Maritime Logistics Clusters:
Cases: Panama and Hampton Roads

Ricardo Ungo, *Maritime & Supply Chain Management*

Trade Facilitation & Innovation Summit

Lima, Peru, October 2020

Agenda

1. Features of Maritime Clusters

2. Cases: Panama and Hampton Roads

3. Maritime Cybersecurity

4. Future trends

Agenda

1. Features of Maritime Clusters

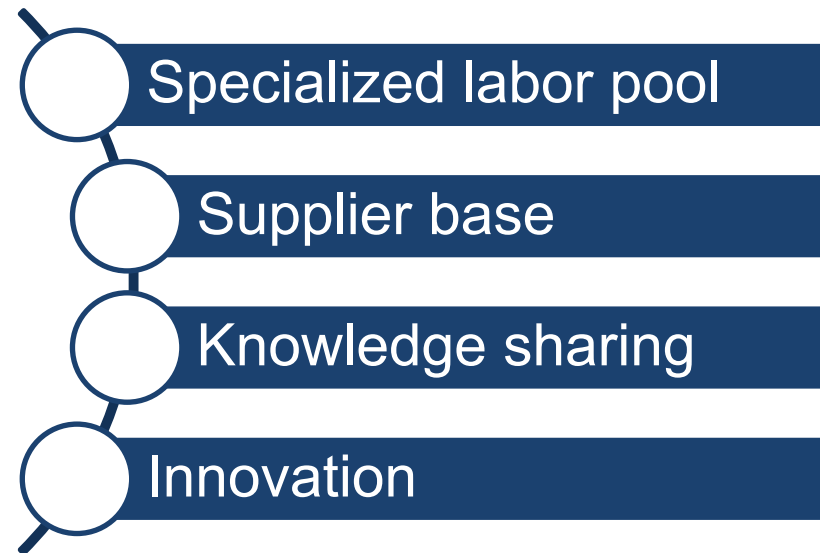2. Cases: Panama and Hampton Roads

3. Maritime Cybersecurity

4. Future trends

Clustering in logistics

Creating a comparative advantage in logistics….

cluster in one geographic area and serving the same industry

Specialized labor pool

Supplier base

Knowledge sharing

Innovation

Logistics Clusters

Logistics cluster

- a group of logistics-related business activities concentrated in a single geographic area.

Conditions:

- Geographical location
- efficient physical infrastructure
- IT
- financial services

Benefits:

- knowledge exchange
- collaborative environment
- more efficient transportation options
- resource sharing
- product customization
- job creation

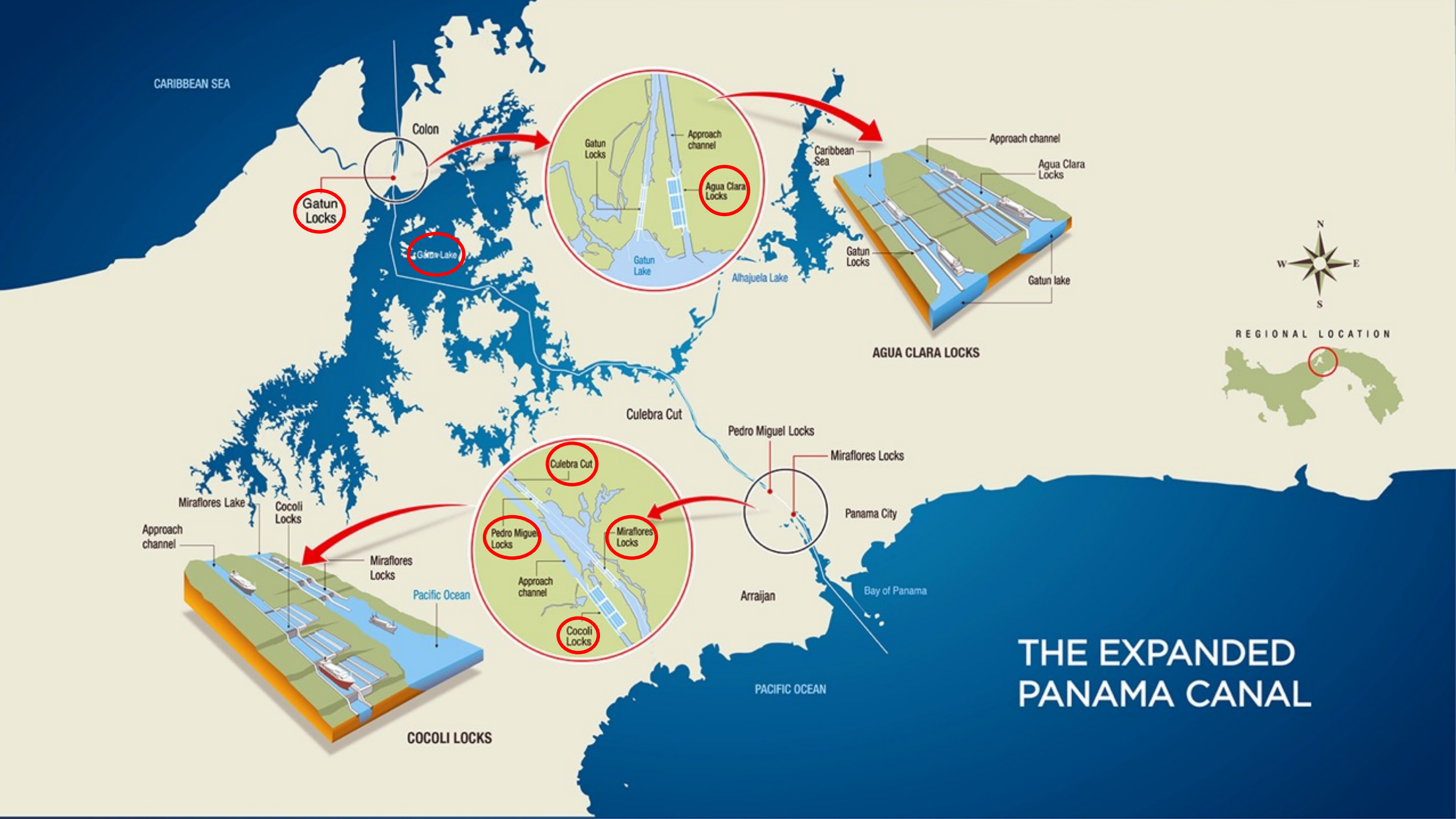Local governments and chambers of commerce can be instrumental in developing such clusters.

Agenda

1. Features of Maritime Clusters

2. Cases: Panama and Hampton Roads

3. Maritime Cybersecurity

4. Future trends

THE EXPANDED PANAMA CANAL

The Expanded Panama Canal

	Pre-Expansion		Post-Expansion
Max Vessel Capacity	Panamax (294m length)		Neo-Panamax (366m length)
Capacity	4,400 TEU's		13,000 - 14,000 TEU's

Raise vessels at 26 m above sea level using three sets of locks.

Location of the Gates in the Atlantic

Location of the Gates in the Pacific

Atlantic Ocean — Lower Chamber — Middle Chamber — Upper Chamber — Gatun Lake

Gatun Lake — Upper Chamber — Middle Chamber — Lower Chamber — Pacific Ocean

Chagres River

Atlantic Ocean — Lower Chamber — Middle Chamber — Upper Chamber — Gatun Lake — Approach Channel — Upper Chamber — Middle Chamber — Lower Chamber — Pacific Ocean

NEW LOCKS IN GATUN

NEW LOCKS IN COCOLI

PROFILE OF THE THIRD SET OF LOCKS

80 km

Source: Panama Canal
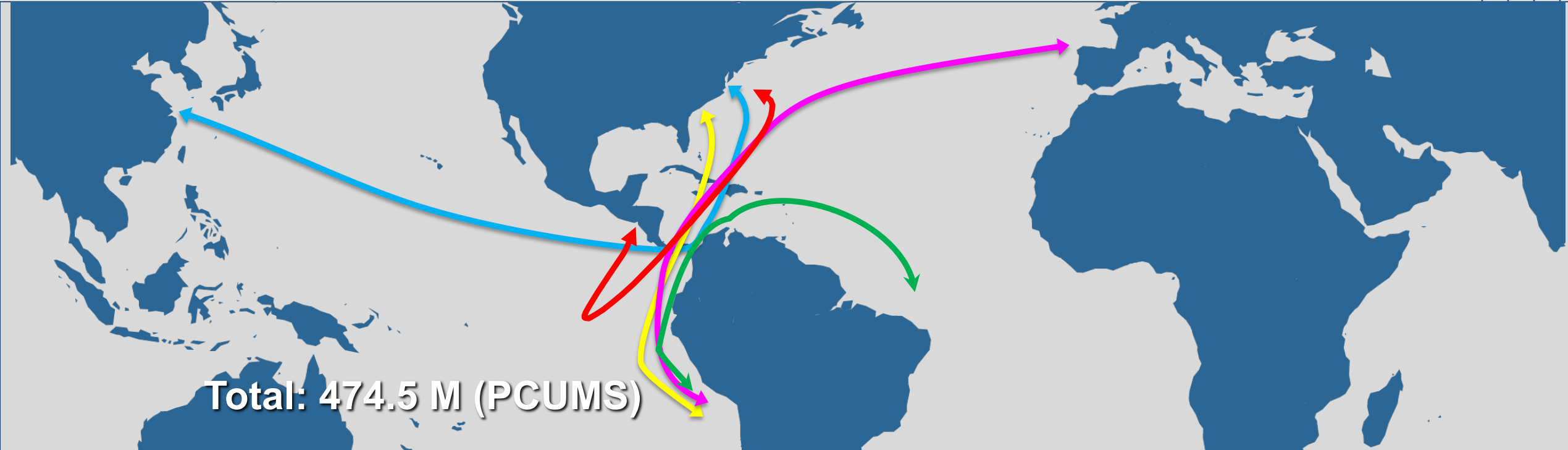
2016

Picture: Panama Canal

Panamax and Neopanamax Locks -- Atlantic side

Picture: Panama Canal

Main Routes – FY 2020

Total: 474.5 M (PCUMS)

Route	Color	Value
Asia – US East/Gulf Coasts	(blue)	212 M (45%)
South America West Coast – US East Coast.	(yellow)	37 M (8%)
South America West Coast - Europe	(magenta)	26 M (5%)
Central America West Coast – US East Coast	(red)	22 M
South America Intercoastal	(green)	20 M

Main Users of the Panama Canal

Ranking	Country (FY2019)
1	USA
2	China
3	Japan
4	Chile
5	Mexico
6	South Korea
7	Colombia
8	Peru
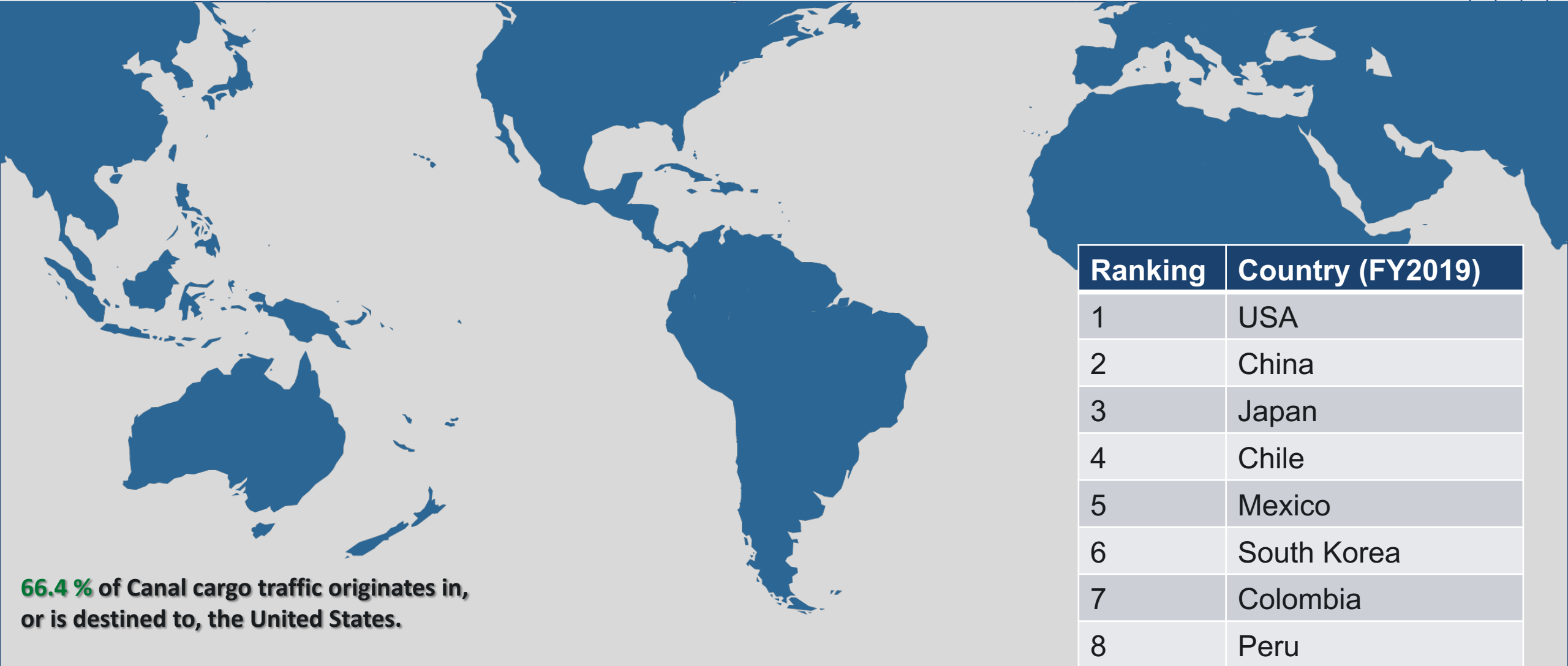
66.4 % **of Canal cargo traffic originates in, or is destined to, the United States.**

* Measurement in million long tons

Source: Panama Canal

Evolution - PCUMS tons and transits

+40% in volume

7.3X in 65 years

4,832 — FY 1955
9,931 — FY 1975
18,940 — FY 1995
35,520 — FY 2020

Toneladas por barco

Transits   PCUMS tons

Source: Panama Canal

The role as regional hub

Panama Canal Relevance on the Seaborne Trade of Selected Latin-American Countries (in tons)

9%

8%

29%

2%

11%

31%

28%

27%
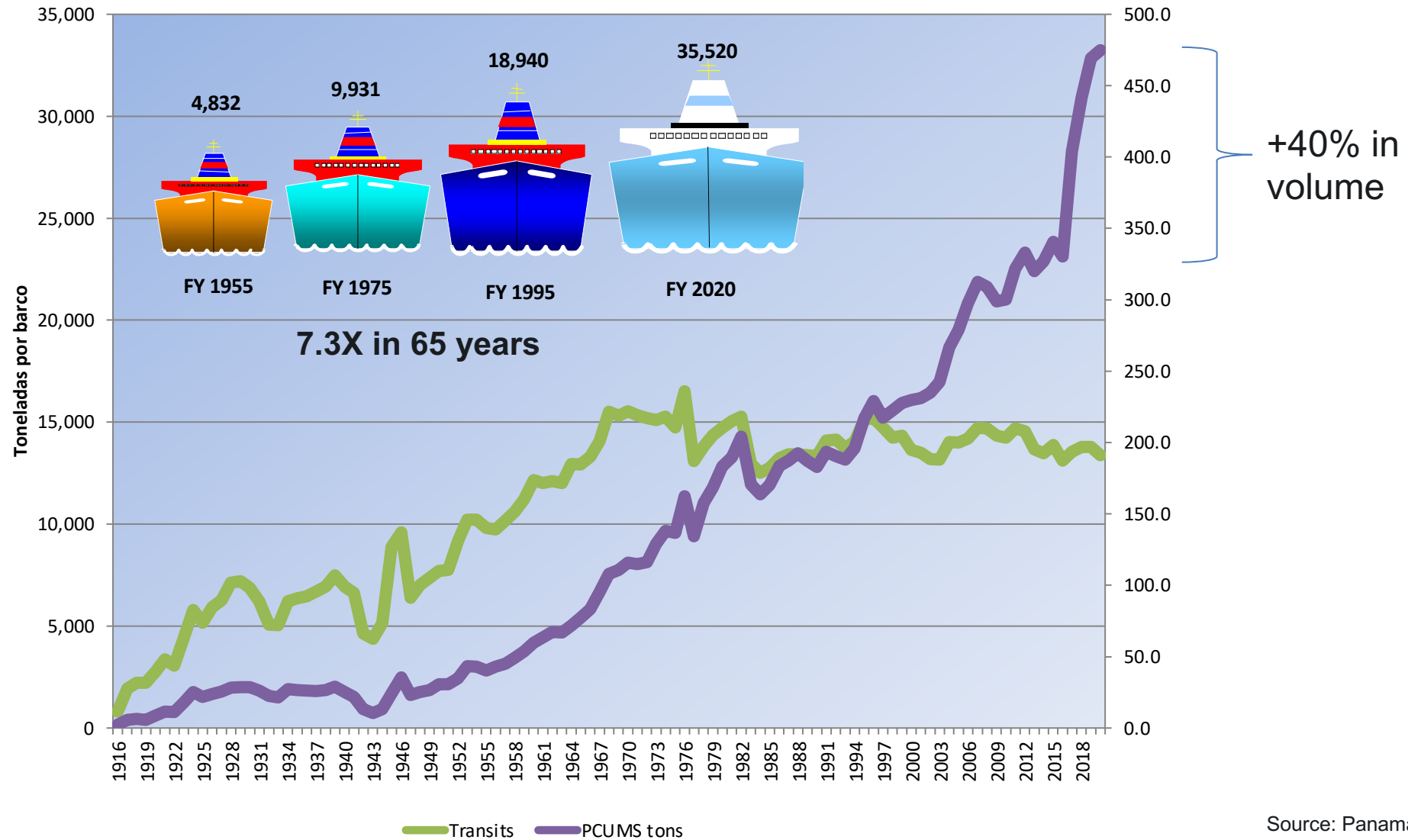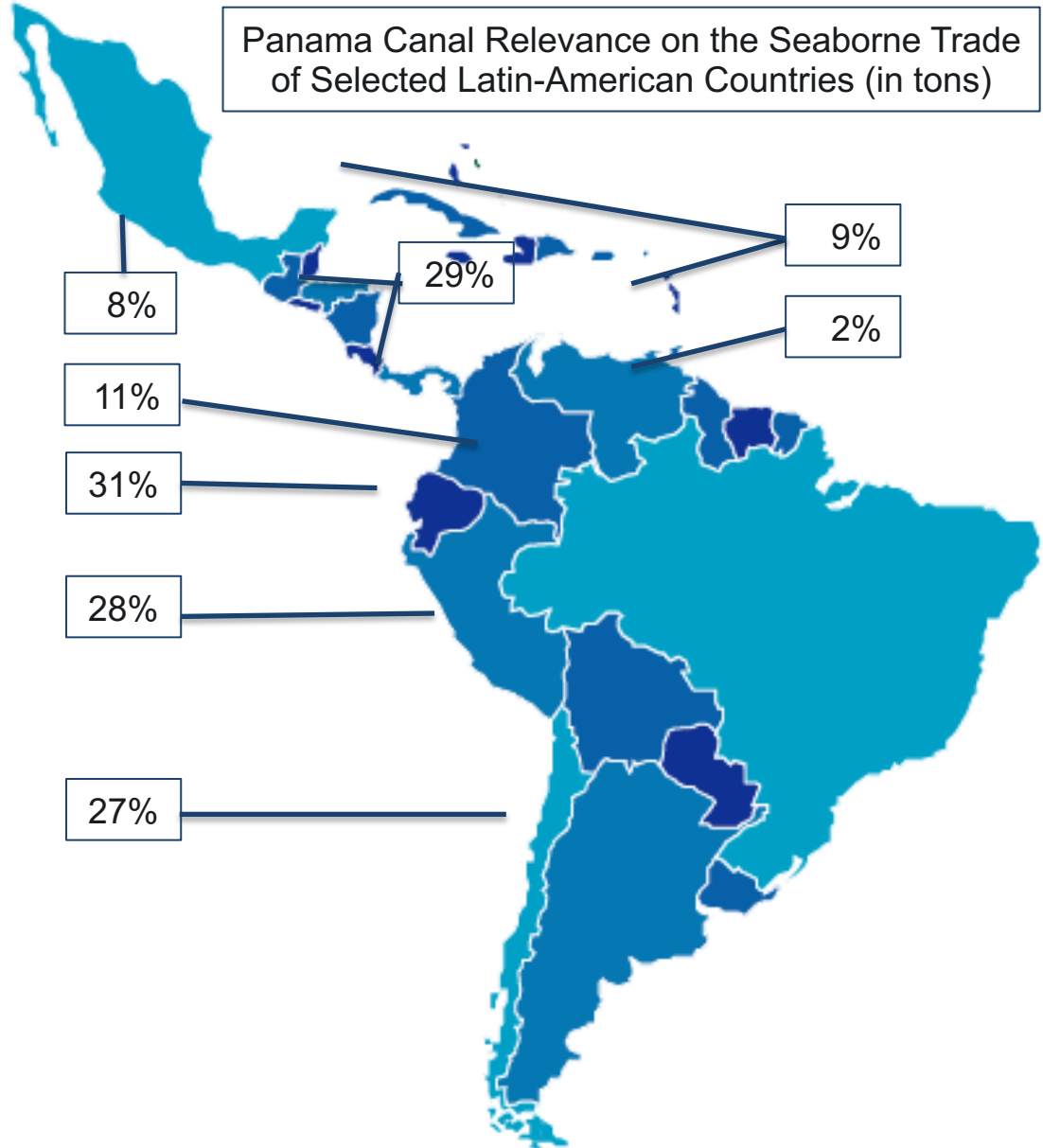
The Panamanian port system serves the region and fosters Latin-American trade

Facilitates imports and reduces costs

Promotes intraregional commerce

Provides an export platform for the region
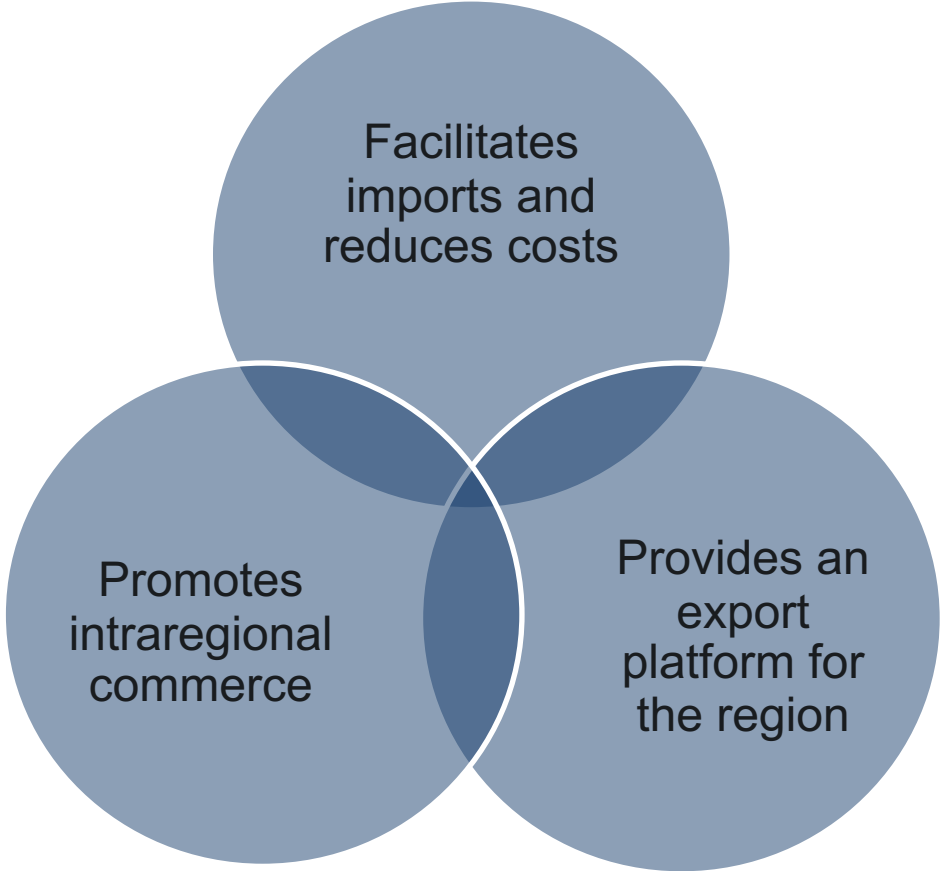
One port with terminals in both oceans

ATLANTIC SECTOR

Manzanillo International Termina (2.5 M TEU)

Panama Ports Company - Cristo (1 M TEU)

Colon Container Terminal (0.8 M TEU)

TRANSISTHMIAN RAILROAD

LNG terminal

TRANSISTHMIAN HIGHWAY

PACIFIC SECTOR

Panama Ports Company - Balb (1.9 M TEU)

PSA (1 M TEU)

Total Throughput 2019 = 7.3 m TEUs

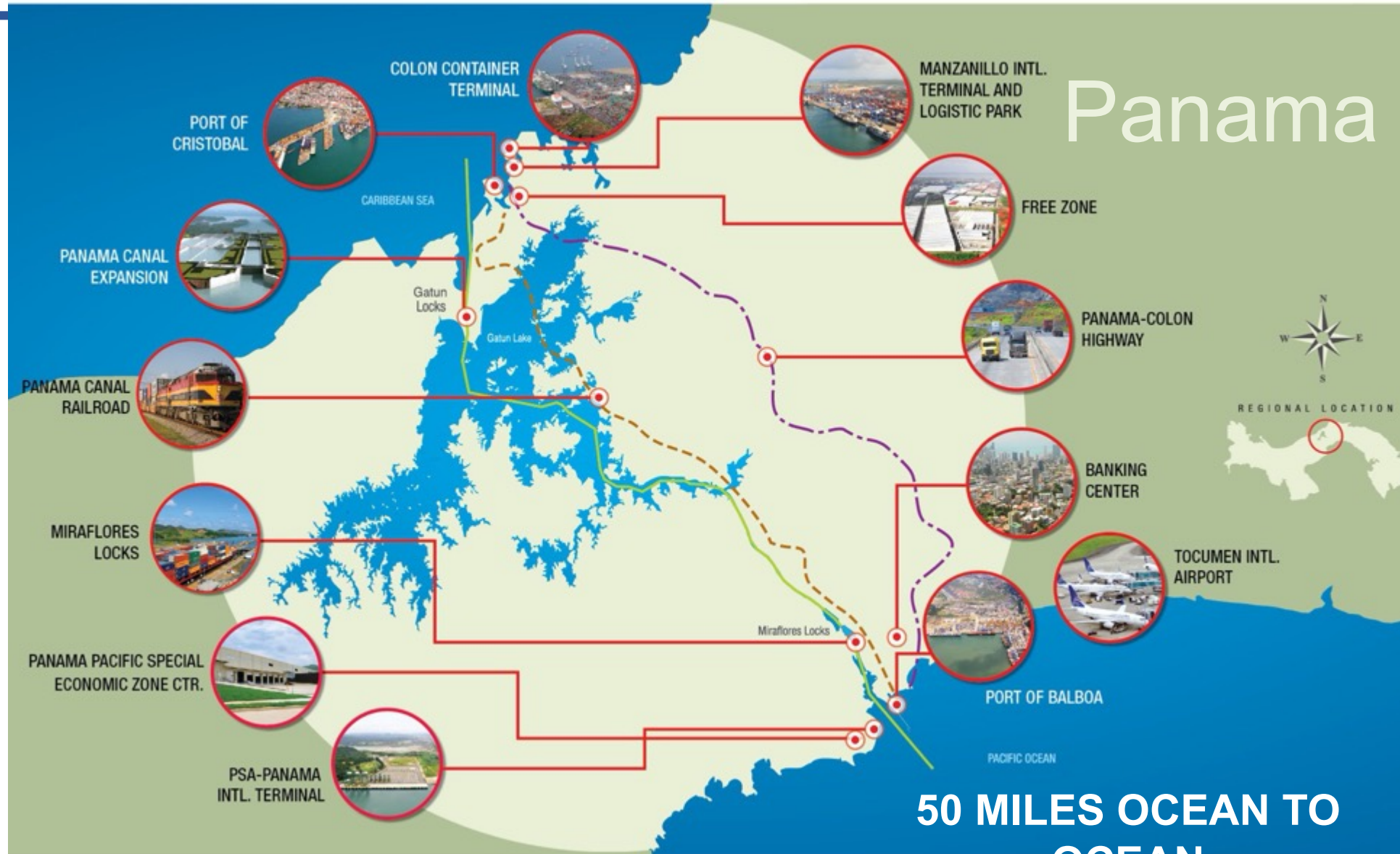# Integration – Port - Free Zone – Atlantic side
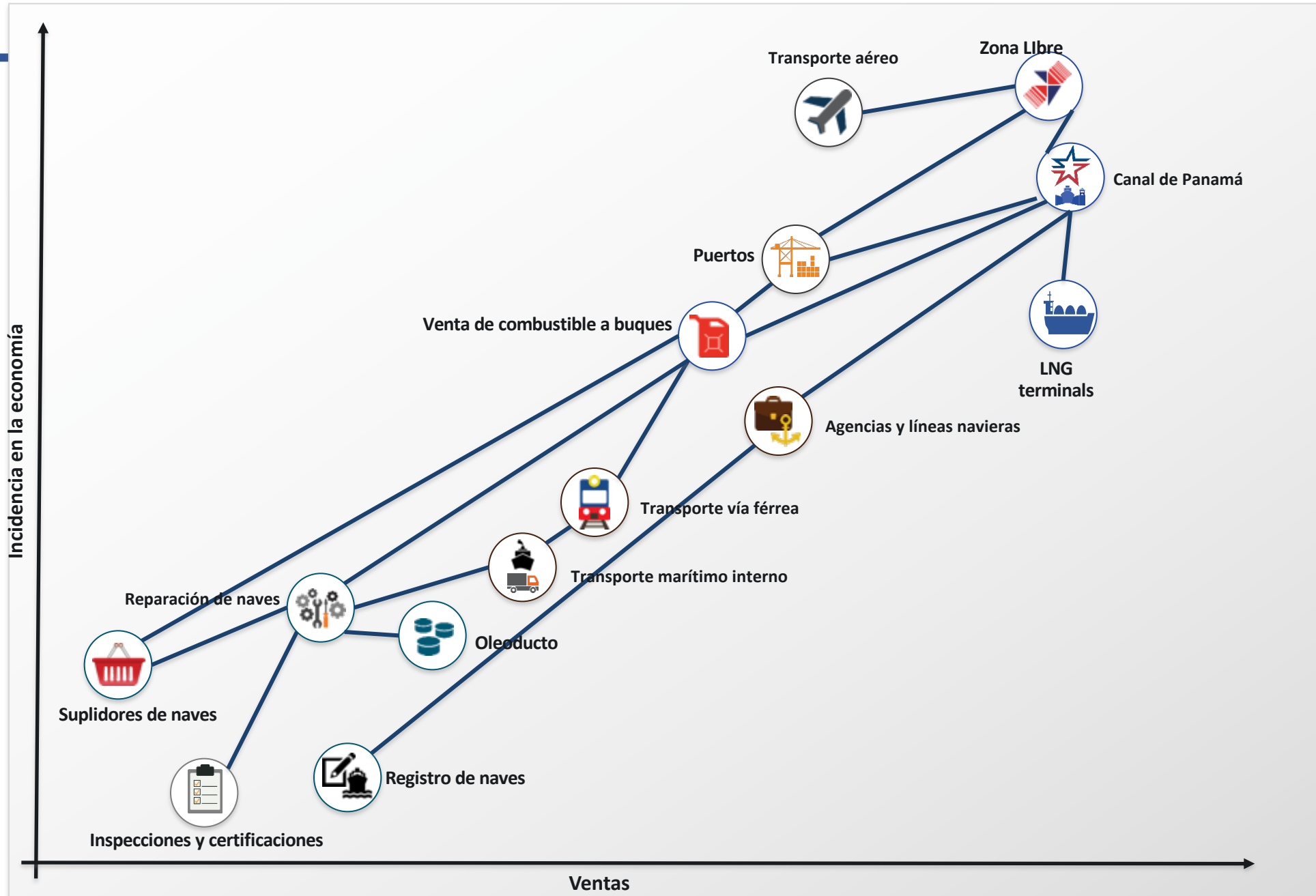

Cristobal

MIT

Railway

The Transportation and Logistics Hub

Logistic cluster structure

Hampton Roads

- One of the world's deepest natural harbors (ice free)
- US largest Naval base.
- Largest concentration of shipbuilding/ship repair activity in US
- Third largest port on the US East coast
- Two Class I railroads (CSX/ NS)
- Two airports
- Barge services
- Highway network
- Transoceanic submarine cables / digital port
- A newly developing offshore wind industry

Logistics assets

Port — 3RD LARGEST PORT ON THE EAST COAST

Air — 2 INTERNATIONAL AIRPORTS - 3.8 MILLION + ANNUAL PASSENGERS

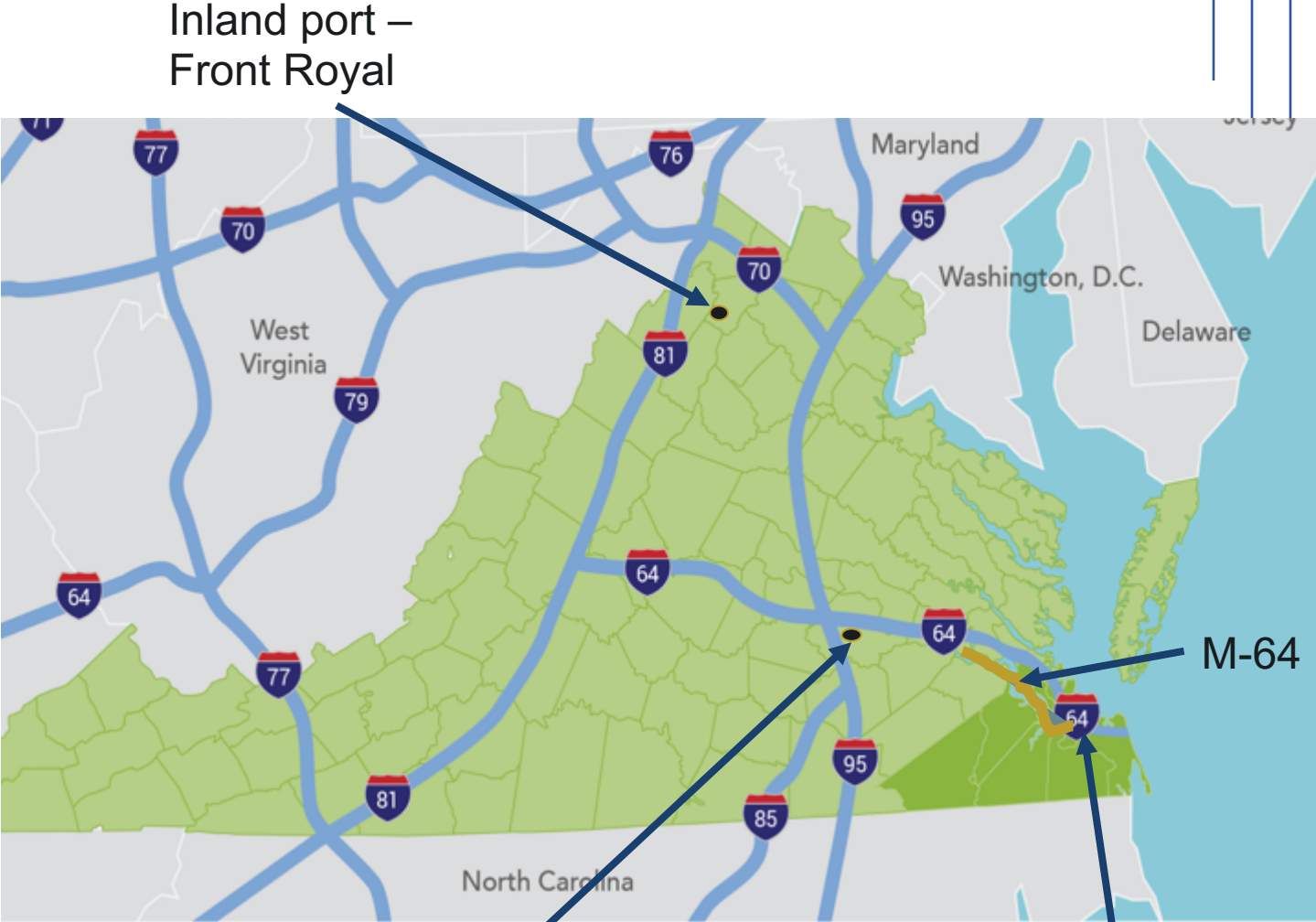**Rail** — 2 CLASS I RAIL SERVICES - NORFOLK SOUTHERN AND CSX

Road — CONNECTED TO 47% OF THE US WITHIN AN 11 HOUR DRIVE

Barge

Inland port – Front Royal

M-64

Inland port – Richmond Marine Terminal

Main seaport/ airport

Time to market

Truckload Transit Days
- 1
- 2
- 3
- 4
- 5
- 6
- 7
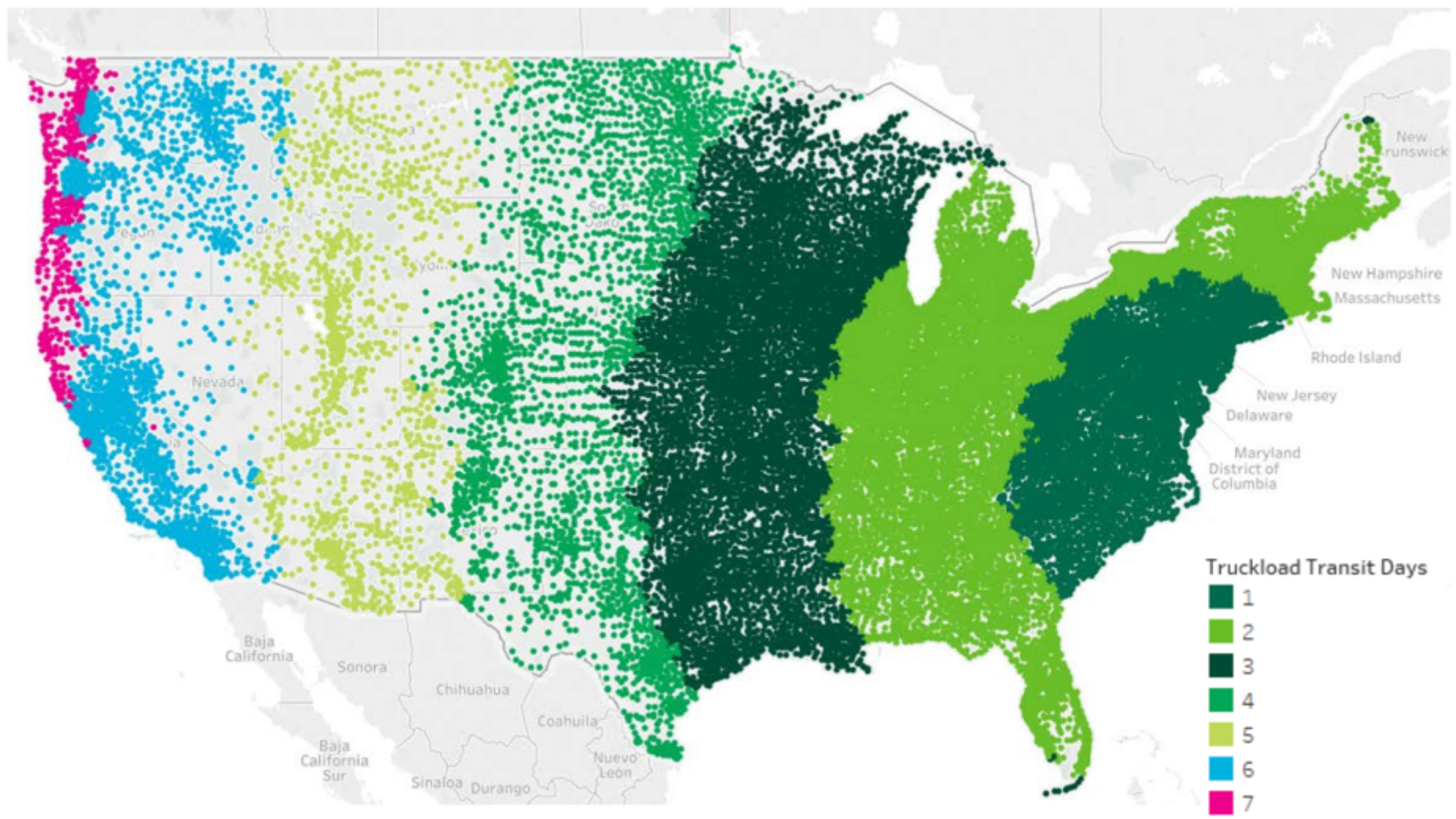
Seaport terminals

Currently has 50 ft./15.24 m. channels and berths, with congressional authorization for 55 ft./16.76 m. deep channels. Dredging work started December 2, 2019

Expansion at VIG

By 2024, the Port of Virginia will complete $1.5 billion in modernization and expansion projects.
Total POV throughput in 2019 = 2.9 M TEUs
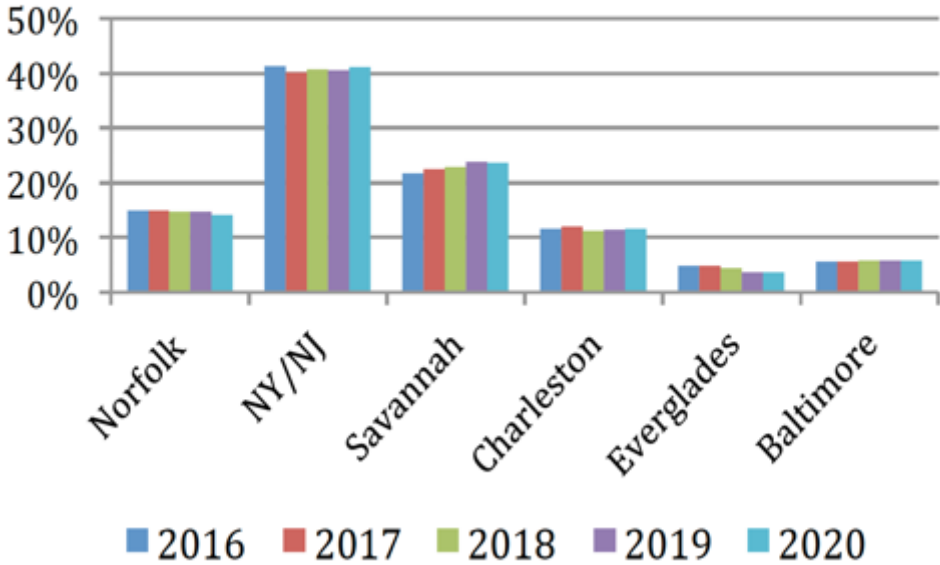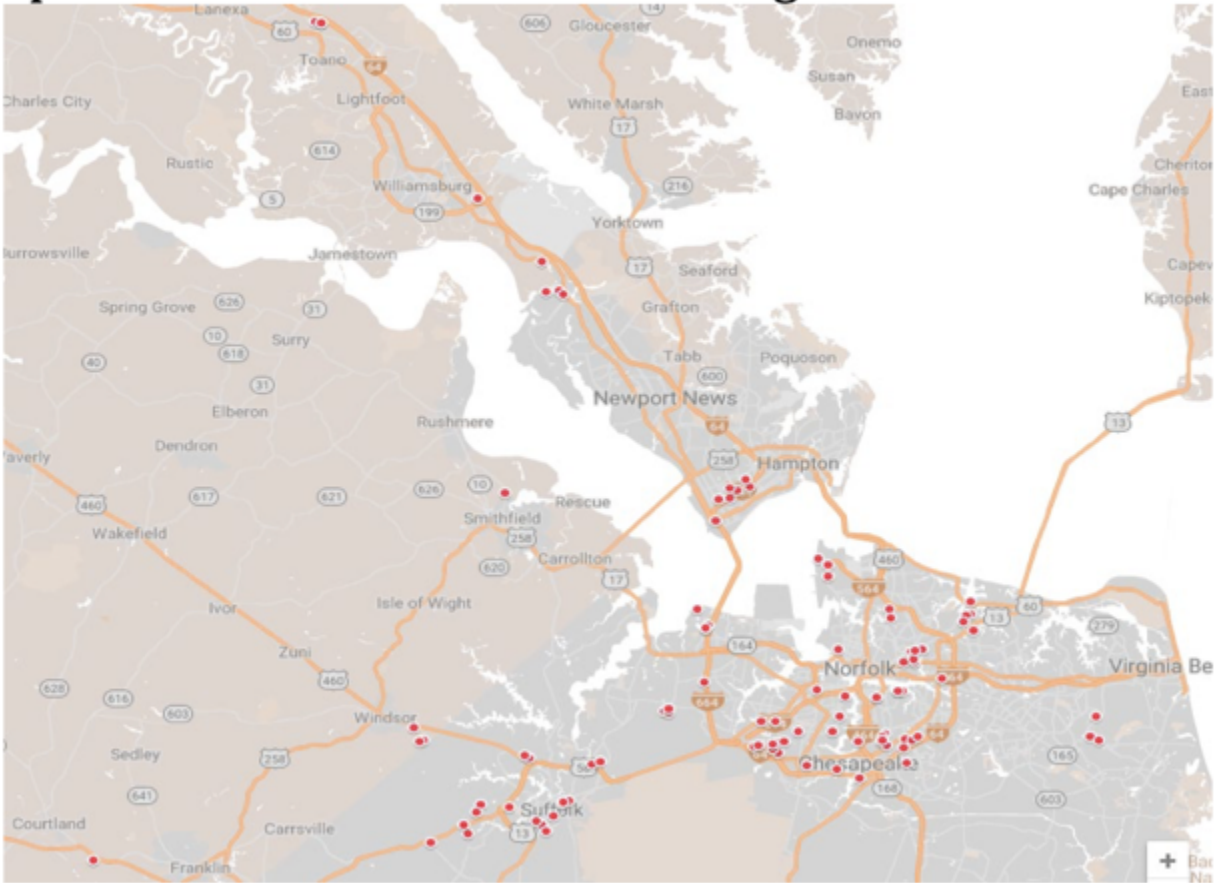
Distribution assets

Import Loaded TEUs Market share: East Coast (YTD May)

Spatial distribution of warehousing activities

Source: Virginia companies' websites, author's calculations

Main Trade lanes
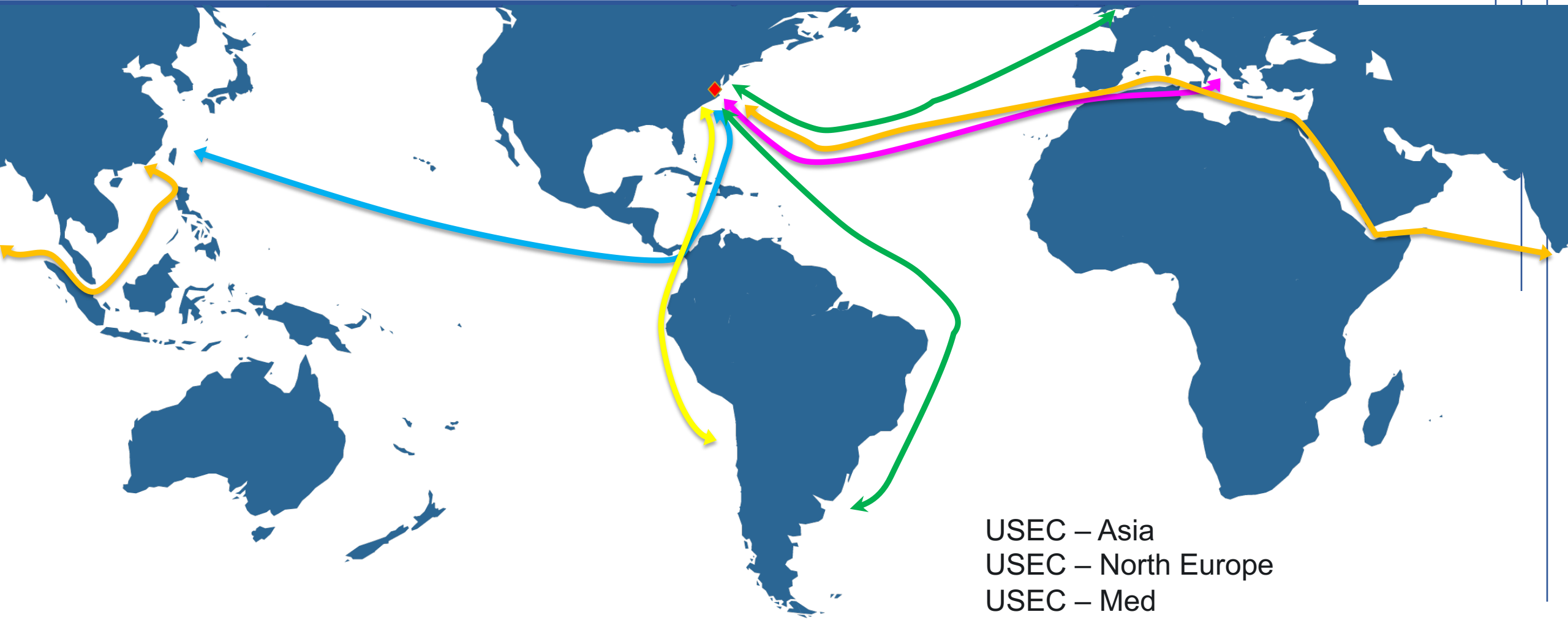
USEC – Asia
USEC – North Europe
USEC – Med
USEC – South America

Rail connectivity

Map labels (left map):
- Chicago
- Cleveland
- 1,264 Miles to Chicago
- Harrisburg
- 1,031 Miles to Chicago
- Columbus
- Roanoke
- 28 Tunnels Modified to Provide 20'-3" Clearance Required for Double-Stacked Containers
- — Heartand Corridor
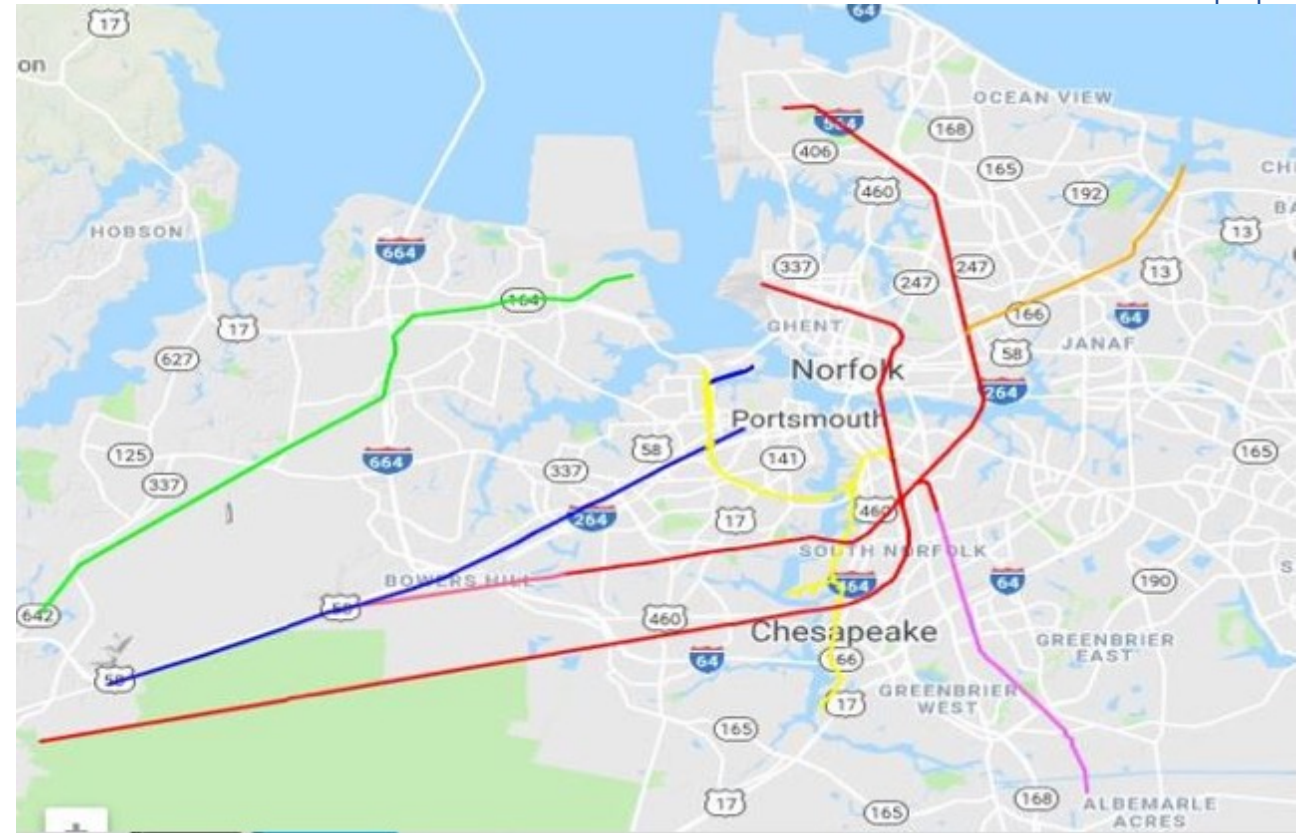
2 Class I railroads operate on-dock (NS and CSX), providing two-day double-stack rail to and from Midwest markets.

Map Key
NPBL –Yellow
CSX – Blue
NS – Red
Bay Coast – Orange
C&A – Purple
Commonwealth RR – Green

	Panama	Hampton Roads
Port type	Transshipment	Gateway
Inland distribution	Limited	Main
Rail connectivity	Trans-oceanic	2 class I - Midwest
Distribution infrastructure	Free Zones – re-export	Free Zone & Import DCs
Cluster	Mainly logistics	Logistics and industrial
Air connectivity	Main node	node
Shipyards	Repairs	Shipbuilding & repairs
Submarine cables	Yes	Yes

Agenda

1. Features of Maritime Clusters

2. Cases: Panama and Hampton Roads

3. Maritime Cybersecurity

4. Future trends

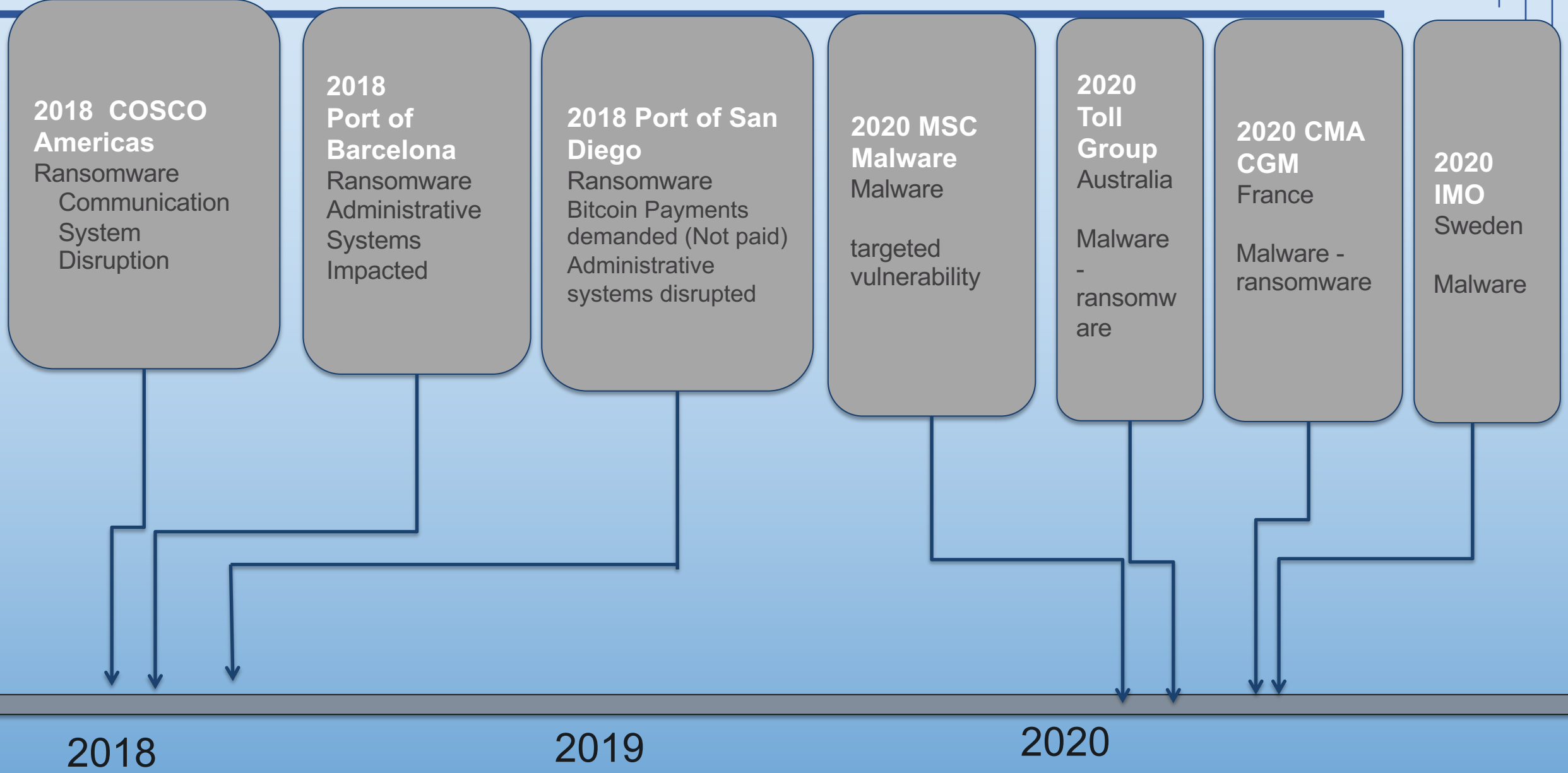# Notable Maritime Cybersecurity Incidents

A Turning Point:

**2017 Maersk
Destructive Ransomware**

- 4,000 servers
- 45,000 workstations
- 2,500 applications
- Impaired TOS
- 20% reduction in total shipping volume
- Losses from downtime and lost business
- Reimbursements for re-routing/storing cargo

- Cost: Between $250 million and $300 million

Notable Maritime Cybersecurity Incidents

2018 COSCO Americas
Ransomware
Communication System Disruption

2018 Port of Barcelona
Ransomware
Administrative Systems Impacted

2018 Port of San Diego
Ransomware
Bitcoin Payments demanded (Not paid)
Administrative systems disrupted

2020 MSC Malware
Malware

targeted vulnerability

2020 Toll Group
Australia

Malware - ransomware

2020 CMA CGM
France

Malware - ransomware

2020 IMO
Sweden

Malware

2018

2019

2020

Maritime-specific Challenges

Vessels

• Information Technology (IT): computers, networks and applications.
• Operational Technology (OT): engine control, ECDIS, on-board measurement and control systems, PLCs and remote support for engines.

Port Terminals

• Information Technology (IT): computers, networks and TOS.
• Operational Technology (OT): Industrial control systems for machinery and automation

Challenges
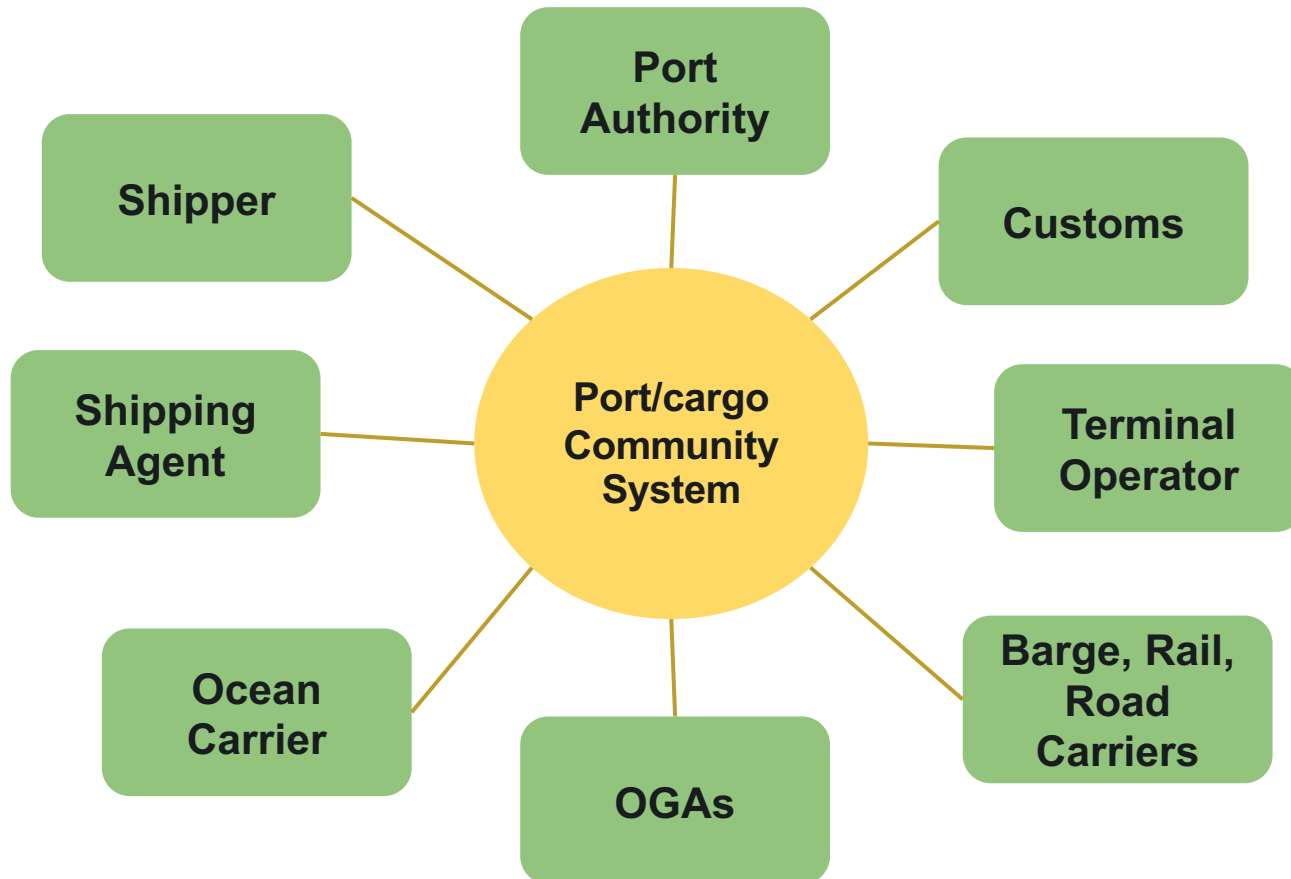
- ✓ Non-Digital Culture
- ✓ Lack of Awareness & Training
- ✓ Port Ecosystem Complexity
- ✓ Legacy Systems
- ✓ Keeping up w/Latest Threats
- ✓ IT & OT Convergences
- ✓ Complex Supply Chain

Cyber-security cannot be seen as a 'technology problem for IT to fix'.

Agenda

1. Features of Maritime Clusters

2. Cases: Panama and Hampton Roads

3. Maritime Cybersecurity

4. Future trends

Impact of Covid-19 on Global Supply Chains

- Global Supply Chains rely heavily on seaborne trade. Over 90% of the world's goods are shipped via ocean freight.

- Two shock waves that brought disruption to global supply chains:

  First: Supply-side - Lockdown in China, Europe

  Second: Demand-side - Lockdown in USA

Impact of Covid-19 on SC trends

accelerated the current trends for:

The need for social distancing and contactless operations

The need for rapid response

Digitalization

Automation of processes

Teleworking

Visibility in global supply chains

Natural evolution

Transport hub:

- transport hub for regional markets

Value-added logistics hub:

- basic value added activities take place.
- These include blending, re-packing, re-labeling, assembling, etc.

Industrial complex

- manufacturing activities for which the logistics chain cost is a critical factor.

- Manufacturing results in double volumes: import of raw material and shipment of finished products.

The future

- Multimodal emphasis

- A greater emphasis in the resilience of supply chains (risk management, business continuity plans, etc)

- More diversification on global value chains to reduce dependency

- Reshoring / nearshoring of critical supply chains

- Supply chain/Ports will be digital (digital twins, IoT, AI, unmanned operations)

- Greater supply chain visibility with PPP

Thank you!