Hinterland Interfaces, Intermodal & Inland Terminal Operations

International Best Practices

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Agenda

Challenges for Intermodal Hinterland Operations

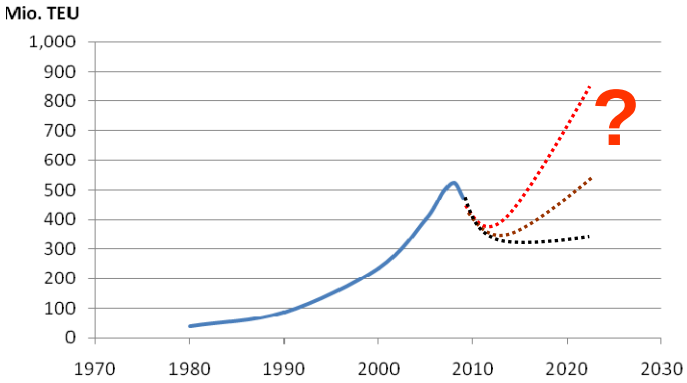
Impacts on Intermodal Network and Terminal Structures

Best Practice Case – CSX Hub Terminal North West Ohio

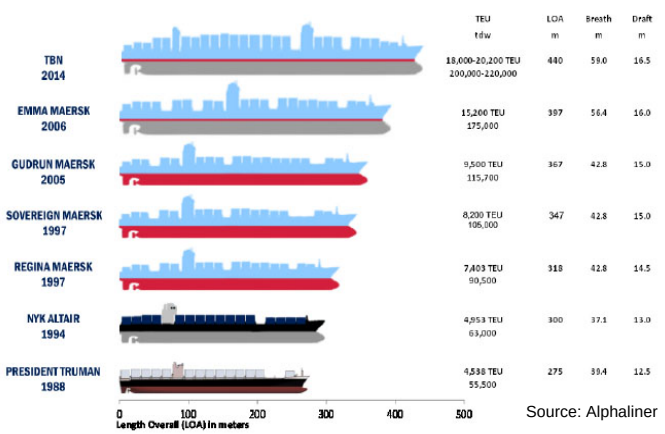
Changes in the Maritime Industry

Market Growth and Vessel Size Development

Global Container Transport Growth



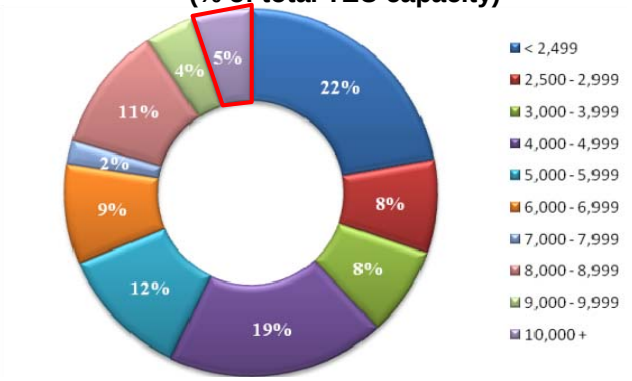
Evolution of Containerships 1985-2011



Source: Alphaliner

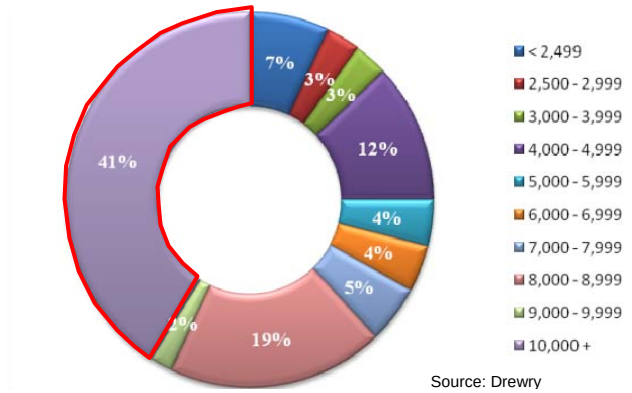
Vessel Size Growth, Fleet Segmentation

(% of total TEU capacity)



Order Book Segmentation

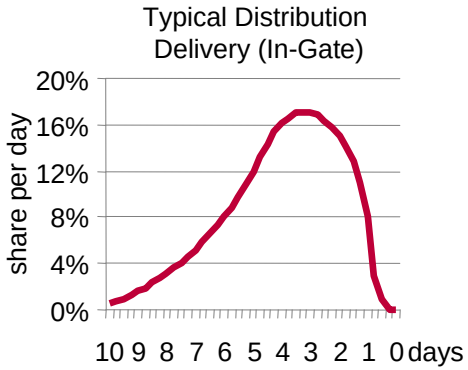
(% of TEU order capacity)

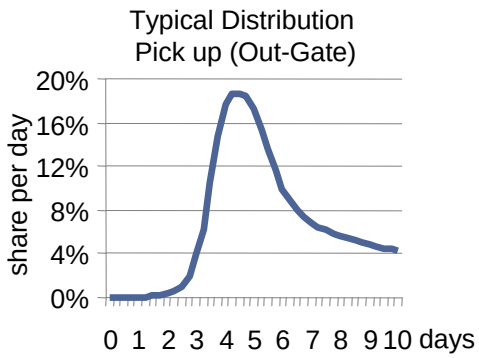


Source: Drewry

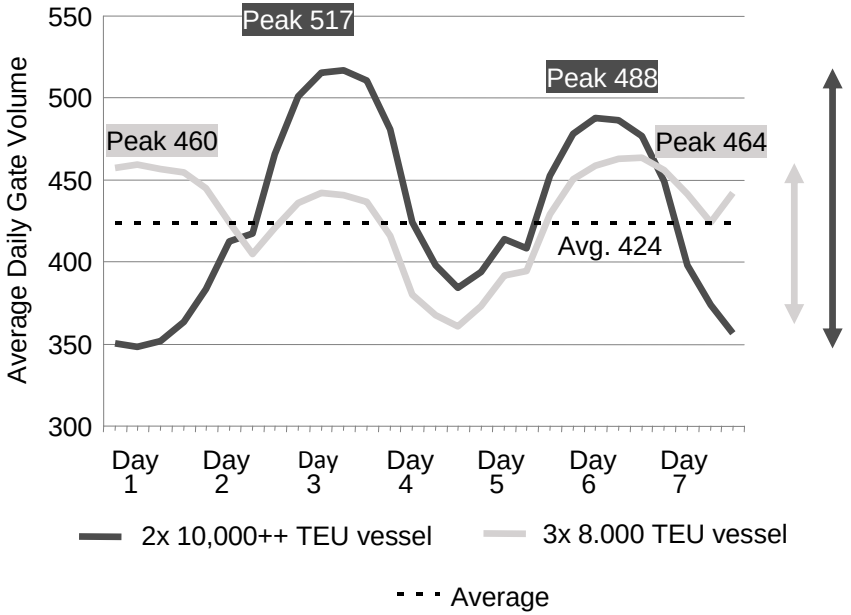
Challenges: Port Terminal Dimension

Consequential Interface Issues





Change of call pattern from tri-weekly 8,000 (4,000 moves) to bi-weekly 10,000 (6,000 moves) TEU vessels



→ **Day-to-day volatility increased by 80%**

→ **Total peak increased by 11%**

→ **Vessel Size Growth Creates new Challenges for Intermodal Railway Facilities in Ports and on Intermodal Networks!**

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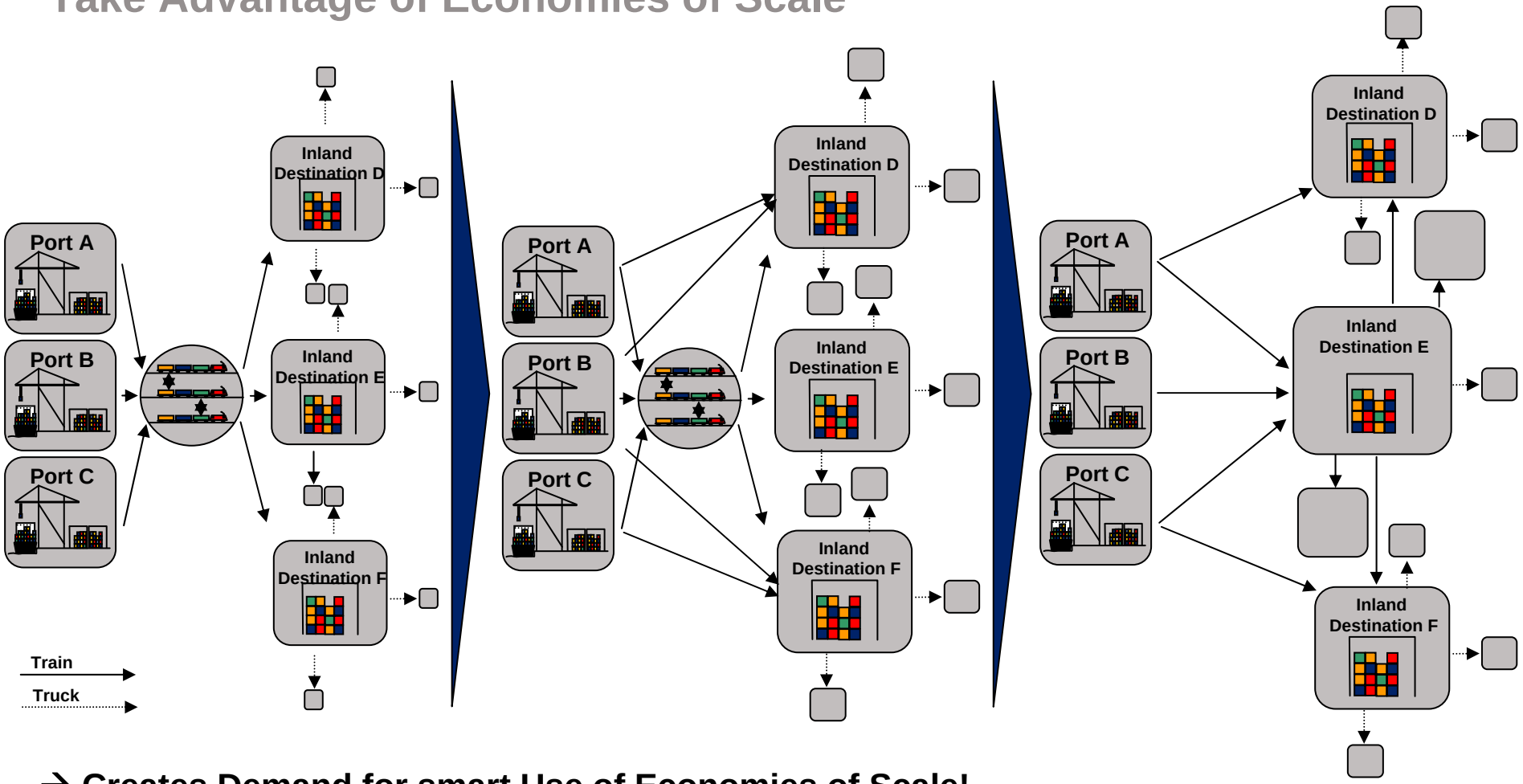
Changes to Network Architecture

Take Advantage of Economies of Scale



→ Creates Demand for smart Use of Economies of Scale!

Changes to Terminal Intermodal Operations

Existing Terminal Networks

→ Existing Terminals are not Designed to Serve as Hubs!

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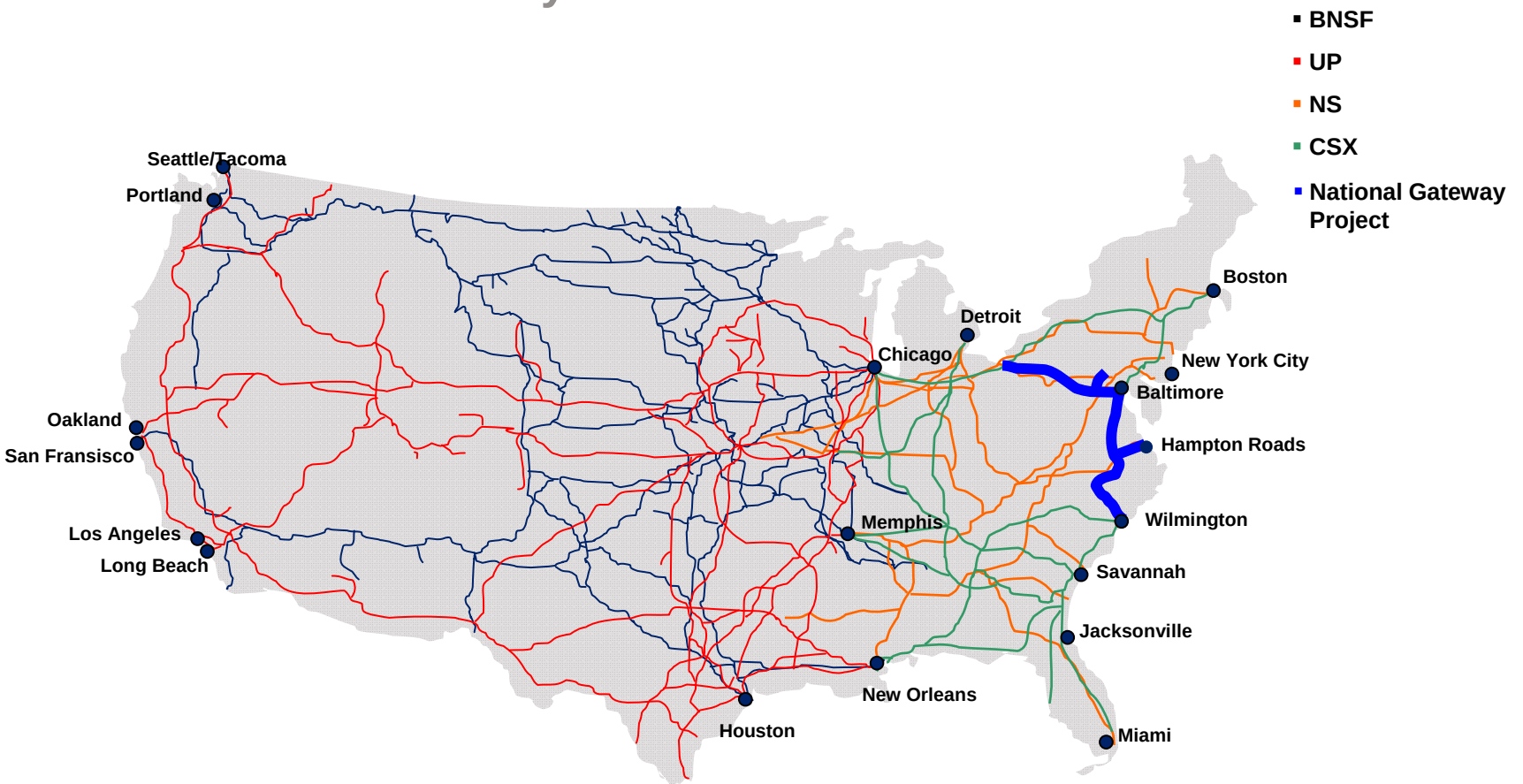
Challenges for Intermodal Hinterland Operations

Impacts on Intermodal Network and Terminal Structures

Best Practice Case – CSX Hub Terminal North West Ohio

Initial Situation

Eastern & Western Railway Network Interfaces Issues



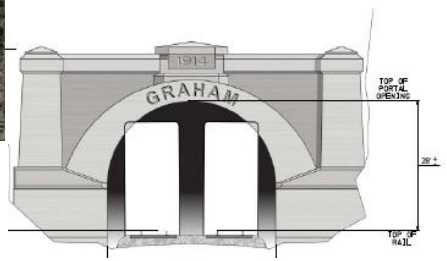
→ **East-West Transit is Broken and Time Consuming**

→ **Different intermodal Operations in Eastern and Western States Create Ops Challenges**

Initial Situation

National Gateway Project

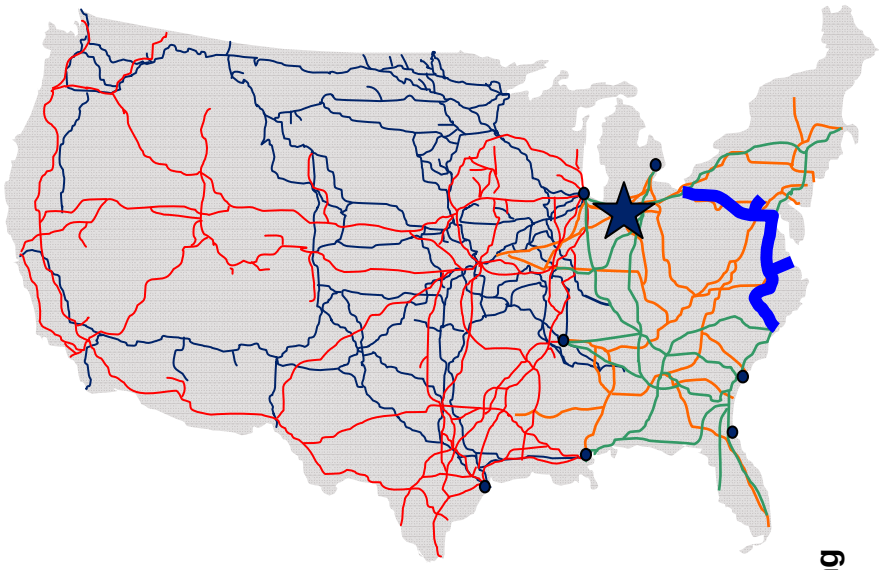
- **Project overview:**
  - **$842 million in investments**
  - **61 double stack clearance projects**
  - **Construction of 6 intermodal terminals**
- **Strategic value**
  - **Increases intermodal capability in key population centers**
  - **Provides double stack capacity from East Coast Ports to Midwest**

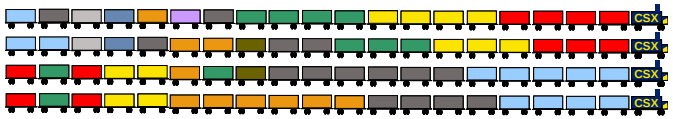


Source: National Gateway

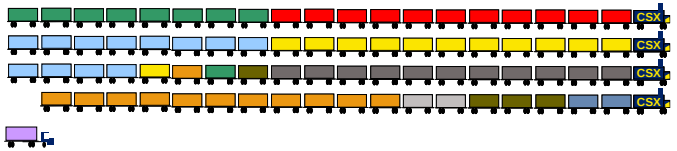
CSX Intermodal Terminal NW Ohio

Objectives and Operations Means





Block Swapping
Container Swapping



Objectives

- connect east/west
- toupee/fillet operations
- make use of economies of scale in distribution of domestic and maritime volumes
- serve local economy of northern Ohio

→ Combined Switching/ Intermodal Lift "Transrailment" Terminal!

CSX Intermodal Terminal NW Ohio

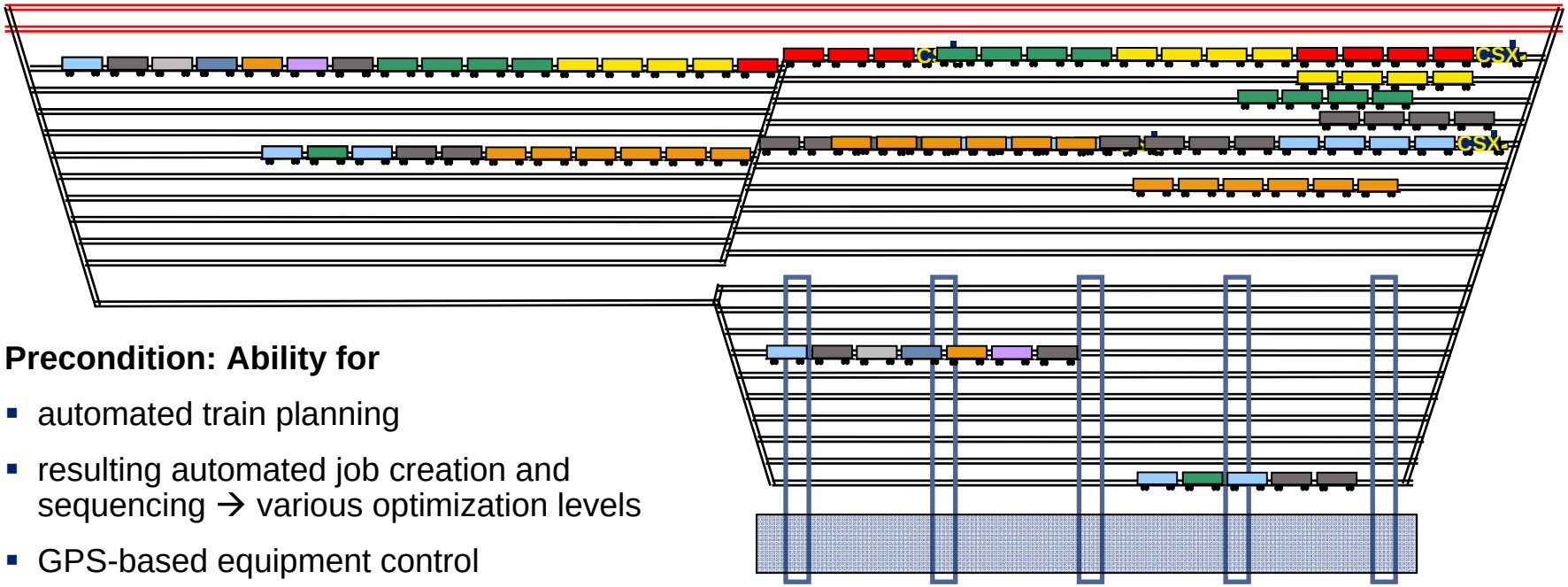
Facts & Figures

- **Combined block swapping/ container handling facility**
  - **8 process tracks 24,000ft/ 7,300m**
  - **9 block swap tracks 100,000ft/ 30,000m**
  - **2 straddle lanes for horizontal relocation**
  - **1 truck lane for local delivery**
  - **5-wide container stack (four high)**
  - **Parking for approx. 280 local units**
- **Capacity: throughput appr. 2 million containers**
- **Hub within CSX network and cornerstone of Nat'l. Gateway Concept**
- **Feb 2011: 17 trains/day**
- **June 2011: gate delivery/receipt**
- **July 2011: full swing with 32 trains/day**

→ First real Hub Terminal worldwide Designed to Serve as such!

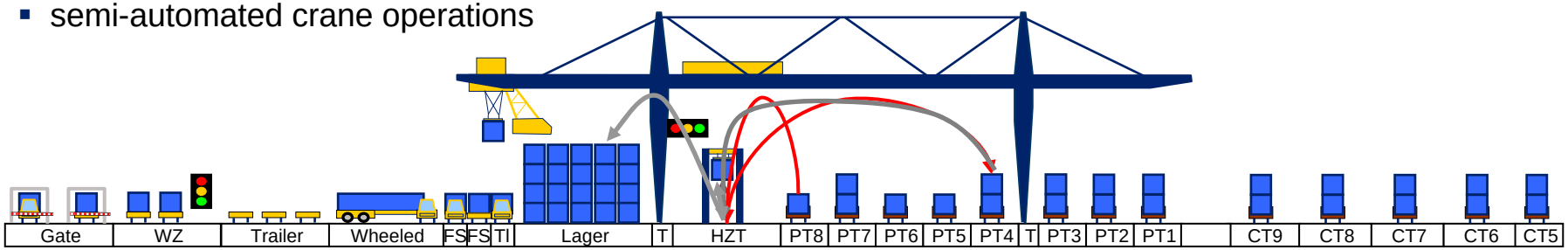
CSX Intermodal Terminal NW Ohio

Operations Concept



Precondition: Ability for

- automated train planning
- resulting automated job creation and sequencing → various optimization levels
- GPS-based equipment control
- semi-automated crane operations



CSX Intermodal Terminal NW Ohio

Planning Approach

Train Schedule and Consist Analyses

Track Utilization Planning

Crane Performance Demand Analysis

Storage Demand Analysis

Crane System Selection

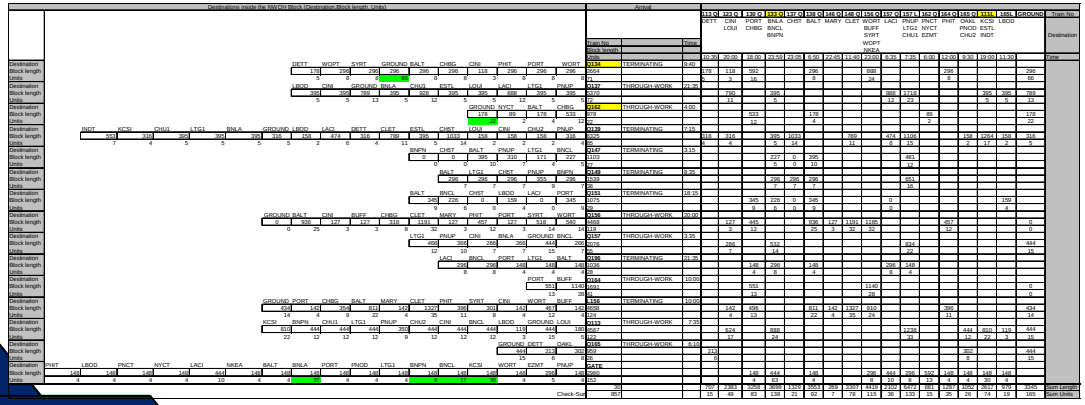
Selection of Horizontal Transport Alternativ

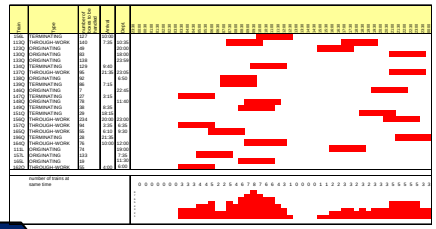
Simulation incl. Scheduling and Equipmen Deployme Optimizati

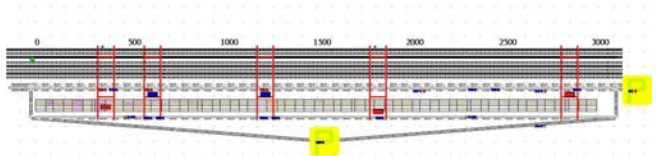
Feasibility Tests

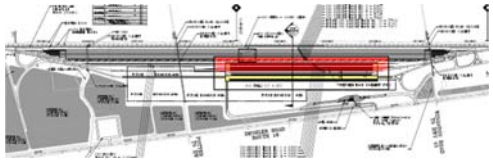
System Validation and Selec

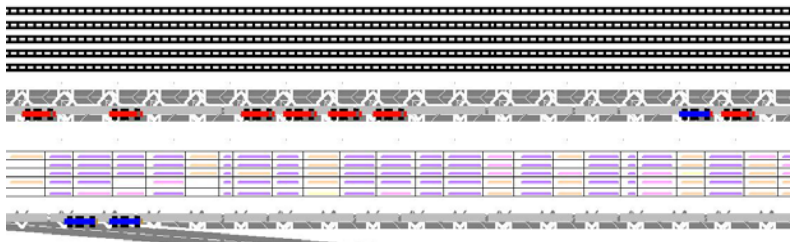
Detailed Process Planning and Requirements Engineering





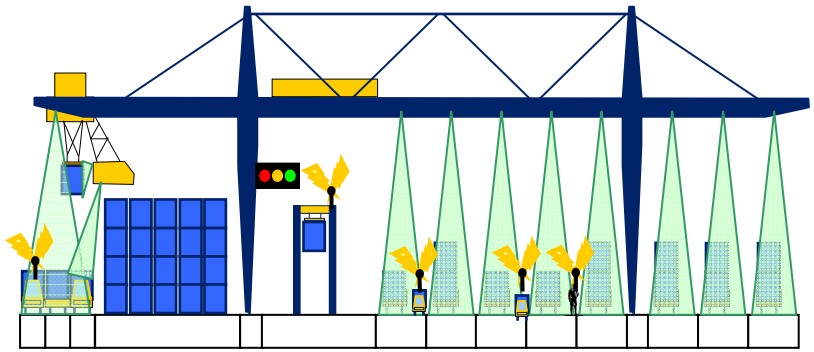






CSX Intermodal Terminal NW Ohio

Enabling Technologies



- **Automated railcar recognition in approach to terminal, in ladder and in entrance to process tracks**
- **Automated container recognition**
- **Railcar tracking in entire facility**
- **Automated train-set position calibration**

- **Automated collision/overrun with load control between cranes, SCs, grunts, M&R crews and moving trains**
- **Auto-gates and system based truck-to-crane order calls**

→ Tailored Planning Process including Simulation and Process Optimization Ensured Feasibility of Hub Functionality and finally Operations Success!

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With courtesy of CSX Intermodal Terminals Inc.