MOVEMENT

B. **COST PER UNIT** OF GOODS SHIPPED: TRANSPORTATION COMPONENT

C. **TIME-IN-TRANSIT** THROUGH MULTIMODAL SYSTEM: ORIGIN TO DESTINATION

D. **"ONE-STOP" TRANSSHIPMENT** (THE "LOAD CENTER" CONCEPT) FOR:

- MINIMIZING TIME IN PORT
- ACCESS TO LARGE-SCALE PORT TECHNOLOGIES
- ACCESS TO TRANSCONTINENTAL RAIL ROUTES
- ACCESS TO ADVANCED PRODUCER SERVICES (GLOBAL CITIES)

E. **JUST-IN-TIME MANAGEMENT** (JIT) OF "INVENTORY ON WHEELS" (FIXED-BASE WAREHOUSING IS OBSOLETE TECHNOLOGY)

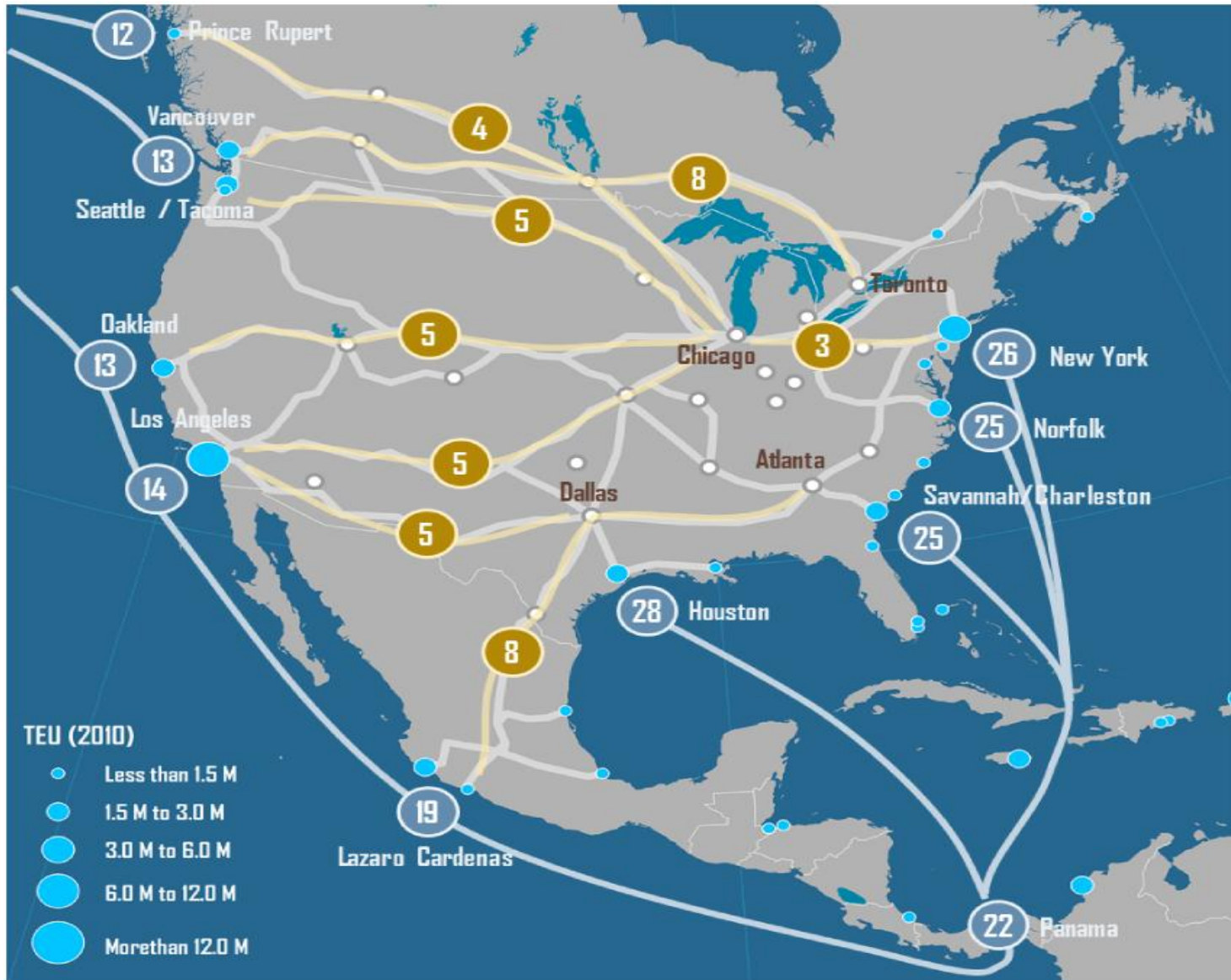
FIVE DETERMINANTS OF CONTAINERIZED GLOBAL SHIPPING ROUTES

4. **POST-PANAMAX ERA:** ROUTE ALTERNATIVES PROLIFERATE:

- SINCE 1970s, TRANS-PACIFIC TRADE THROUGH THE “NORTH AMERICAN LAND BRIDGE” (WEST COAST SEAPORTS DOMINATE EAST/WEST CONTAINER TRAFFIC ROUTES)
- SINCE 1980, SUEZ CANAL ROUTE EMERGES AS PRODUCTION MOVES TO SOUTH CHINA SEA AND WESTWARD (SINGAPORE DOMINATES ROUTE)
- SINCE 2010, EXPERIMENTS WITH A “TRANS-SIBERIAN LAND BRIDGE” (A NEW SILK ROAD)
- SINCE 2015, GLOBAL WARMING OPENS YEAR-ROUND ARCTIC ROUTE (NORTHWEST PASSAGE)
- IN 2016, THE NEW PANAMA CANAL OPENS

RESULTING IN A COMBINED WORLD MULTIMODAL SYSTEM!

THE NORTH AMERICAN “LAND BRIDGE” COMPARED WITH PANAMA



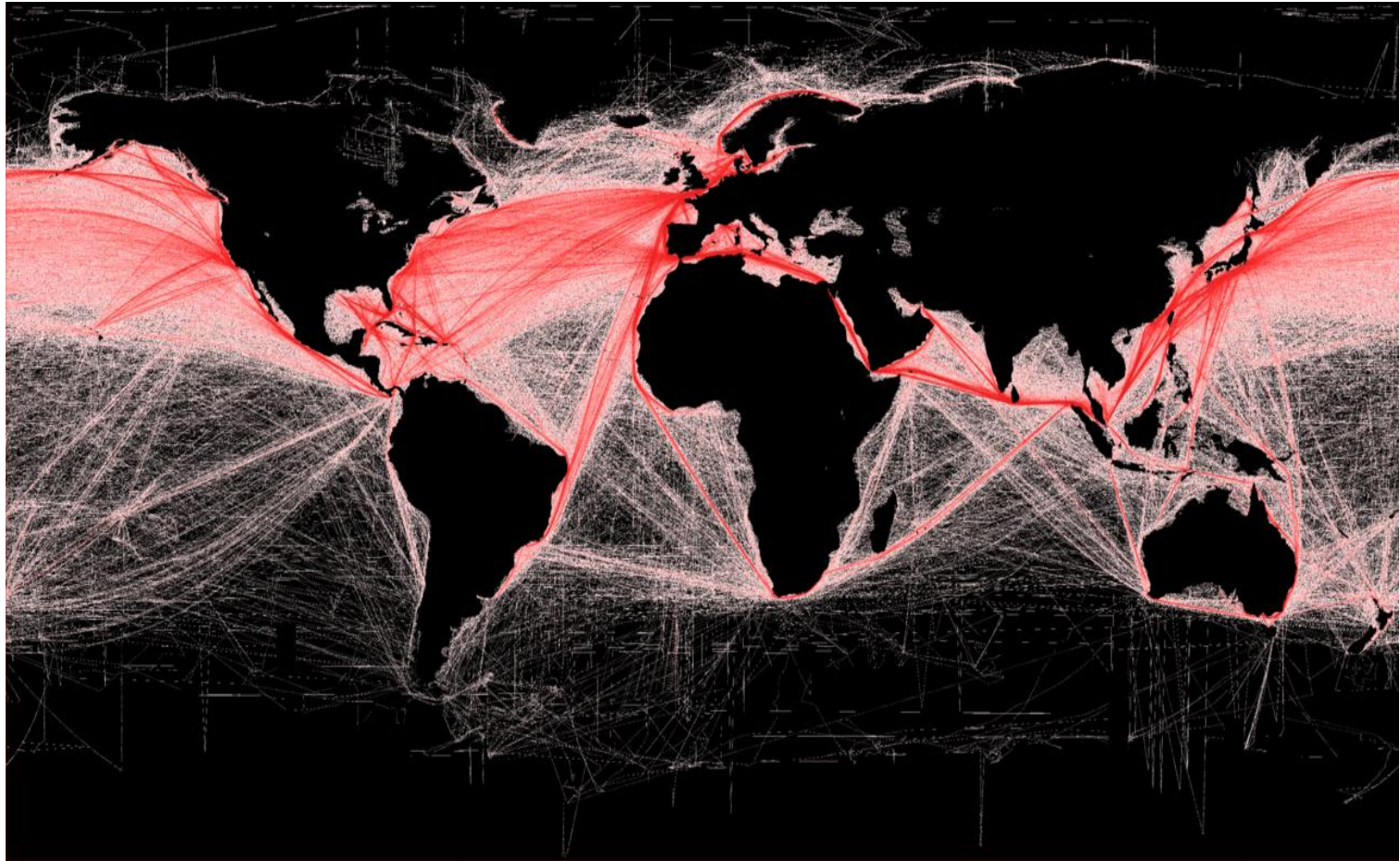
SUEZ ROUTE AND TRANS-SIBERIAN “LAND BRIDGE”



POTENTIAL ARCTIC SEA ROUTE VS. PANAMA AND SUEZ CANALS



A WORLDWIDE TRADE SYSTEM: MARITIME ROUTE INTENSITY

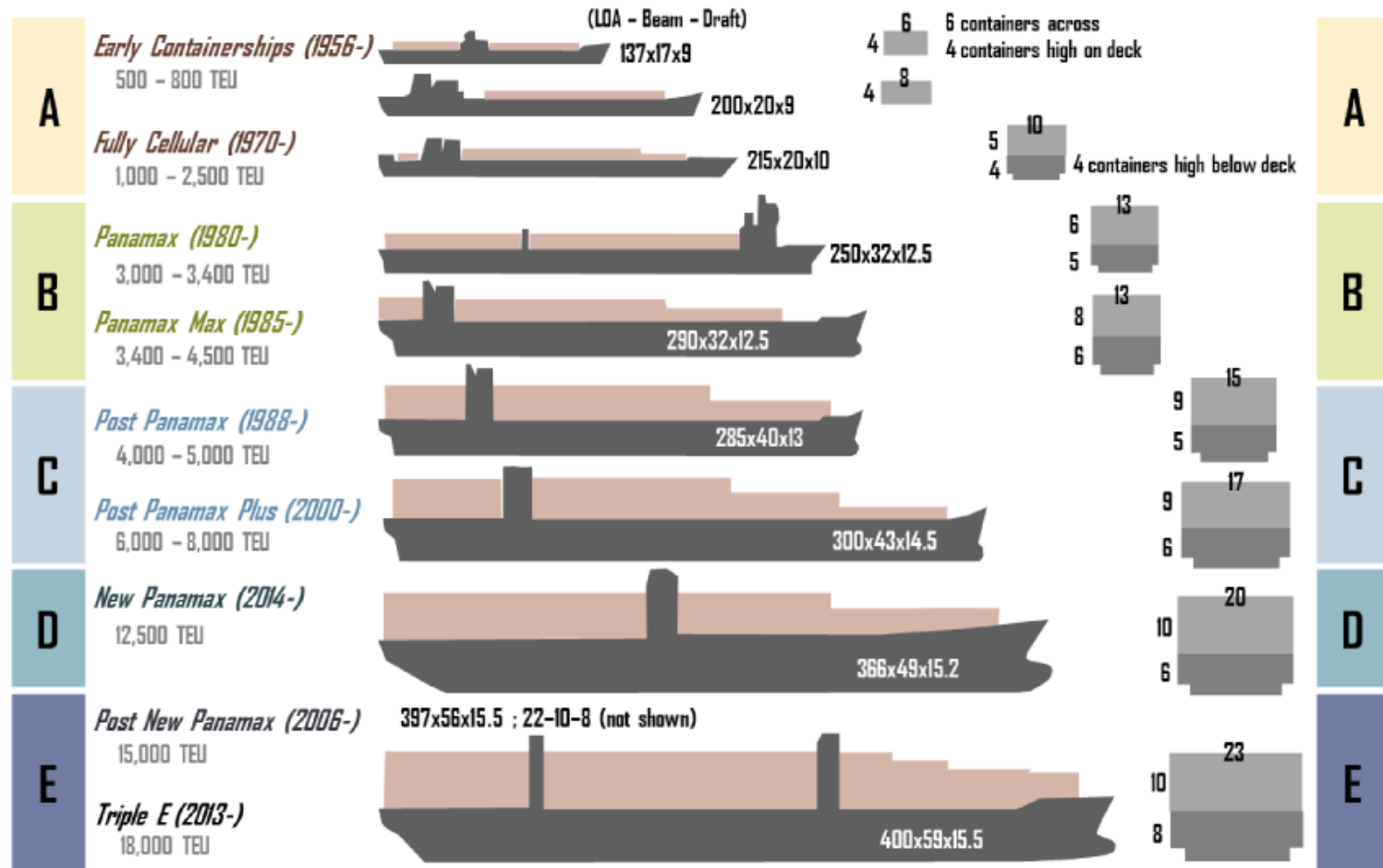


FIVE DETERMINANTS OF CONTAINERIZED GLOBAL SHIPPING ROUTES

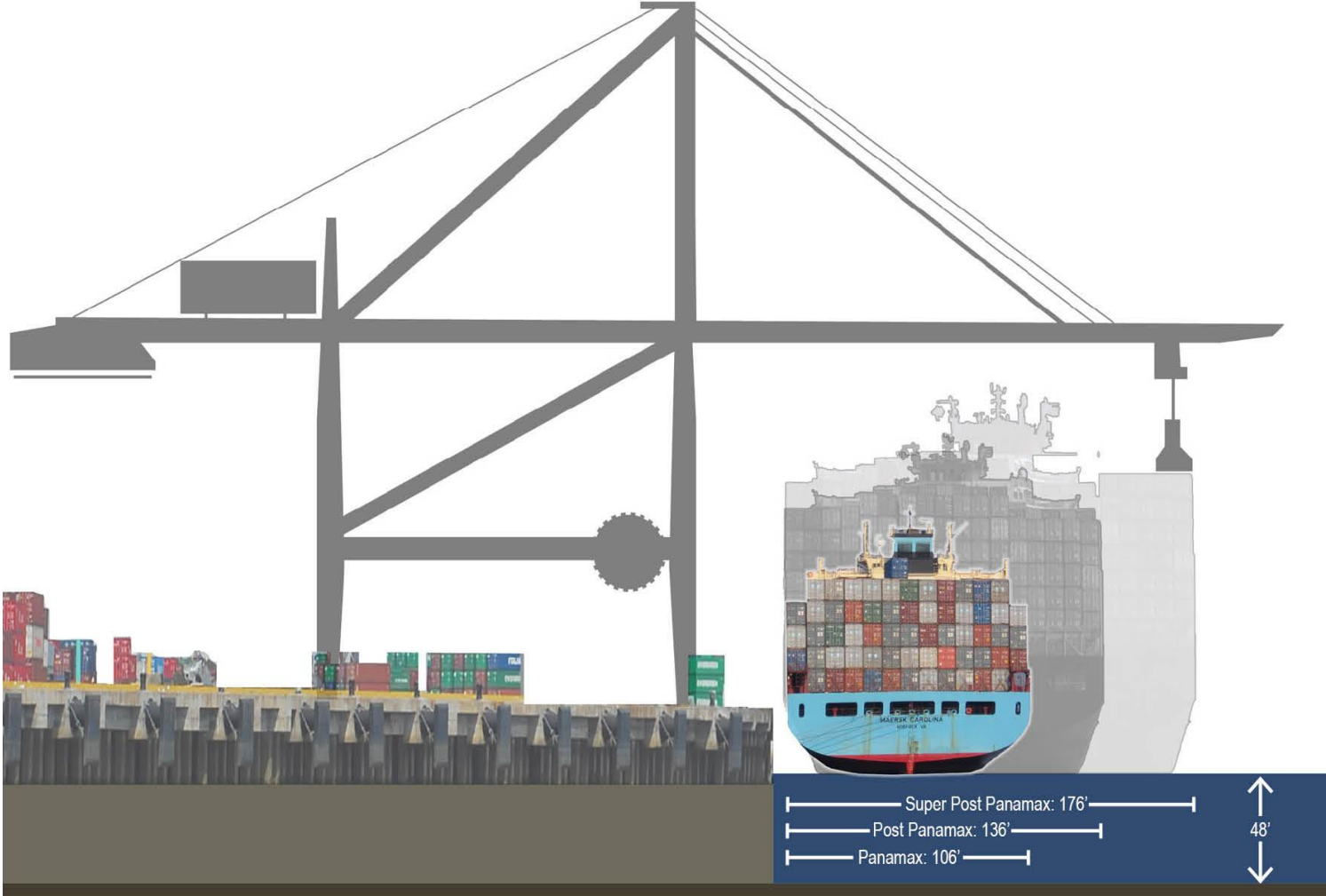
5. **INFRASTRUCTURE TECHNOLOGY:** ADDRESSING SCALE AND INTERMODAL SYSTEM CONTROL

- **CONTAINERS** (SINCE 1960s): GROW IN **LENGTH** (TWENTY-FOOT-EQUIVALENT-UNITS [TEUs] REPLACED IN SUCCESSION BY 40s, 48s, 53s)
- **SHIPS** (SINCE 1970S): CONTAINER SHIPS GROW IN **SIZE** (FIRST GENERATION CAPACITY \leq 1000 TEUs ; CURRENT TRIPLE-E CLASS \geq 18,000 TEUs)
- **CONTAINER SEAPORTS** (SINCE 1965): MULTIPLE TRANSSHIPMENT INNOVATIONS
 - + STADLE **CRANE** DESIGNS EVOLVE WITH SHIP SIZE AND VOLUME
 - + COMPUTERIZED TRANSSHIPMENT SYSTEMS: **CONSOLIDATION AND ROUTING**
 - + **DOCKSIDE ROBOTICS** AND AUTOMATION SYSTEMS REPLACE MANPOWER (INNOVATIONS SINCE 2010 LED BY ASIAN COUNTRIES)
- **CONTAINER TRAINS** (SINCE 1980s): **"DOUBLE-STACK"** FOR TRANSCONTINENTAL AND LAND-BRIDGE ROUTES
- **THE NEW PANAMA CANAL** (2016): PROVIDES ACCESS TO ALL POST-PANAMAX SHIPS

EVOLUTION IN CONTAINERSHIP SCALE



SEAPORT AND SHIP: SYMBIOTIC TECHNOLOGIES



CONTAINER PORT TRANSSHIPMENT: THE “GENERAL METHOD” BEING REPLACED WITH CONTROL AUTOMATION AND ROBOTICS

Boat Loads

The general method in which cargo ships in the U.S. are unloaded varies by port, but can be slow and arduous. The system relies heavily on human labor and older equipment—a stark contrast to automated ports in other countries that use advanced technologies such as robotic cranes and computer-controlled vehicles.

1. After a ship arrives at berth, cranes lift off containers and place them on the dock.

2. Large vehicles called straddle carriers pick up containers and place them in stacks in the storage area, where they may sit for days.

3. Containers destined for rail transportation are hauled by trucks to the port's rail yard, which has direct links to rail lines.

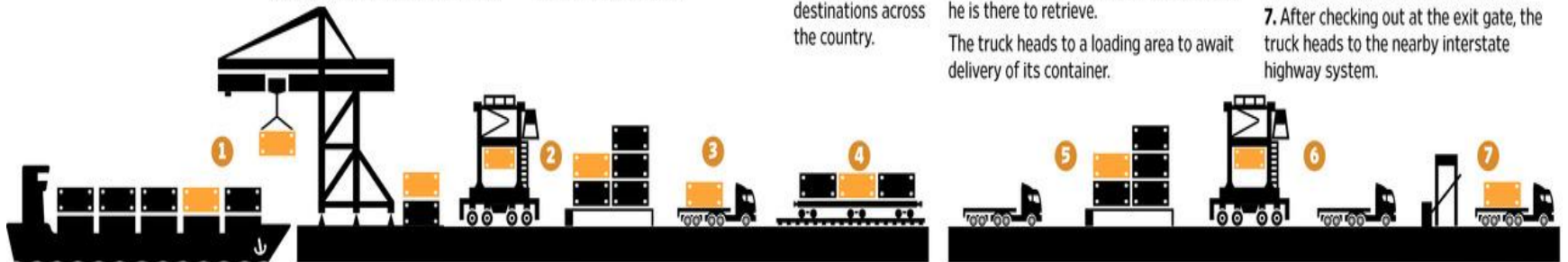
4. Those containers are put on rail cars and eventually transported to destinations across the country.

5. Most containers are transported by truck. When a truck first arrives at the terminal entrance gate, the driver scans an ID that alerts port workers what container he is there to retrieve.

The truck heads to a loading area to await delivery of its container.

6. A straddle carrier retrieves the container from the stack, brings it to the truck and deposits it on a chassis, the undercarriage used to transport containers by truck.

7. After checking out at the exit gate, the truck heads to the nearby interstate highway system.



Note: The illustration above is based on the logistical model at one the Port of Virginia terminals. Source: Port of Virginia

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DYNAMICS OF A MULTIMODAL SYSTEM OUT OF BALANCE

- A. **“LOAD CENTER” DEMAND**: SHIPPERS INVESTMENT IN LARGE-SCALE TECHNOLOGIES AND PREFERENCE FOR “ONE-STOP” TRANSSHIPMENT DRIVES COMPETITION TOWARD **FEWER BUT LARGER SEAPORTS**

- B. **“LOAD-CENTER” CAPACITY**: MISMATCH BETWEEN U.S. PORTS’ TRANSSHIPMENT CAPACITY AND GROWTH IN CONTAINER VOLUME AND SHIP SIZE; **CAUSES CONGESTION , DELAY, AND HIGHER SHIPPING COSTS**

- C. **ROUTE COMPETITION**: SHORTFALL IN U.S. LAND-BRIDGE INFRASTRUCTURE INVESTMENT THREATENS WEST COAST PORTS; **FAVORS PANAMA CANAL**

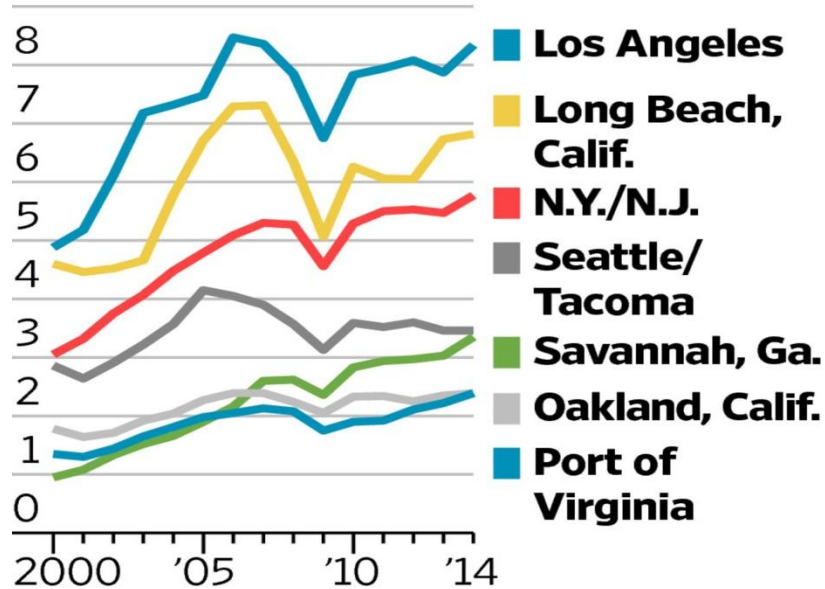
- D. **ROUTE COMPETITON**: PANAMA LIMIT ON SHIP SIZE RESTRICTS ROUTE CHOICES; **NEW PANAMA PROMISES TO REDUCE DISADVANTAGE**

COMPETITION: “LOAD-CENTER” DEMAND & CAPACITY

Piling Up

The volume of container traffic at U.S. ports.

9 million TEUs*



*Twenty-foot-equivalent units, or TEUs, the shipping industry's benchmark for capacity
Source: American Association of Port Authorities

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CONGESTION & DELAY ISSUES AT WEST COAST PORTS

Rerouted

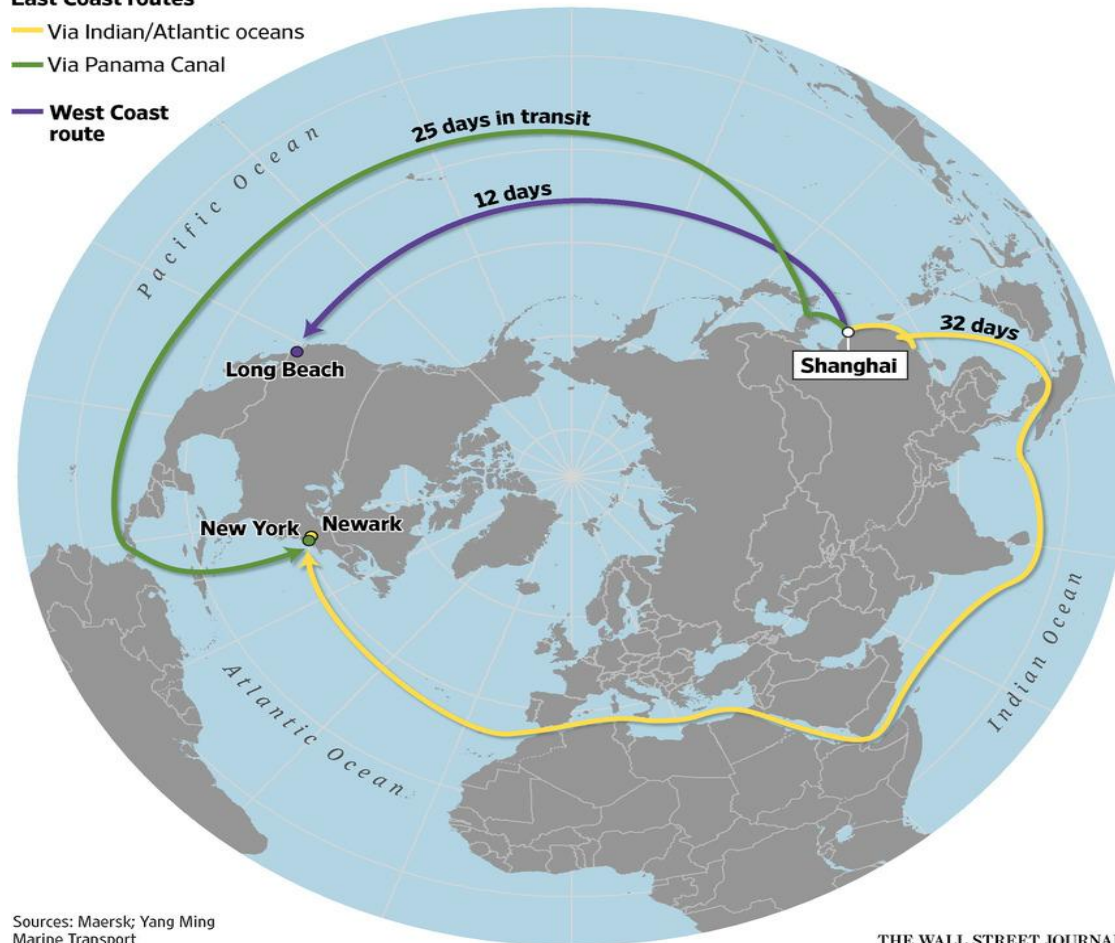
Companies have increasingly shifted cargo to East Coast ports to avoid congestion at West Coast ports, despite the longer trips.

East Coast routes

— Via Indian/Atlantic oceans

— Via Panama Canal

West Coast route



Sources: Maersk; Yang Ming Marine Transport

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PANAMA'S PROSPECTS IN A GLOBAL CONTEXT....

LIKELY TO HINGE ON:

1. HOW ROUTE ORIGIN (**PRODUCTION**) AND DESTINATION (**CONSUMPTION**) SITES FURTHER EVOLVE WORLDWIDE
2. HOW **SHIPPING FIRMS** ALTER THEIR CORPORATE INTEREST CALCULATIONS
3. HOW THE IMPLEMENTATION OF **ALTERNATIVE TRADE ROUTES** UNFOLDS
4. HOW NEW **TECHNOLOGIES** DRIVE COMPETITION WITHIN THE MULTIMODAL ROUTE SYSTEM



WHAT EVERYONE SHOULD KNOW

CANAL STATISTICS.

Length of Canal 50 1/2 Miles.
 Culebra Cut Depth 300 Feet.
 Locks in Pairs 12
 Locks Usable Length 1000 Feet
 " Width 110 "
 Excavation Estimated Total 174,668,596 CY
 By French Useful 29,308,000 CY
 Concrete Total Estimate 5,000,000 CY
 Time of Transit Through Canal 10 1/2 Hours.
 " Passage " Locks 3 "
 Canal Force Actually At Work 39,000
 Canal Co Formed By The French 1879.
 " Work Began " " 1881.
 Eight Years Work " " Cost \$300,000,000.
 Work Began By U.S. May 4 1904
 U.S. Paid French Canal Co \$40,000,000.
 U.S. " Republic of Panama \$16,000,000.
 Cost of Canal Total Over \$375,000,000.
 Date of Completion Jan 14 1915
 Shortening of Route N.Y. to S. F. 8,415. M
 A Yearly Saving of Millions
 to the Shipping World.

Meeting of the Atlantic & Pacific
THE KISS
 OF THE OCEANS 1915

Archie Hilland
 ARTIST
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