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NAV08 Presentation

November 2008

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Congestion Avoidance Dynamic Routing Engine

Vehicle routing and traffic speed models for the real world

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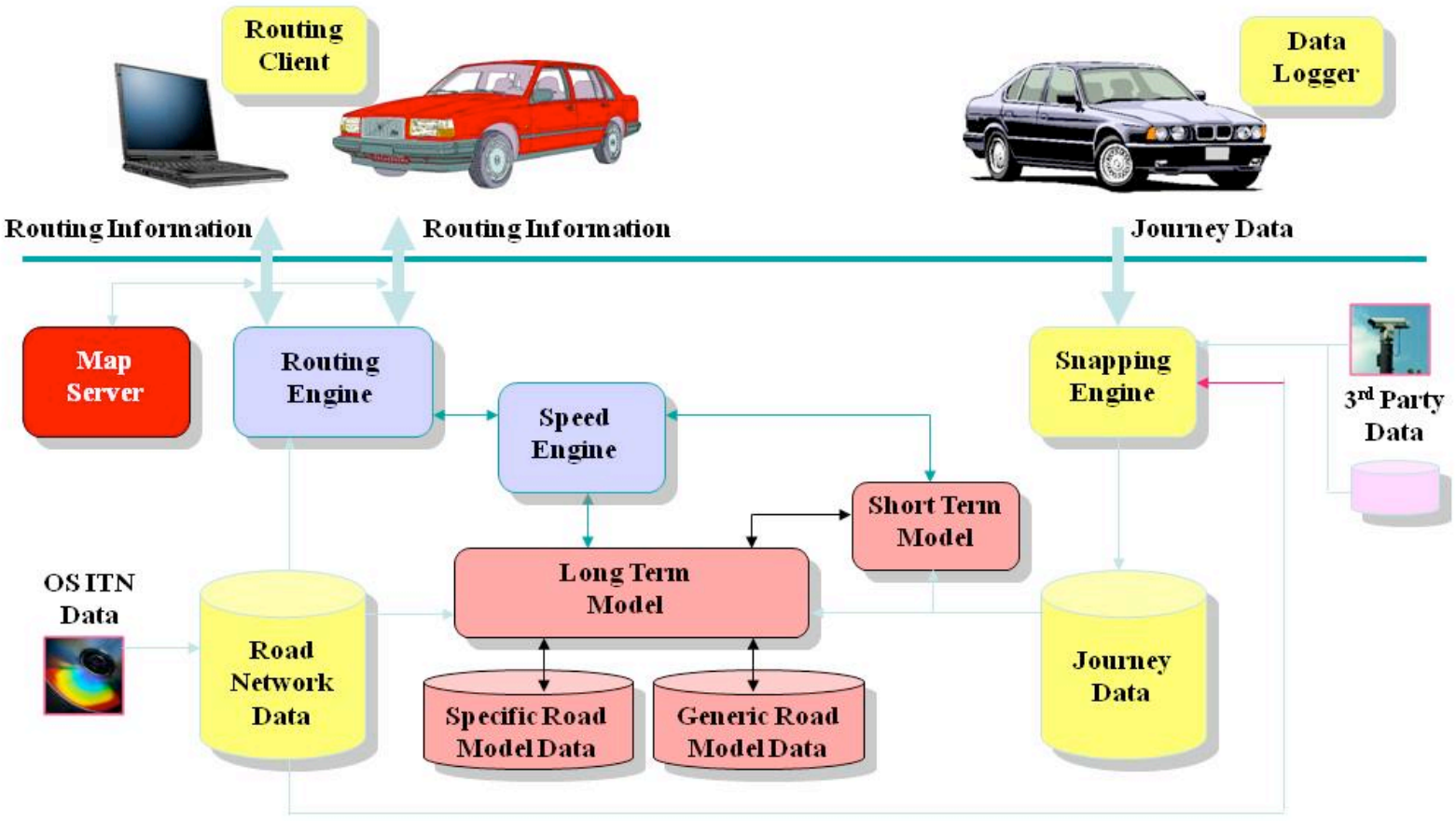
System Overview



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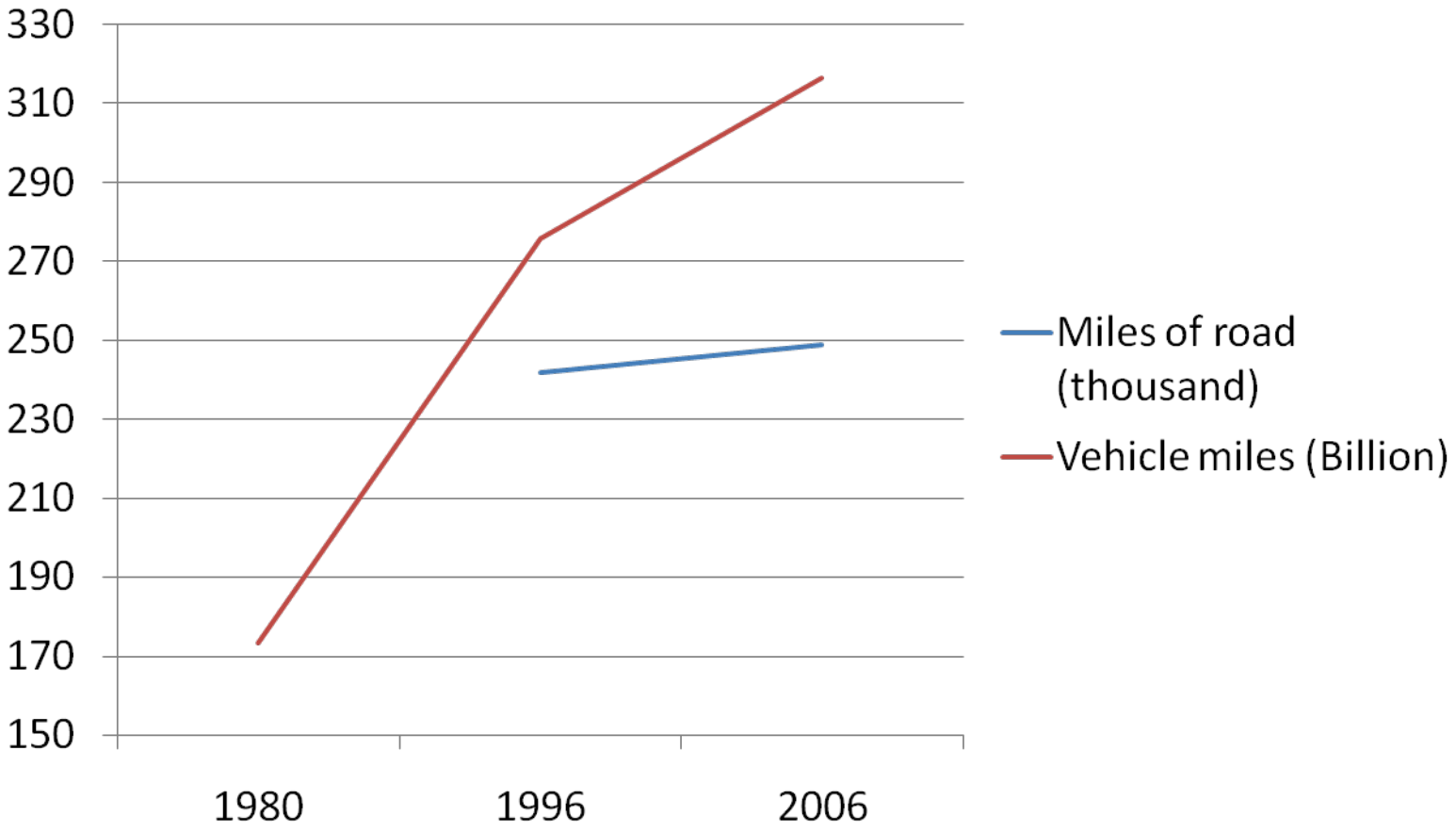
The Congestion Problem



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How To Tackle Congestion

- **Build more roads**
- **Reduce use of vehicles on the roads**
- **More use of roads at low congestion times**
- **More use of uncongested roads**

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Travel time predictions at different times
Better route selection
Dynamic vehicle routing

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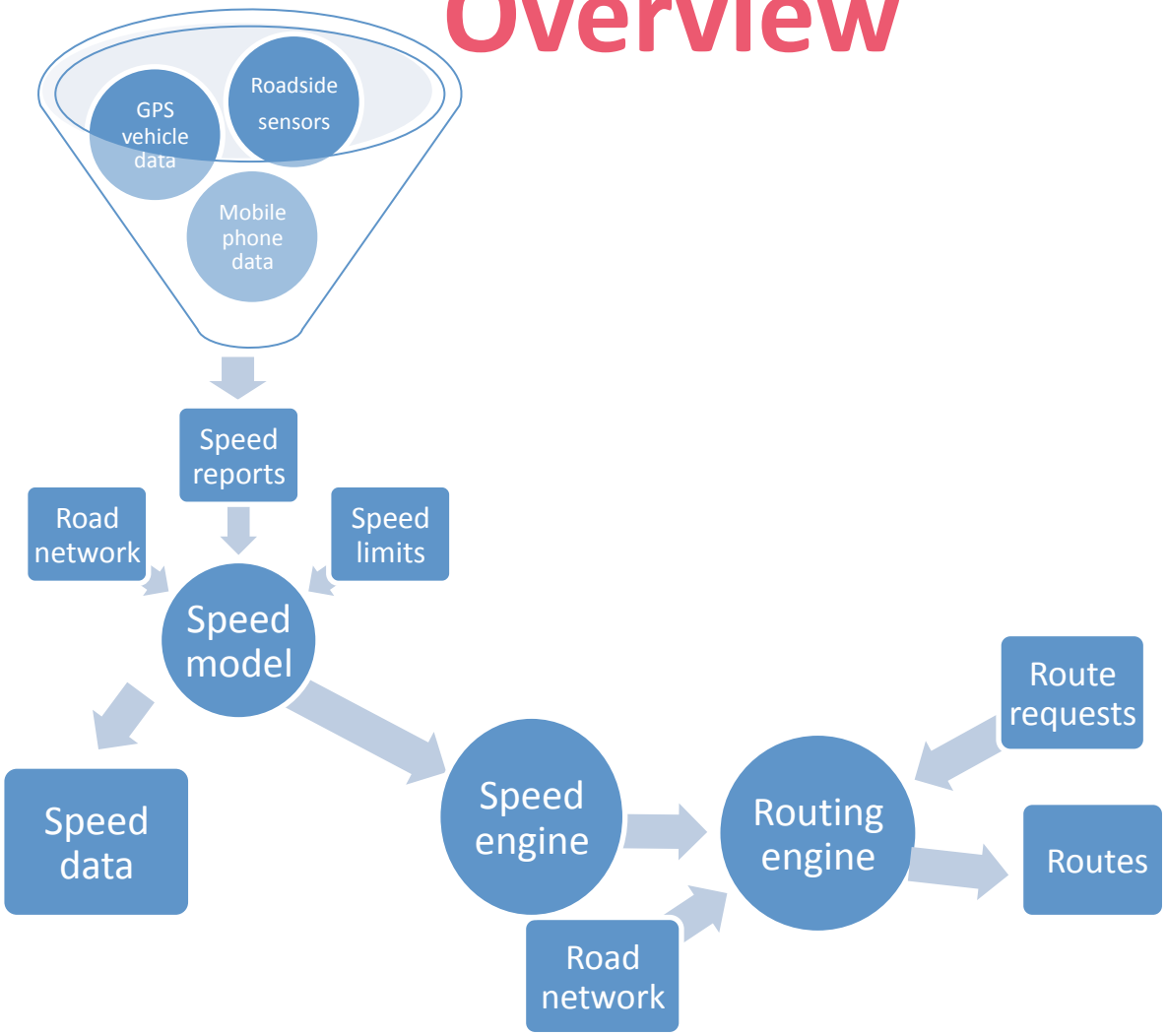
Overview



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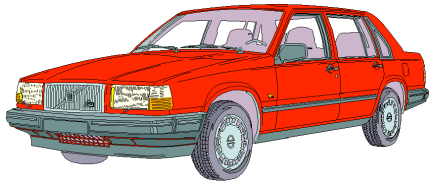
Architecture

Routing Client



Data Logger

Routing Information

Journey Data

Map Server

Routing Engine

Speed Engine

Snapping Engine

Short Term Model

Long Term Model

Road Network Data

Specific Road Model Data

Generic Road Model Data

Journey Data

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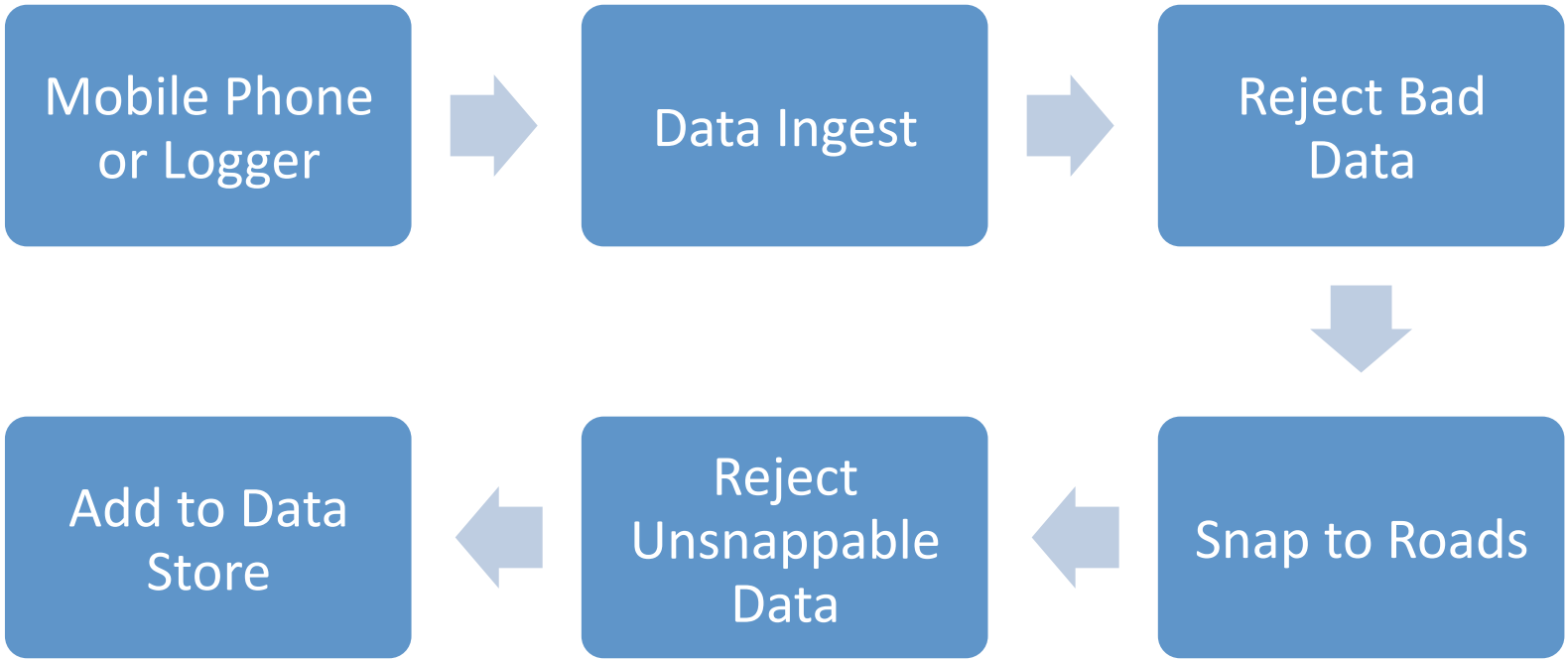
Journey Data



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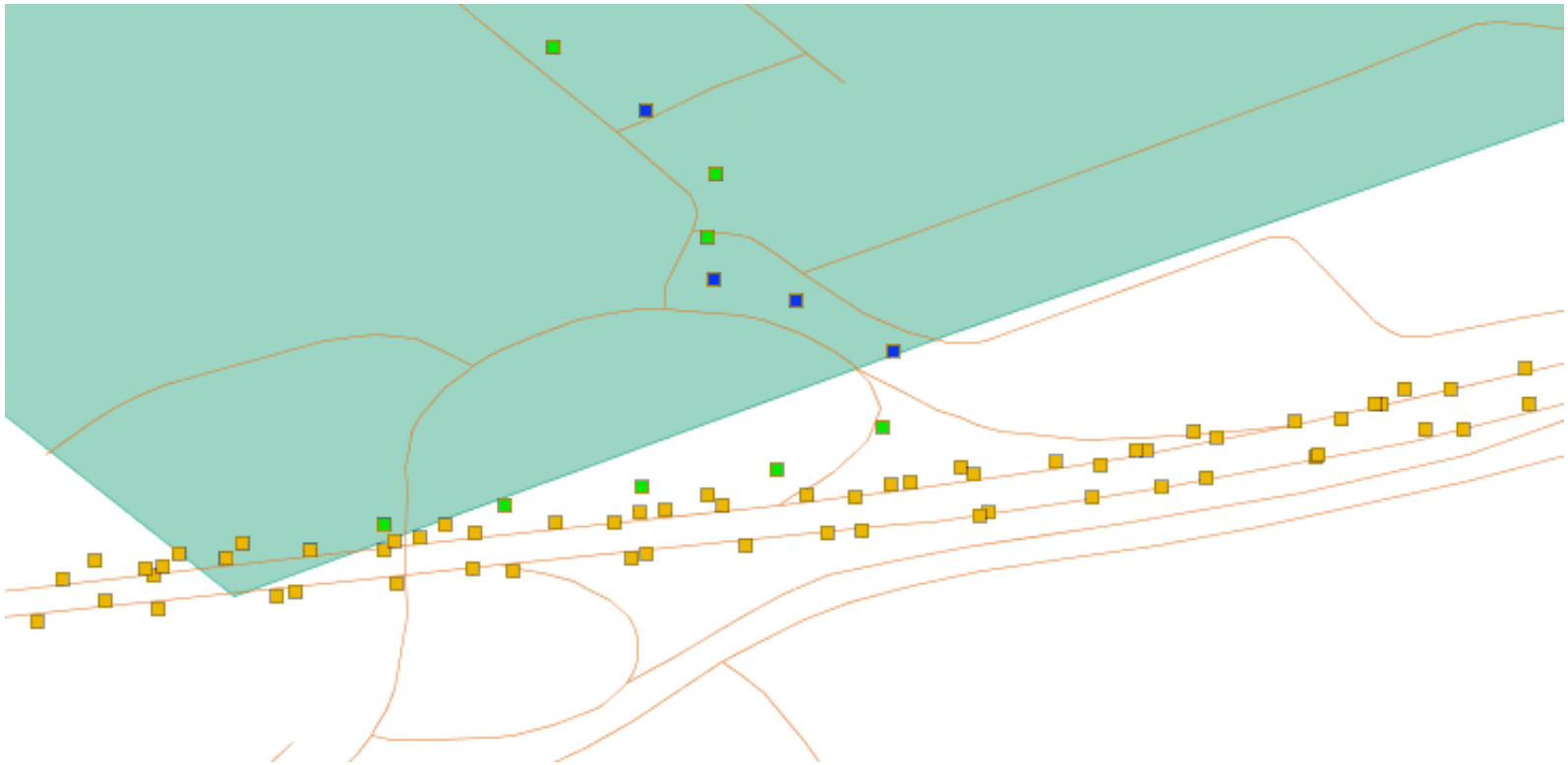
Snapped Data

Snapping Development (since improved – about 90% pass rate)
Green OK, Blue failed, since improved, Gold other journeys.



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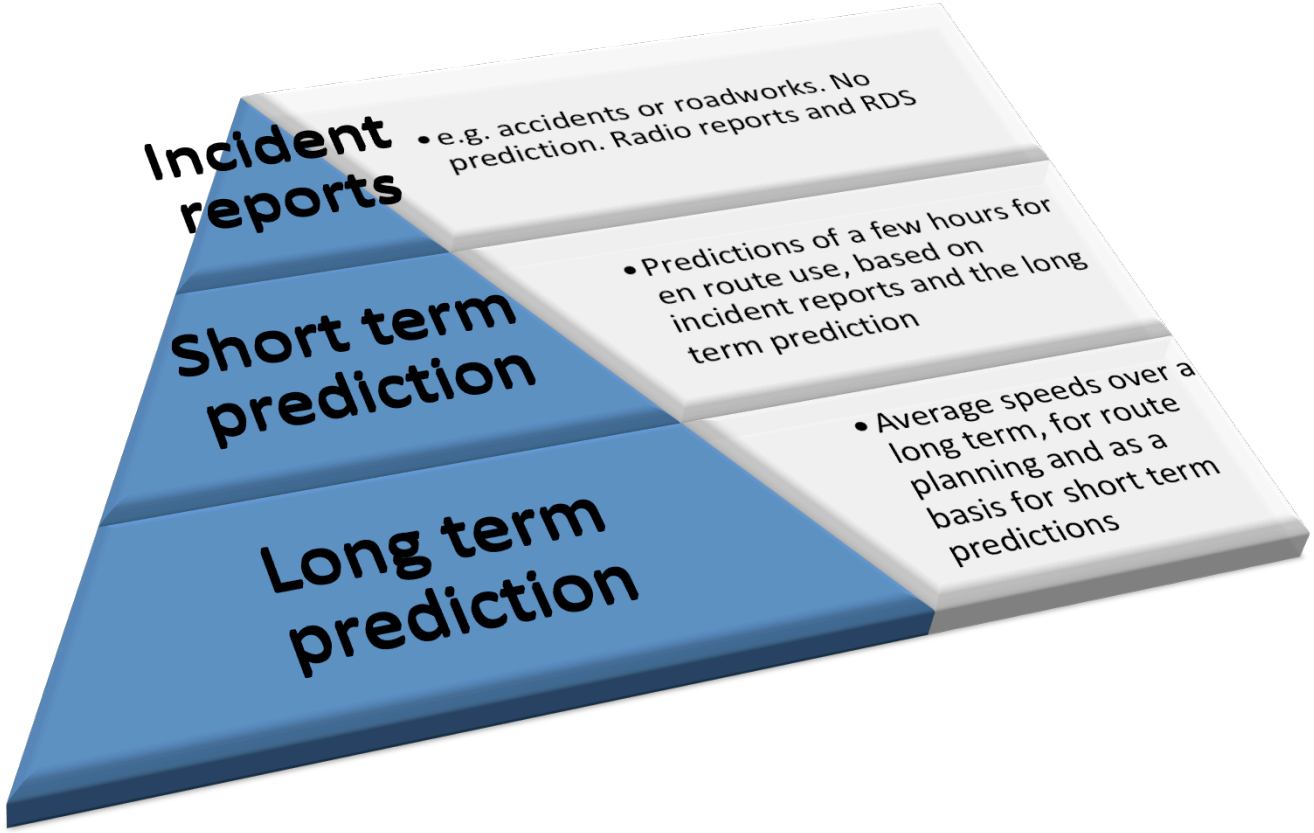
Speed Engine Scales



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Long Term Speed Engine

- Core long term model in place
- Provides speeds for each road segment varying by time of day and day of week
- Long term model in process of improvement
- Short term model being developed in Matlab

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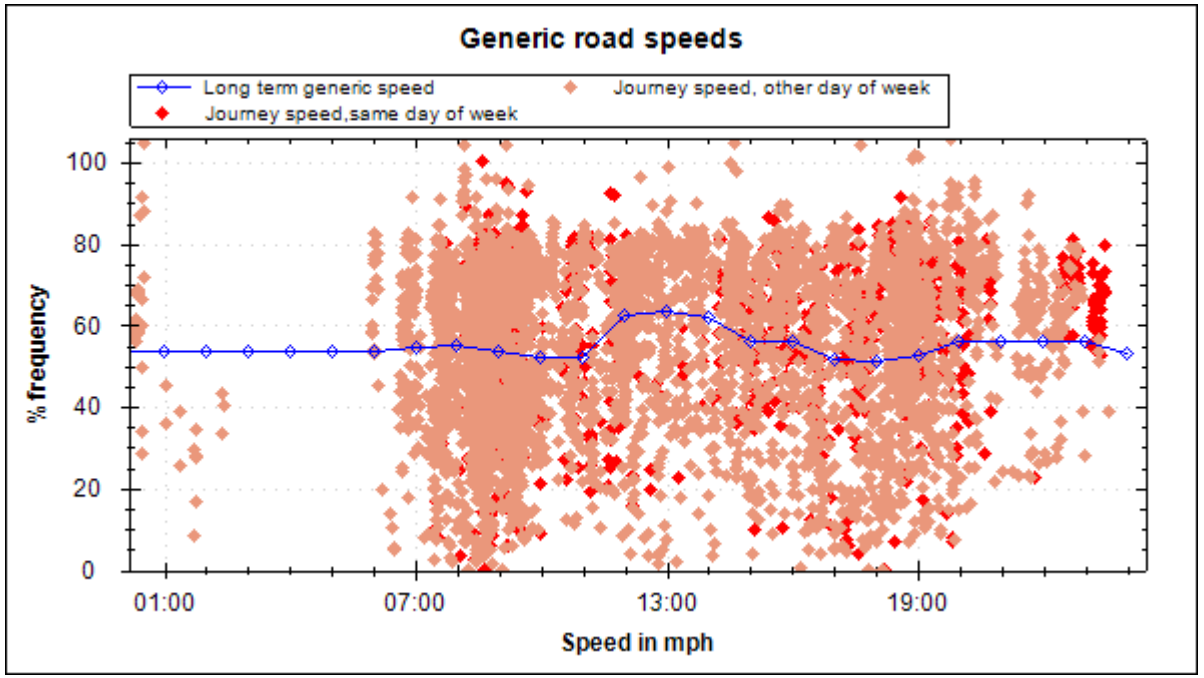
Generic Speed Model

- For roads where there is no specific model
- Spread of data currently being reduced by better modelling
- Model training also being enhanced and automated

A road dual carriageway, 70mph speed limit, Monday



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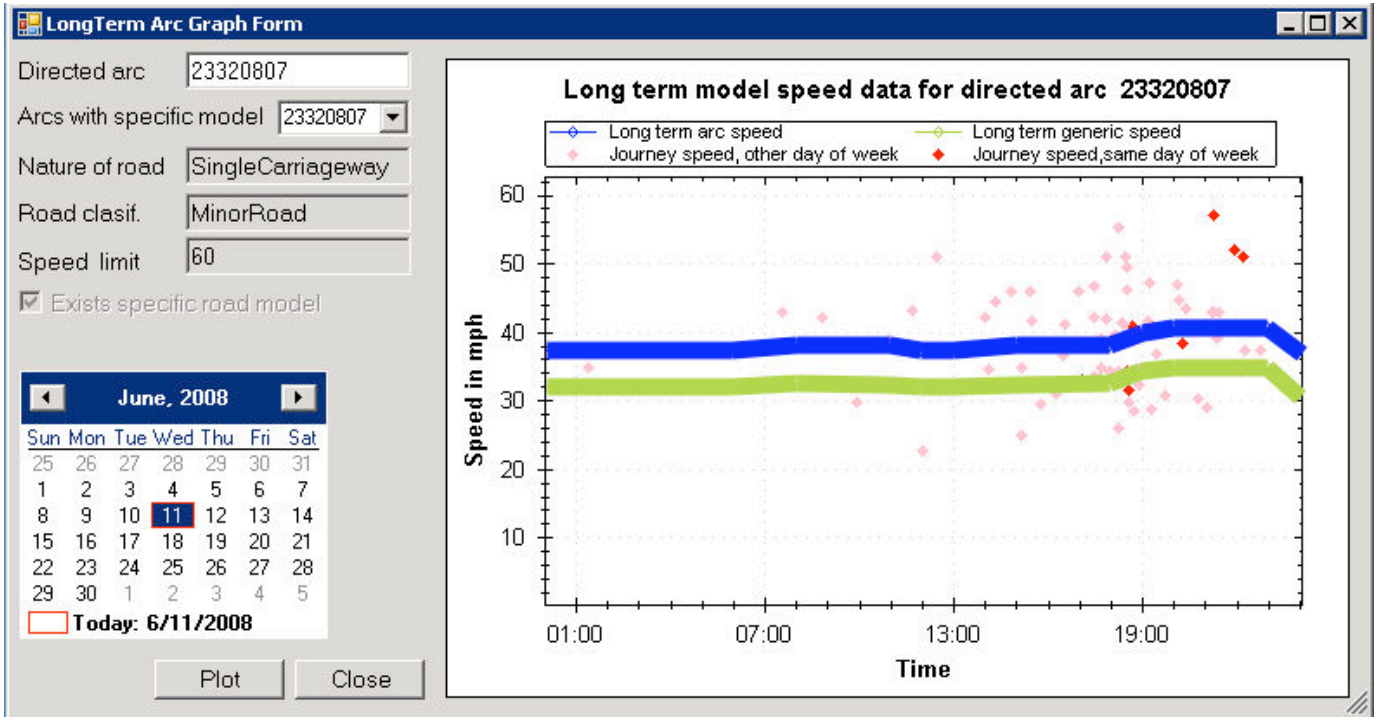
Arc Specific Model

- A model is created for a specific arc once there is enough data of good enough quality
- The model is based on the generic one for that arc and then recalculated using the data for that arc



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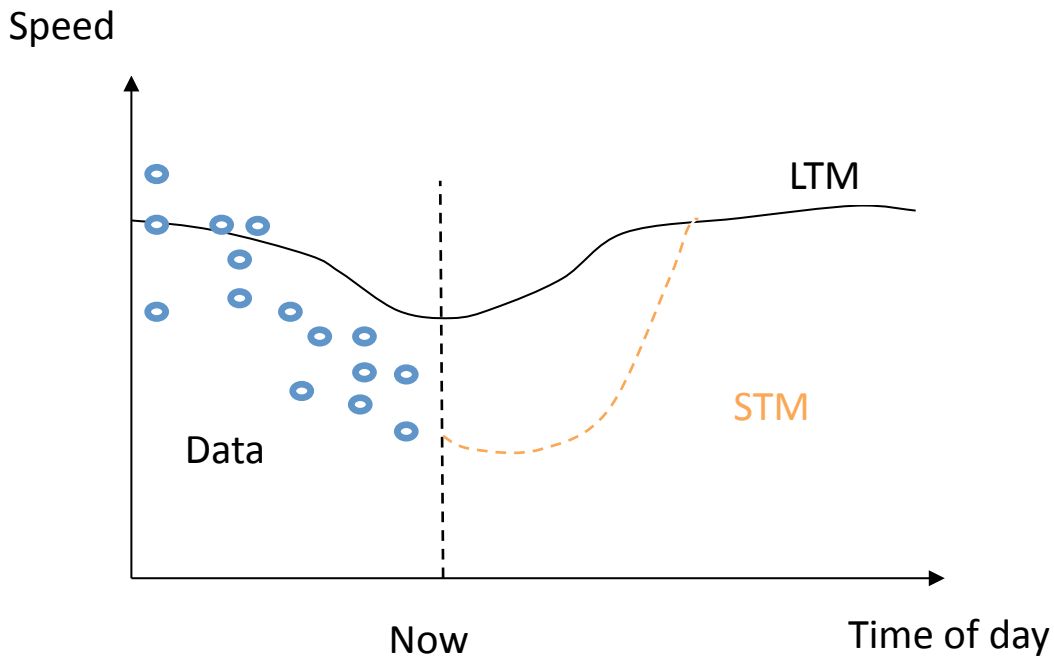
Short Term Model

- Aim is to detect congestion from live traffic data, and then create a short term predictive model based on that
- This part of the speed model is still in the initial modelling phase



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Routing Engine

- Minimum time or minimum distance route
- Uses speed limit or CADRE speed model or speed model capped by speed limit
- Optimised for time varying road speeds
- Heuristics, such as pruning, to aid performance
- Always finds the true optimal route

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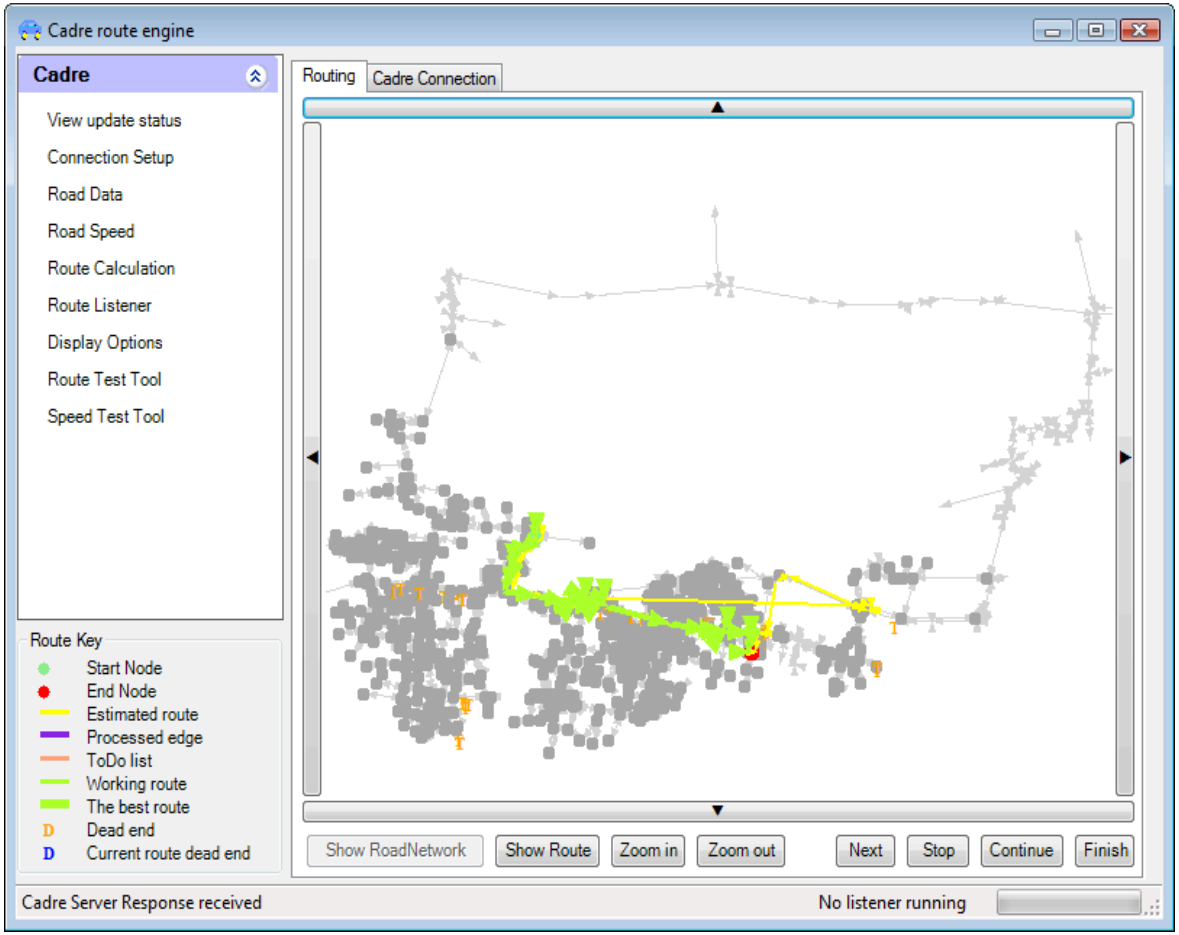
Routing Engine



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Hindhead Traffic Lights

- Journey time using speed engine is more accurate than using speed limit data or via Michelin
- Routing shows that in this case it pays to stay on the congested main road for almost all of the time, rather than to divert down narrow country lanes

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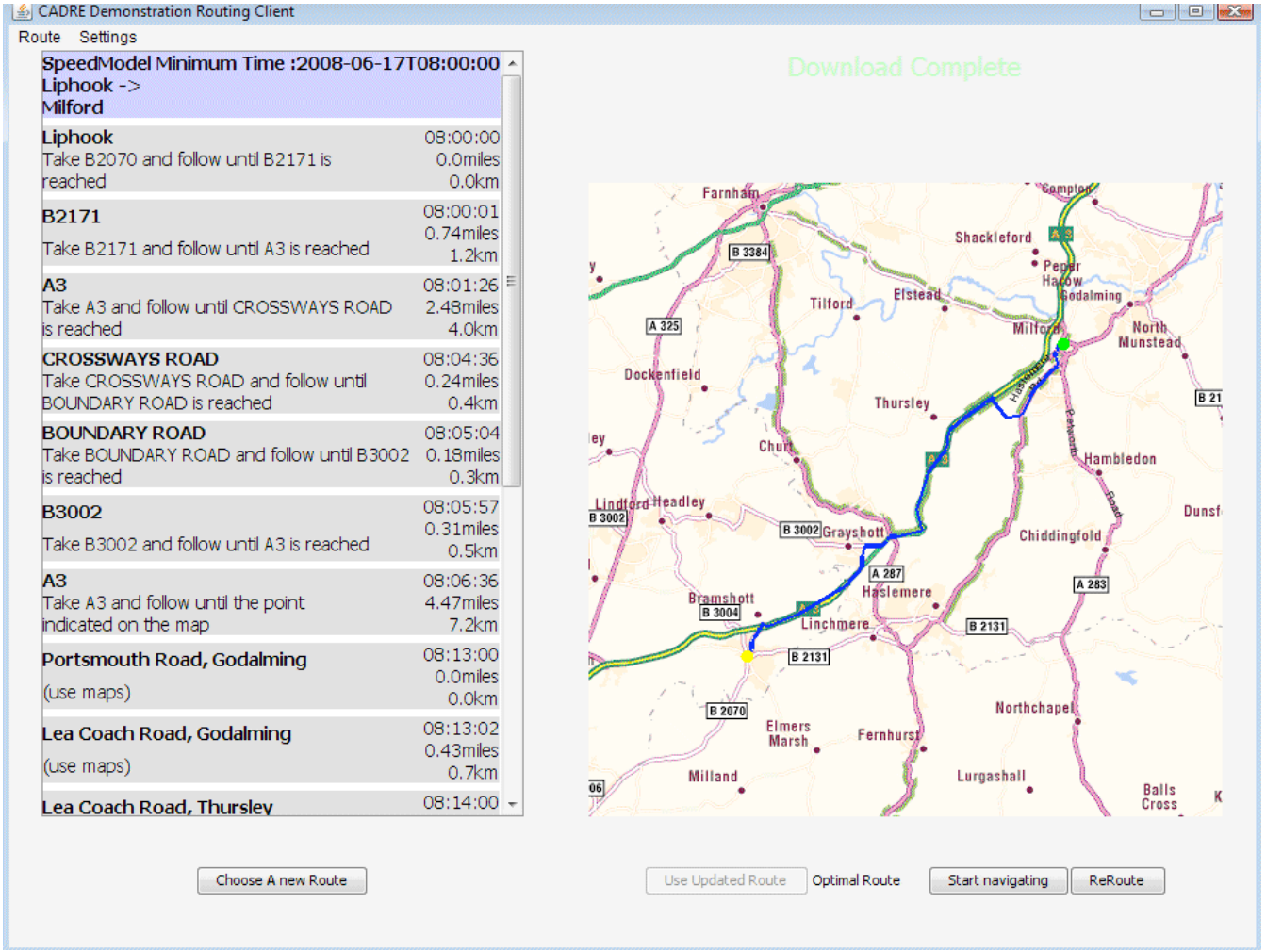
Routing Client



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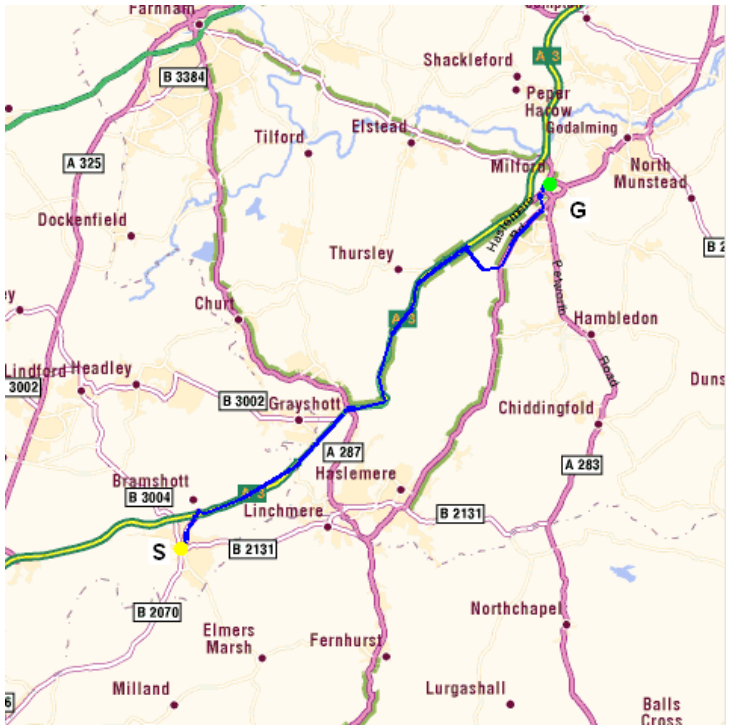
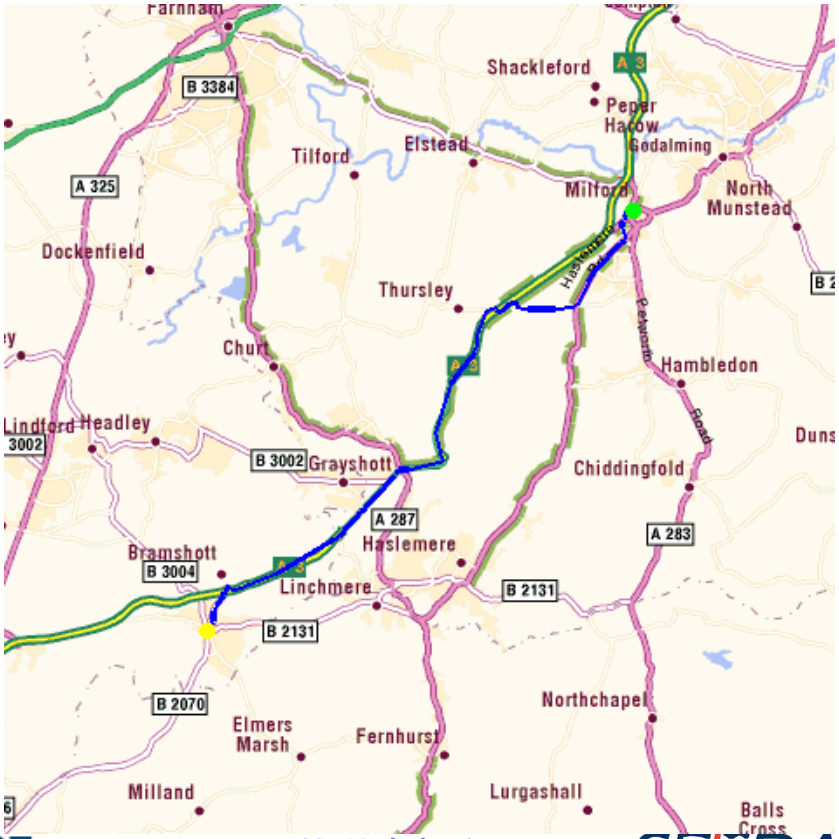
Sample Results - Hindhead

Minimum Time – Speed Limit



Minimum Distance



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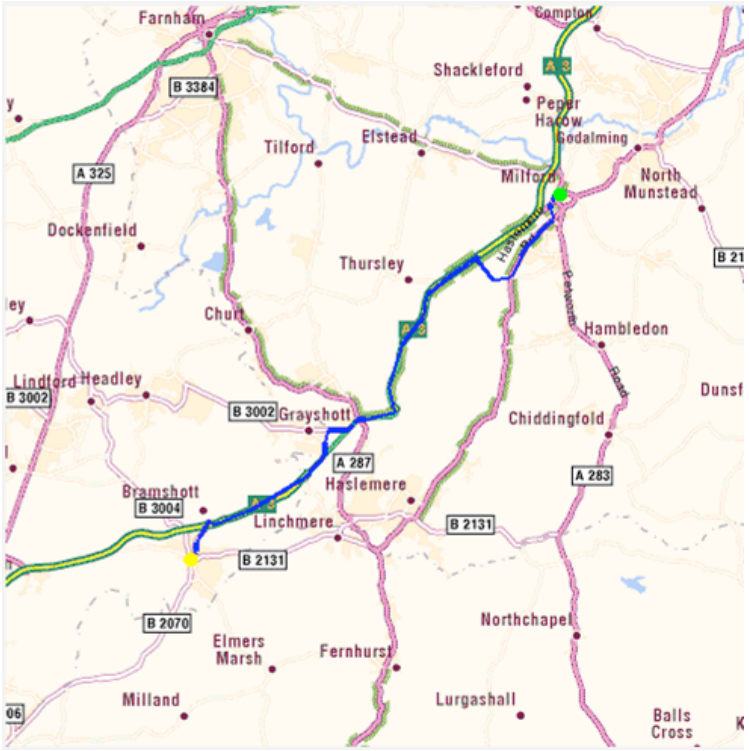
Sample Results - Hindhead

Minimum Time – Speed Engine – 12.30

Minimum Time – Speed Engine – 08.00



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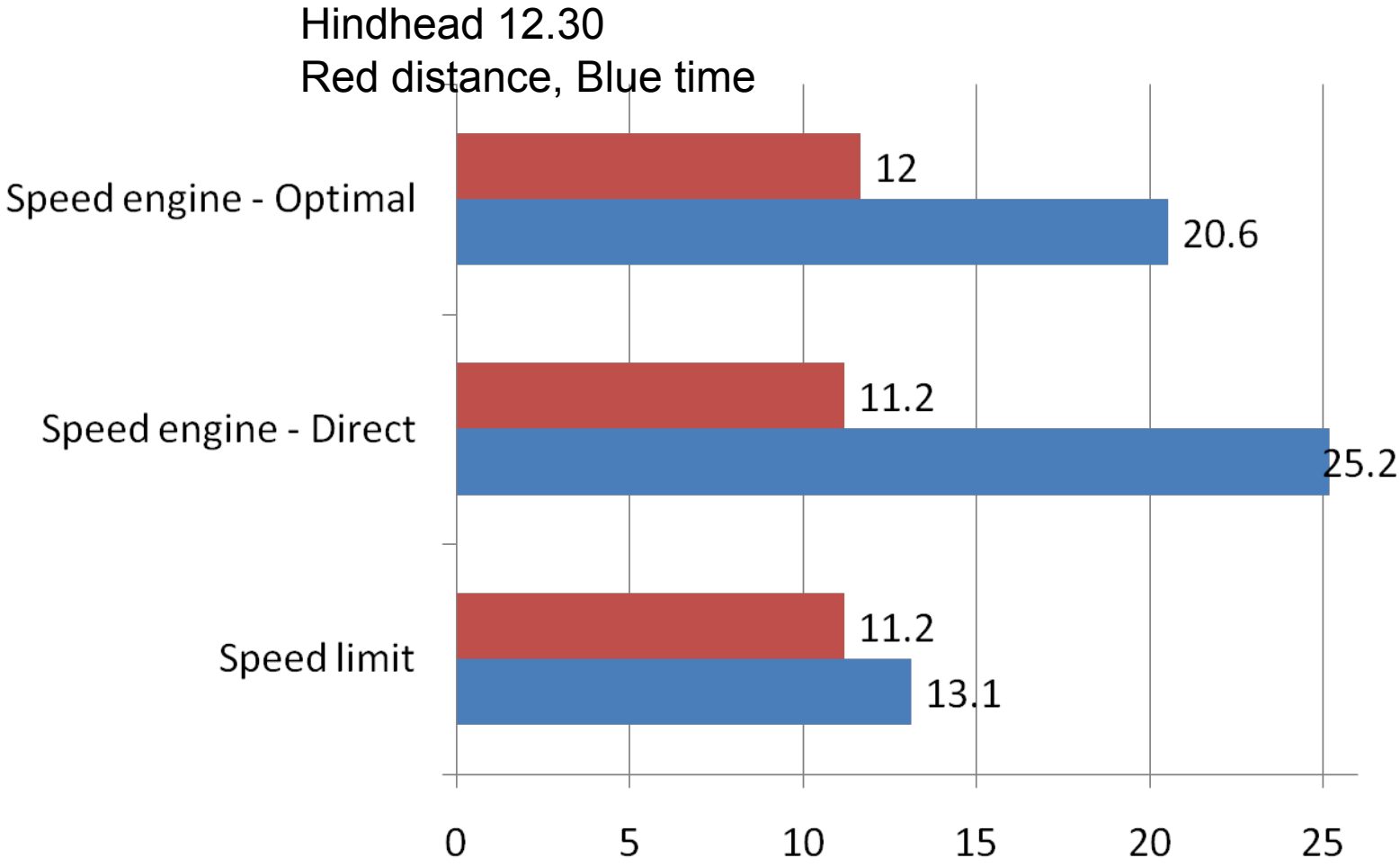
Results Comparison



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