Increasing Network Capacity Through Use of Dynamic Car Scheduling

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MA28 – Maximizing Railway Network

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Agenda

- Background
- Next Generation Car Routing System
- Use Cases
- Summary and Future Plan
- Acknowledgements
Goal: Increasing Network Capacity

- Better utilization of existing train capacity
- Reduce un-necessary trains
- Consider yard capability/capacity
- Plan trains ahead of time (Advance Planning)
About NORFOLK SOUTHERN

19,500 ROUTE MILES across 22 STATES & D.C.

MAKING CONNECTIONS
Norfolk Southern (NYSE: NSC) has served the freight transportation needs of America for nearly two centuries, connecting businesses and communities to the marketplaces of the world — creating jobs, supporting economies, and transporting goods on safe, environmentally friendly rail.

- 43 PORTS SERVED
- 61 AUTOMOTIVE FACILITIES SERVED
- 55 INTERMODAL Terminals
- 154 TUNNELS
- 62,700 FREIGHT CARS
- 250 SHORT LINE CONNECTIONS
  Adds 20,000+ miles to NS network
- 4,155 LOCOMOTIVES
- 9,706 BRIDGES
- 41 RAIL-TRUCK TRANSFER FACILITIES

DELIVERING FOR AMERICAN INDUSTRY AND CONSUMERS

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Dynamic Car Scheduling

• Focus: General Merchandise Trains
• Current Re-routing options:
  ▫ Alternative Trains
    • Multi-rides
  ▫ Alternative Routes
  ▫ Delay at a Location
  ▫ Extra Train
Car Routing Algorithm Flow

- **Identify potential alternative trains**
  - Alternative trains
  - Alternative Routes

- **Identify potential extra trains**
  - Identify extra train candidates
  - Prefer solid block train
  - Cars handled based on first arrival first departure

- **Determine best routes by**
  - Minimize train starts
  - Minimize car delays/dwell time
  - Subject to train capacity
Next Generation Car Scheduling Pilot System

- A web-based real-time planning system that tracks cars and trains and re-routes cars
- The system consists of the following components:
  - Train volume projection and capacity planning
  - Terminal volume and capacity planning
  - KPIs and reports
  - Testing utilities
Balance Train Volume

Before Balancing

After Balancing
Summary and Future Plan

• Presented next generation car routing system, a real-time planning pilot system at NS
• Continue testing/validating pilot system
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