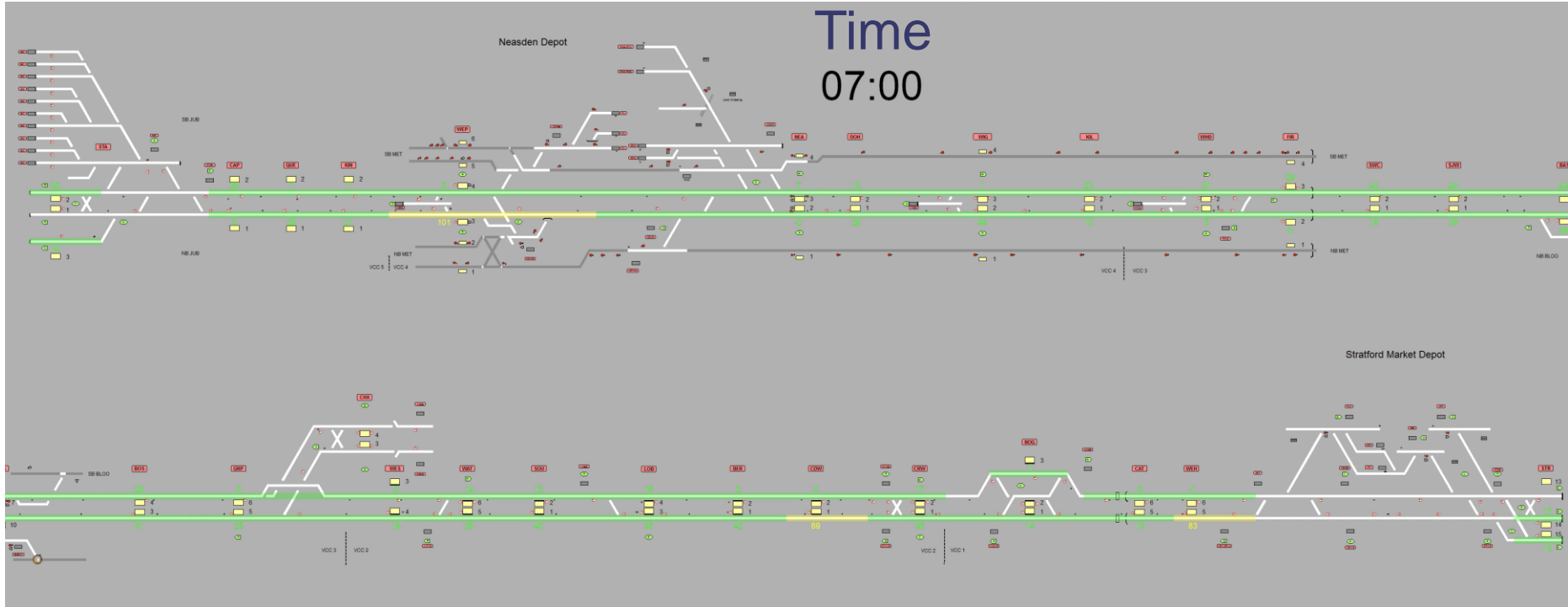




Delivering capacity and service resilience from modern CBTC railway systems

Phil Dubery, Director
23 October 2019

Integrated Railway



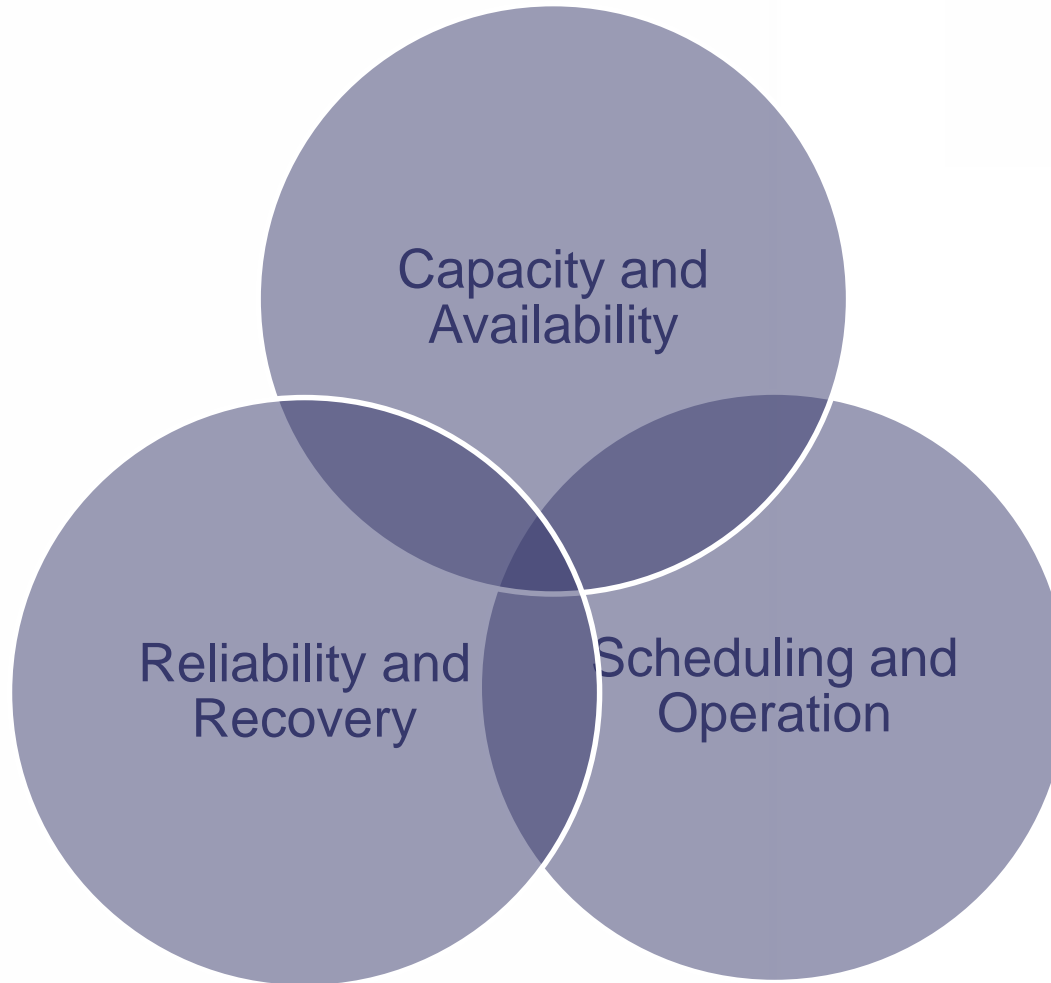
Time
07:00

Variance to timetable

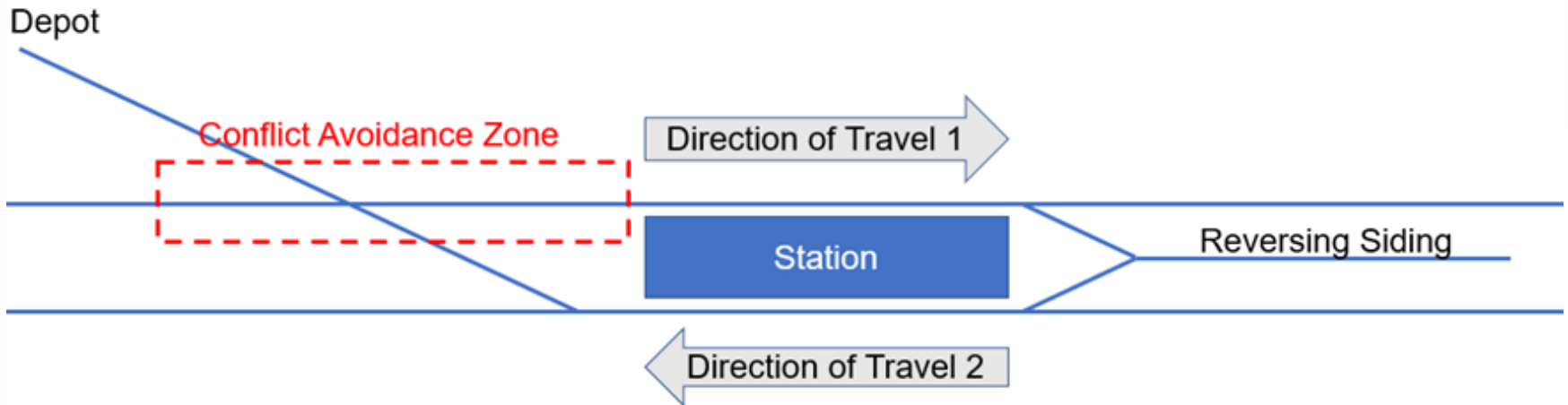
Key

Green	< 60 sec delay
Yellow	>= 60 && < 120 sec delay
Red	> 120 sec delay

Developing Options for a Whole Railway Solution - Capacity and Resilience



Balancing operational and technical aspects



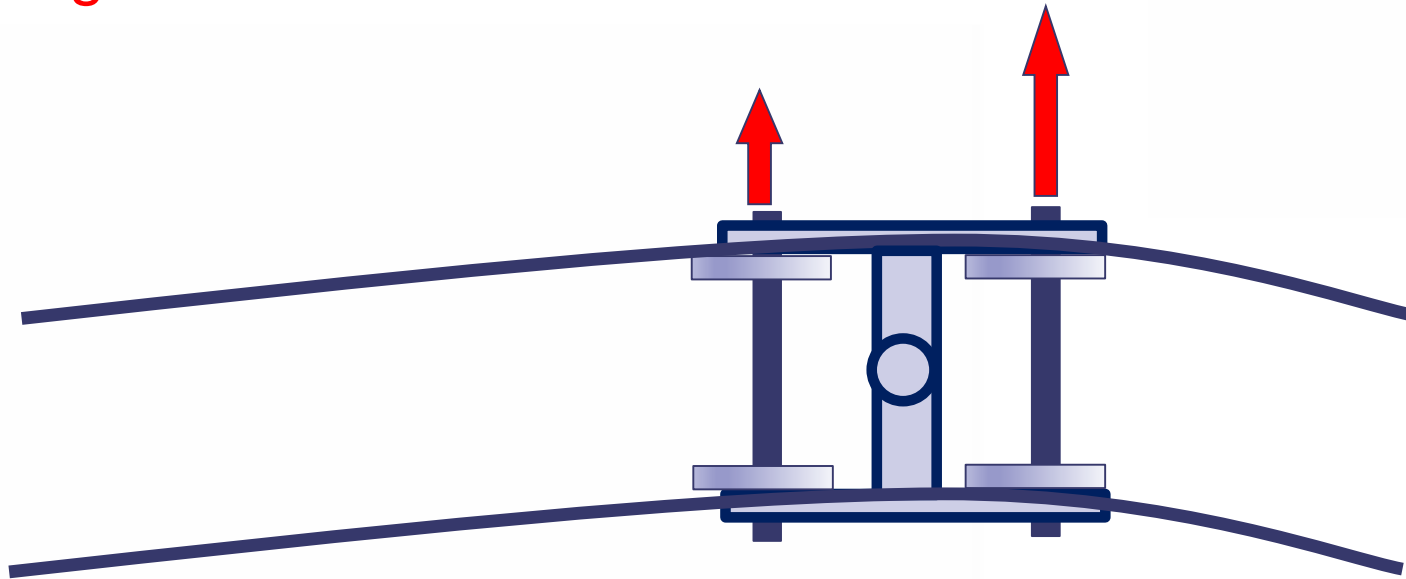
- Scheduling – train ordering and recovery allocation
- Operation – detrainment, crew changeovers and service reformation
- Control – release of trains and junction management
- Signalling – site layout and data configuration
- Track – speeds restrictions

Management of open section adhesion levels



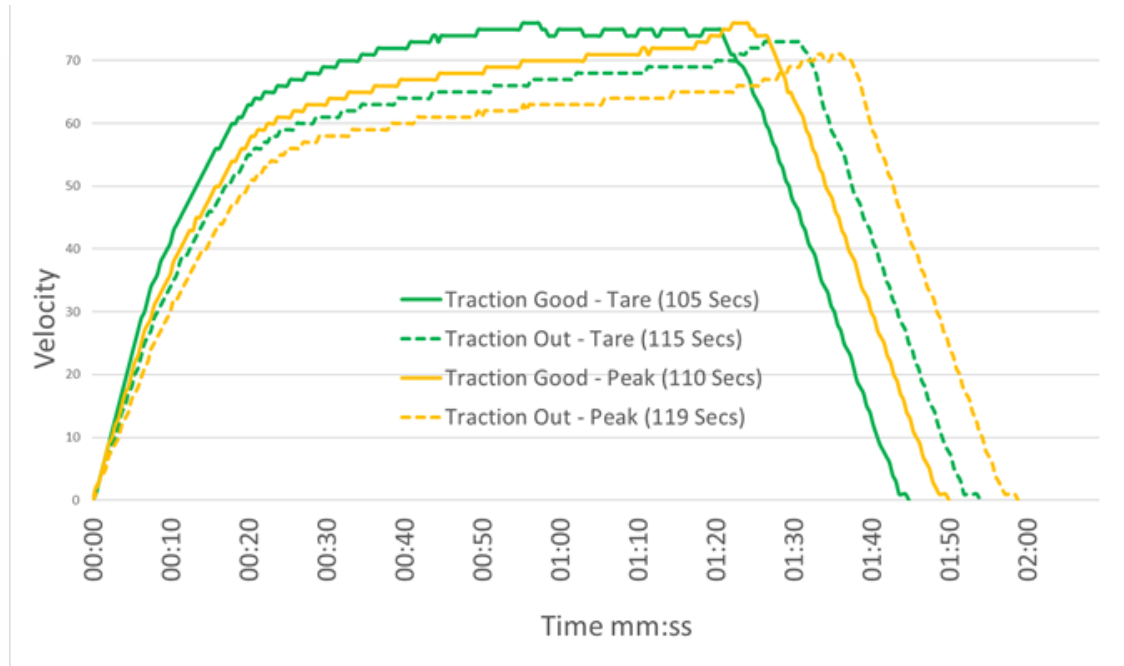
- Make the most of what is available
 - Modern positioning systems and adhesion mapping
 - Modern braking systems
 - Modern wheel conditioning monitoring systems
 - Modern CBTC ATO Systems
 - Modern sanding and adhesion management systems

Management of the vehicle train interface and passenger comfort



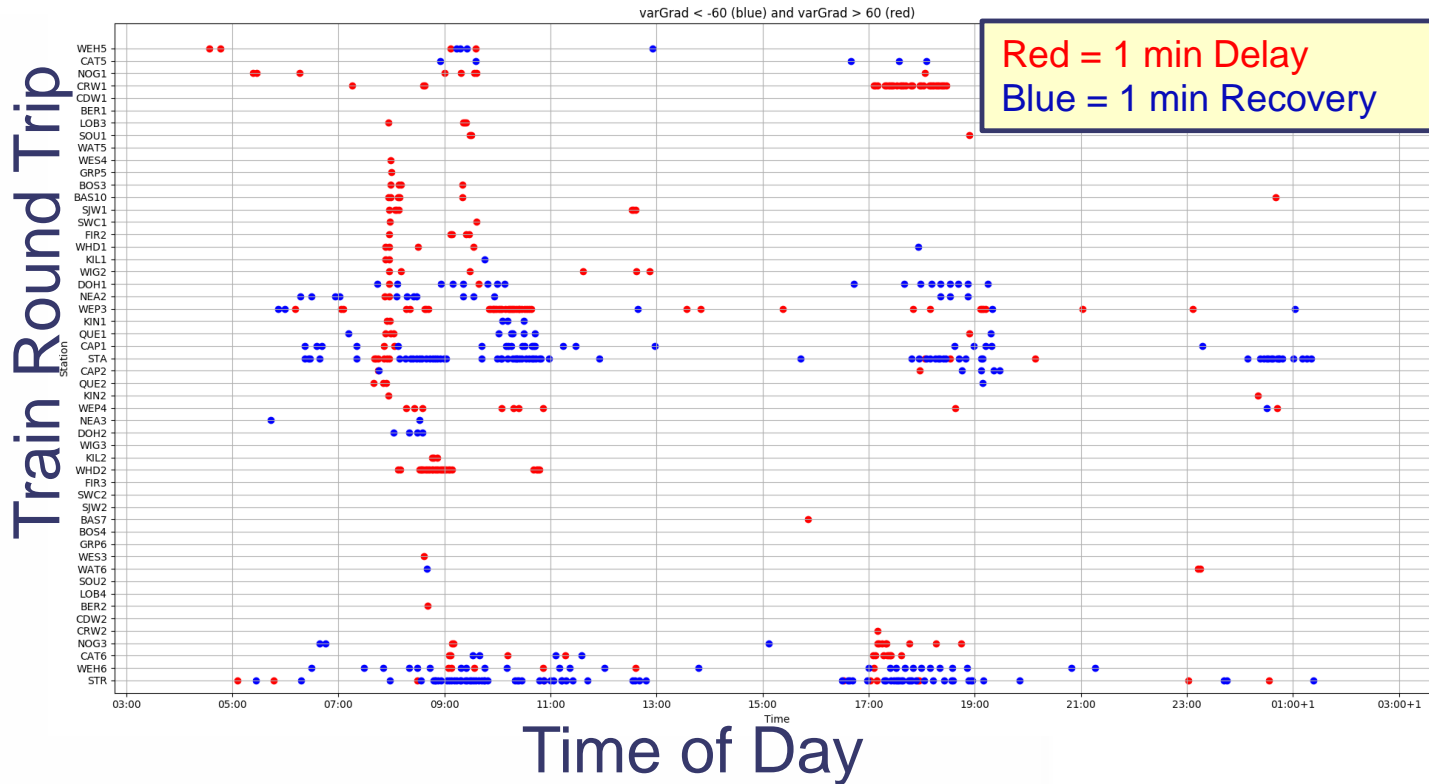
- Operating speeds, especially across points and junctions
- Understanding and managing operational speeds and passenger ride
- Using conditioning data to ensure speed limits are optimised

Ensuring that fleet utilisation is maximised



- Inter-Station Run Times
- Stand time in termini and sidings
- Platform Stopping and Dwell Times
- Auto Door Operation and Depart Functions
- Lost time through service

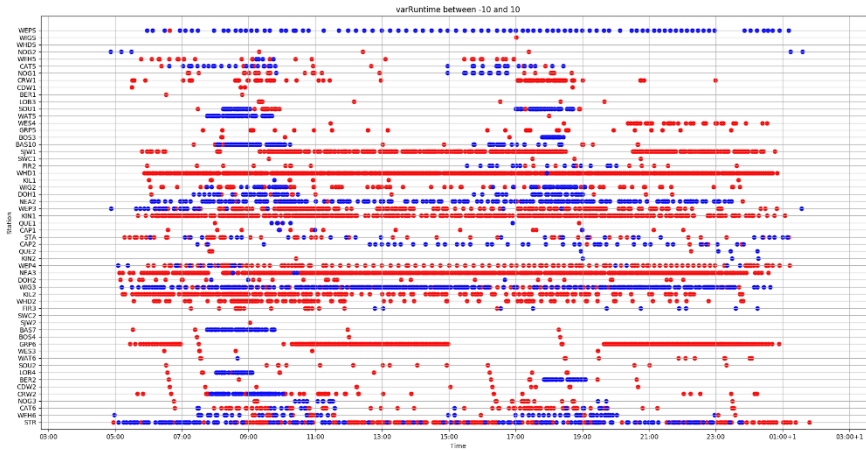
Harnessing data from computer systems



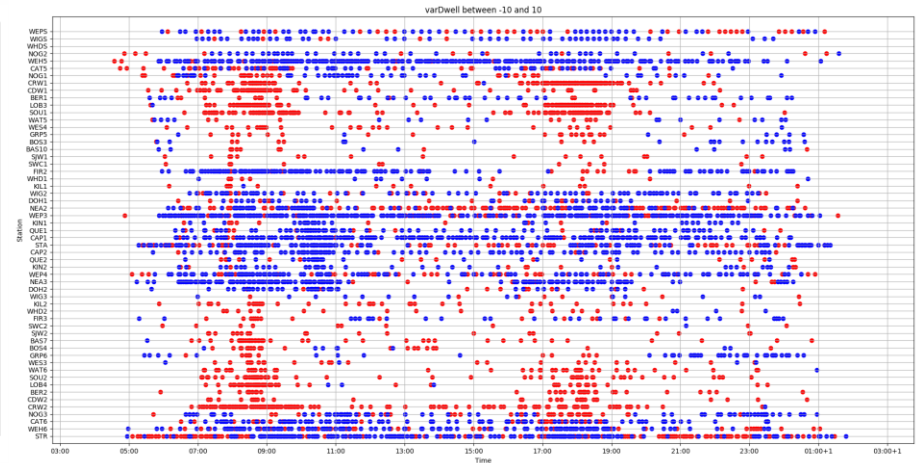
- Characterising the performance of the railway
- Lost time and Recovery Time
- Development of immediate feedback and Key Performance Indicators

Sub Threshold Delays Inhibit Recovery

Runtime



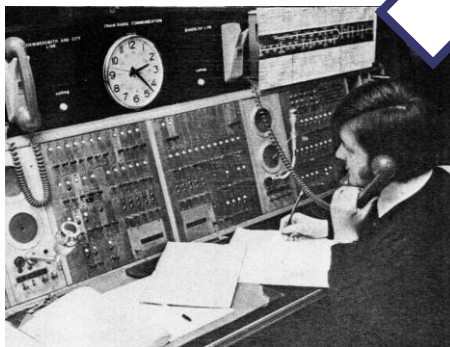
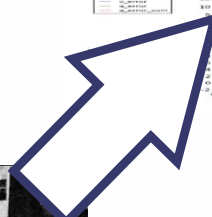
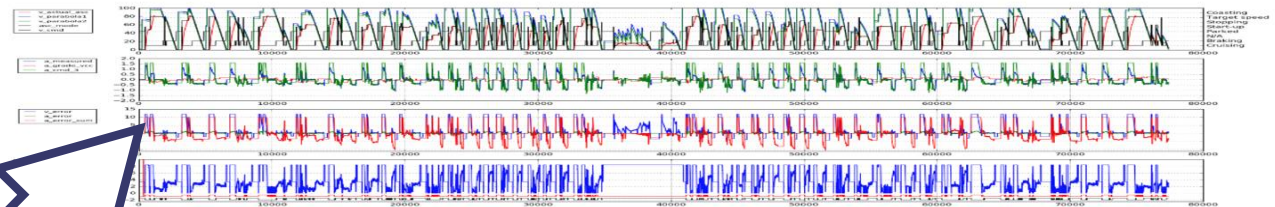
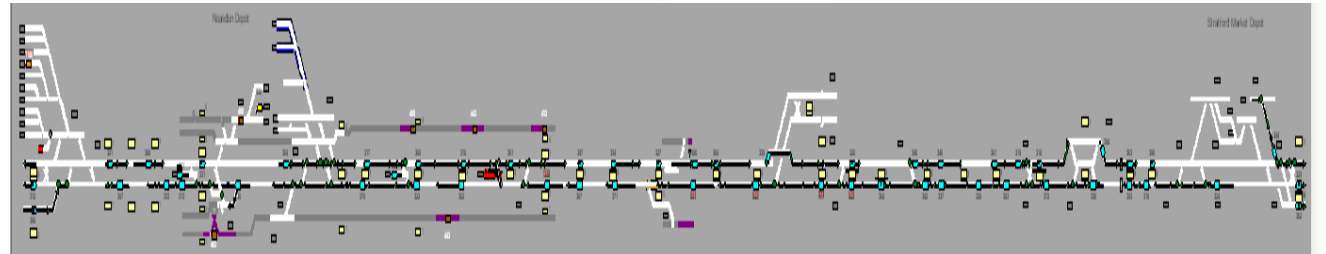
Station Dwell Time



Substantial cumulative delays due to sub 2 minute threshold events

- Individual delays to technical, passenger or operational event
- Pinch-points on the railway particularly during perturbation
- Slow running train or repeatedly delayed during dwell

The integrated railway – every aspect of service operation, scheduling and performance monitored and optimised





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