



Rail Safety & Standards Board



Rolling Stock Whole Life Cost Model

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IMechE

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Acknowledgements



Rail Safety & Standards Board

- Instigated & supported by V/V SIC
- Funded by RSSB
- Developed jointly by Serco and Delta Rail

V/V SIC

Vehicle / Vehicle System Interface Committee





Project Scope

- A tool to assist in high level decision making in the rail industry
- Longevity – life expectancy of 10-20 years
- Flexible to meet the needs of Stakeholders
 - TOCs
 - ATOC
 - DfT
 - ROSCOs
 - Supply Industry
- Results in £s



Purpose of Model

- To identify the costs of building and operating a train to provide a given service.
- To answer specific questions, such as:
 - What is the best vehicle length and train formation?
 - How does train design affect track damage?
 - What is the journey time / mass / energy use trade-off?
 - Is it better to design for particular routes or achieve commonality of stock?
 - How does passenger comfort influence demand?
 - What is the environmental impact of this train service?



Project Progress

- DeltaRail/Serco selected as preferred supplier
- Consultation meetings with stakeholders held
- Finalisation of Customer Requirements
- Functional Requirements Specification delivered and consulted with industry
- Programming started



Project Milestones

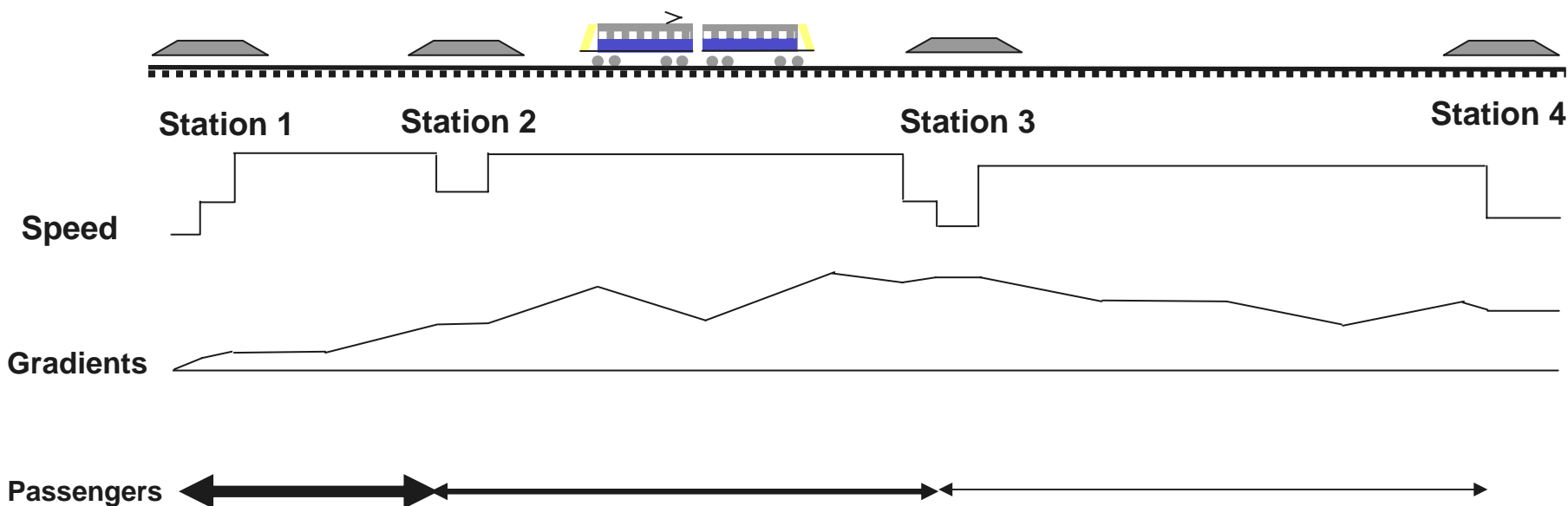
- Customer Requirements Specification – 2/10/2006
- Functional Requirements Specification – 6/11/2006
- Installation & Training DfT – 17/01/2007
- MS Excel 1st Draft beta Release - 31/01/2007
- Conversion to Visual Basic – 01/06/2007
‘Streamlined’ application offering improved usability & flexibility
- Publication & Project Completion 21/06/2007



Whole Life Cost Model

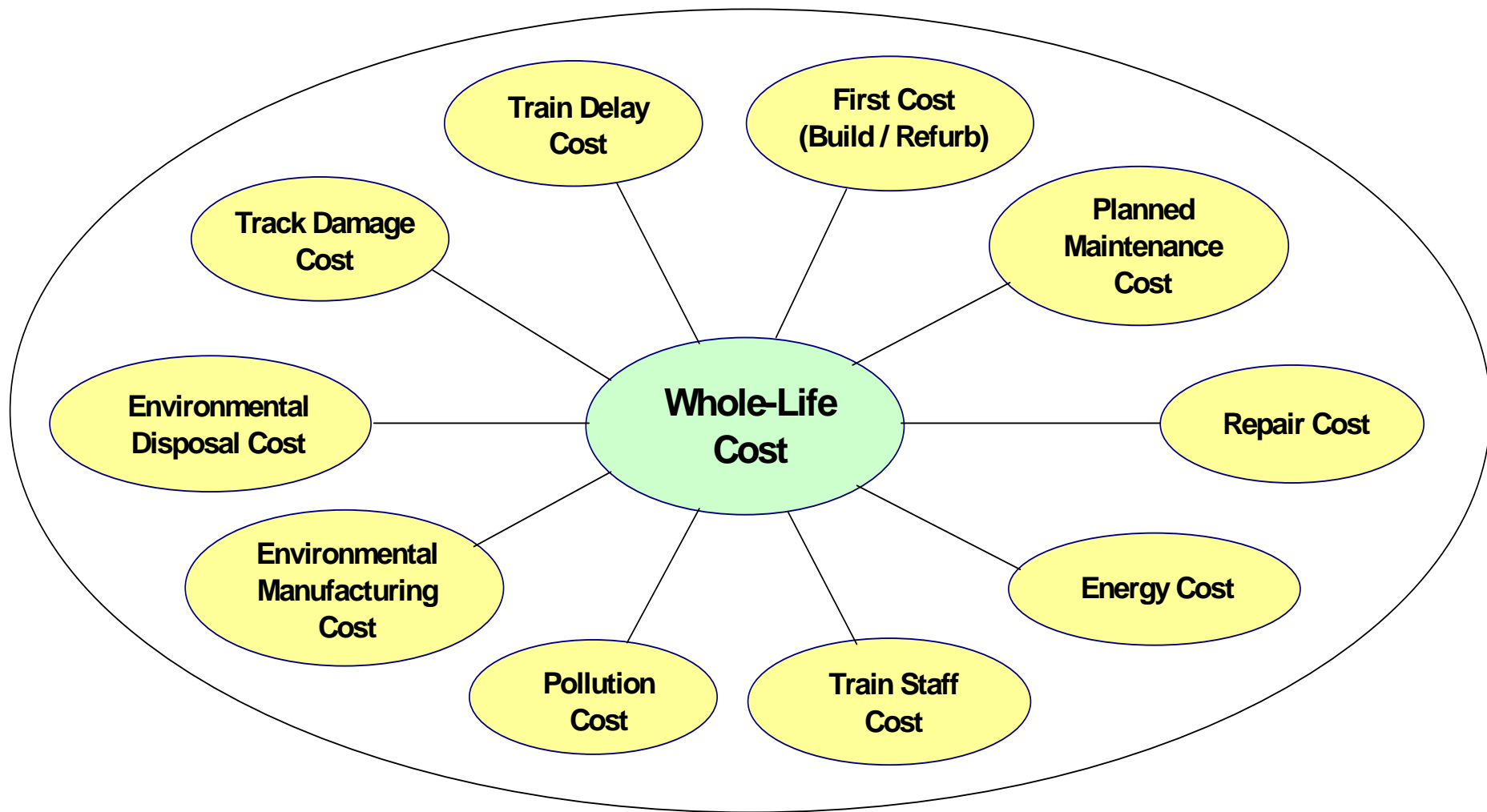
Phase 1 Scenario

- Deals with a single train design
- Running on a single linear route
- With a specified service frequency and stopping pattern
- Over a given life



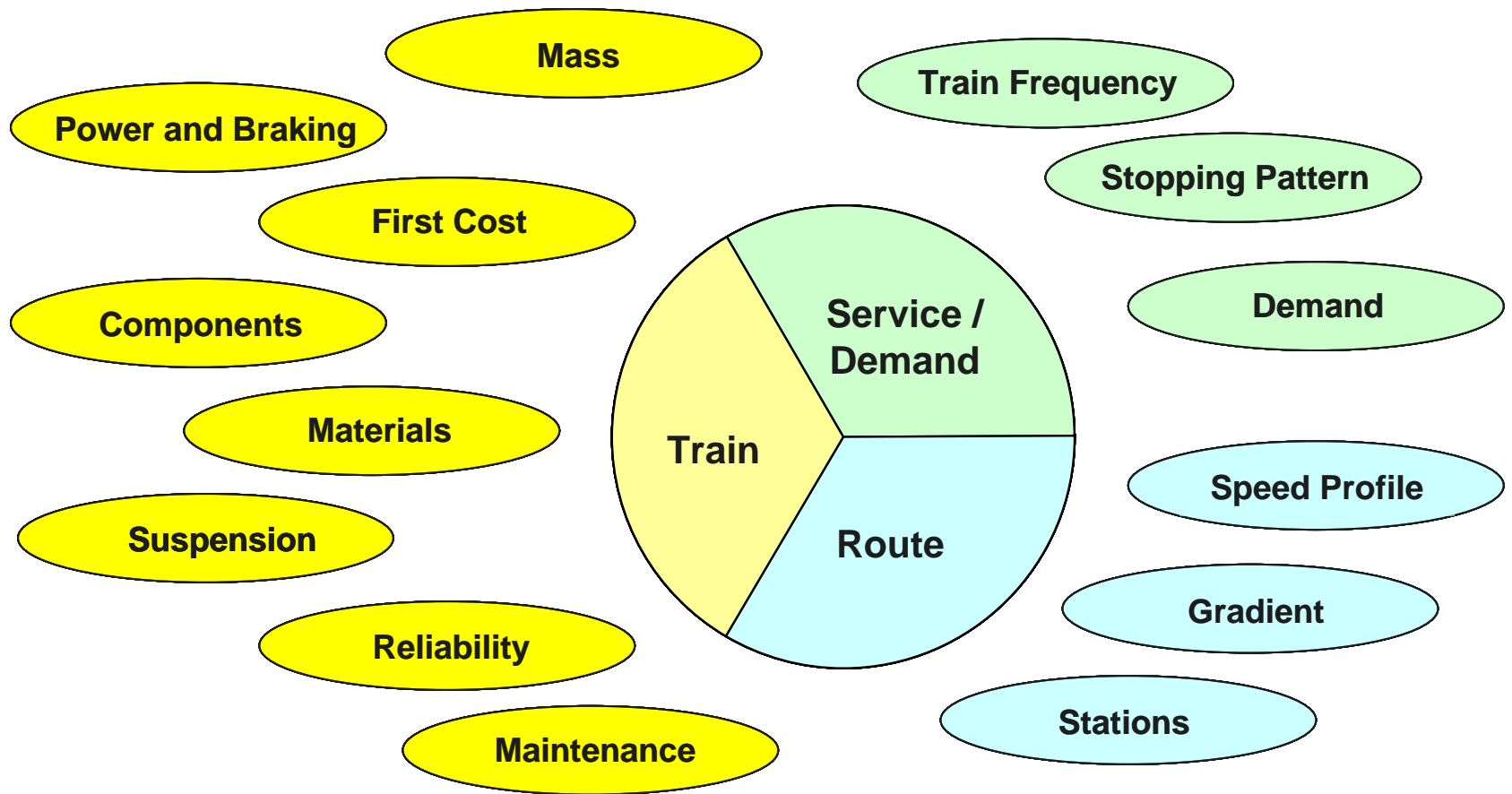


Cost Components



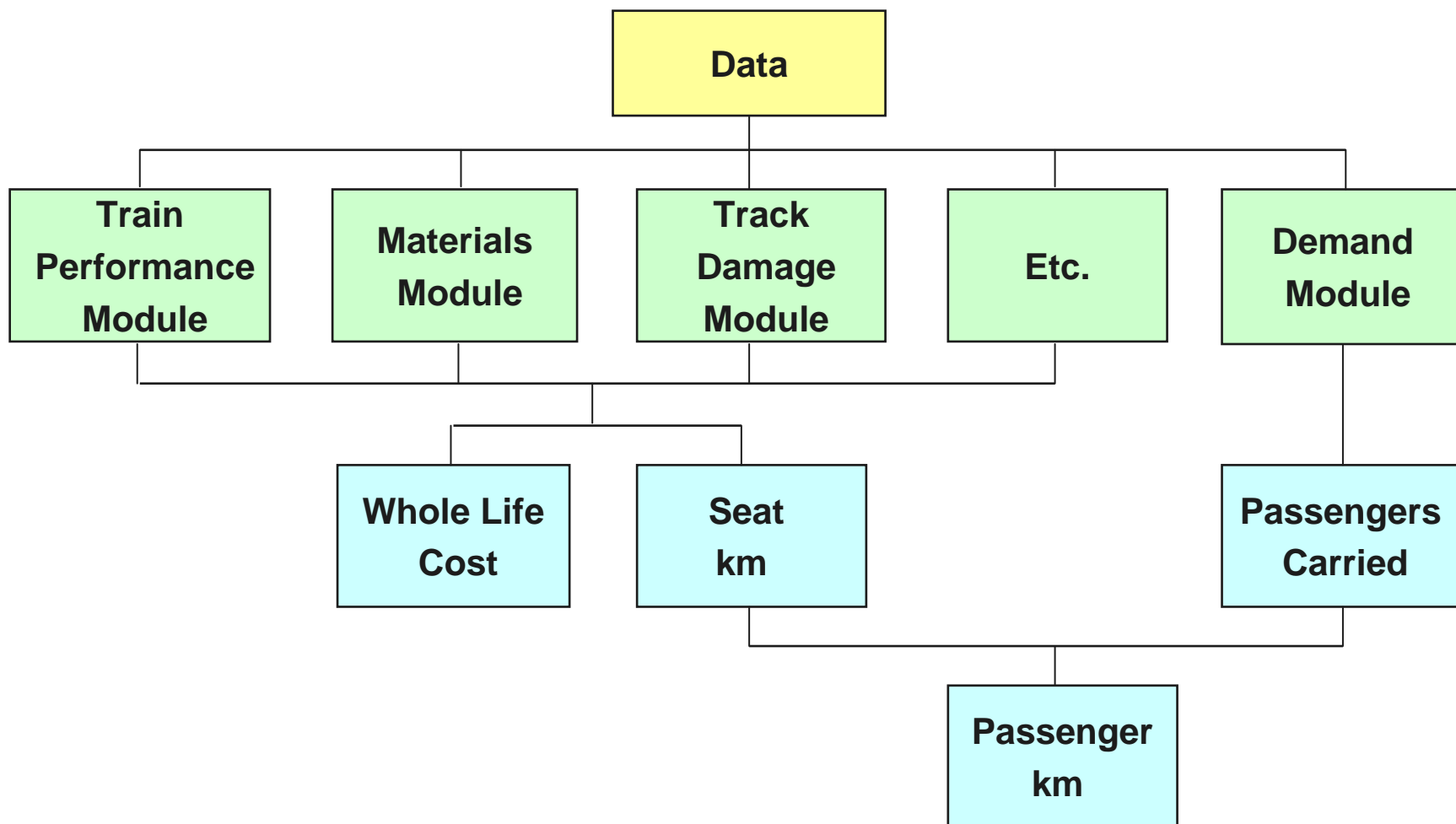


Data





Model Overview





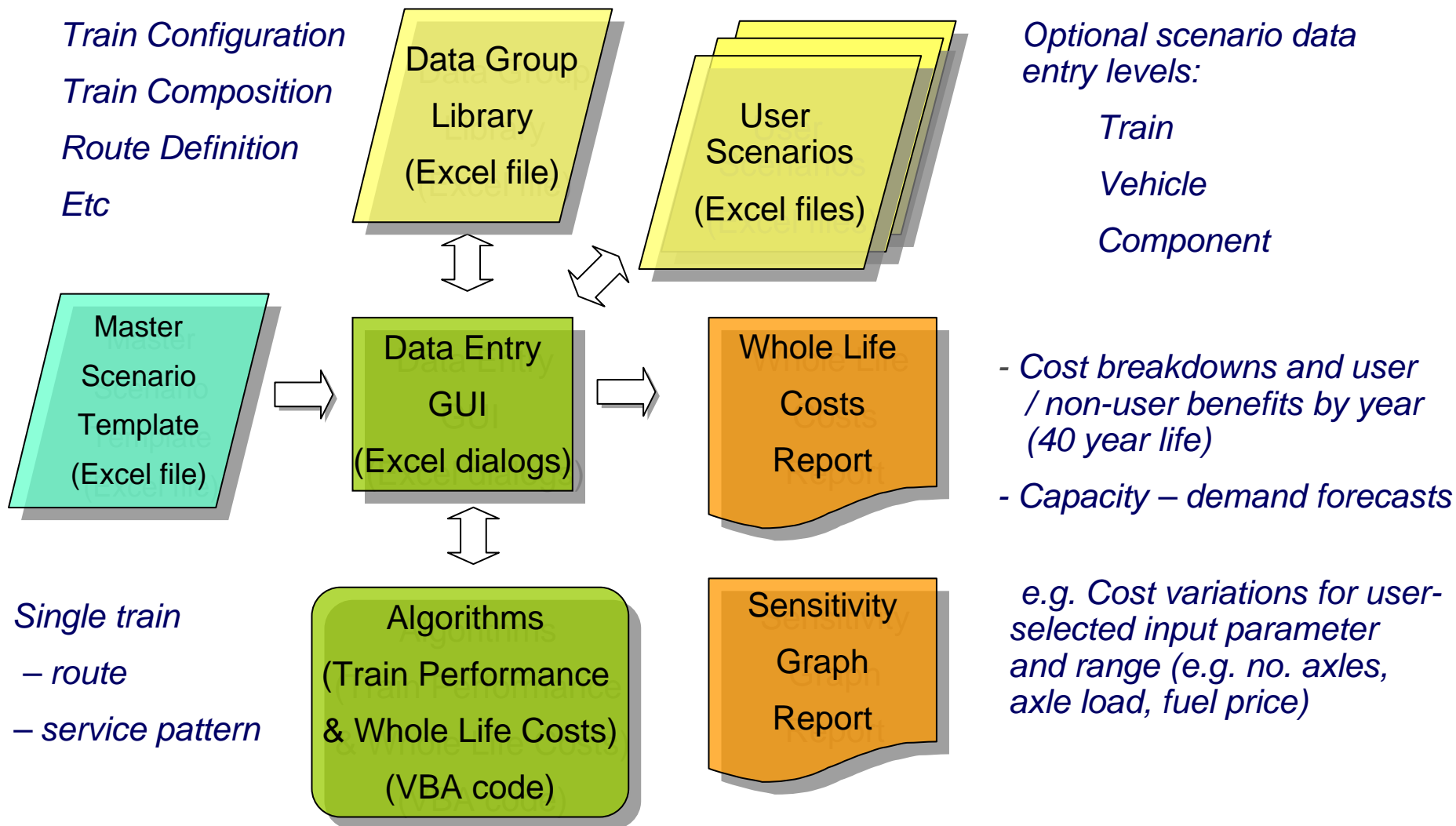
Phase 1 Model Scope

MS Excel-based

- *Scenario*: Single train - route - service pattern model
- Constant train configuration over life
- Separate scenario runs required for multiple trains / multiple routes / refurbishment
- Some control over data entry to assure quality and provide user guidance
- ***Workable, tested, early release model with some compromises on usability***

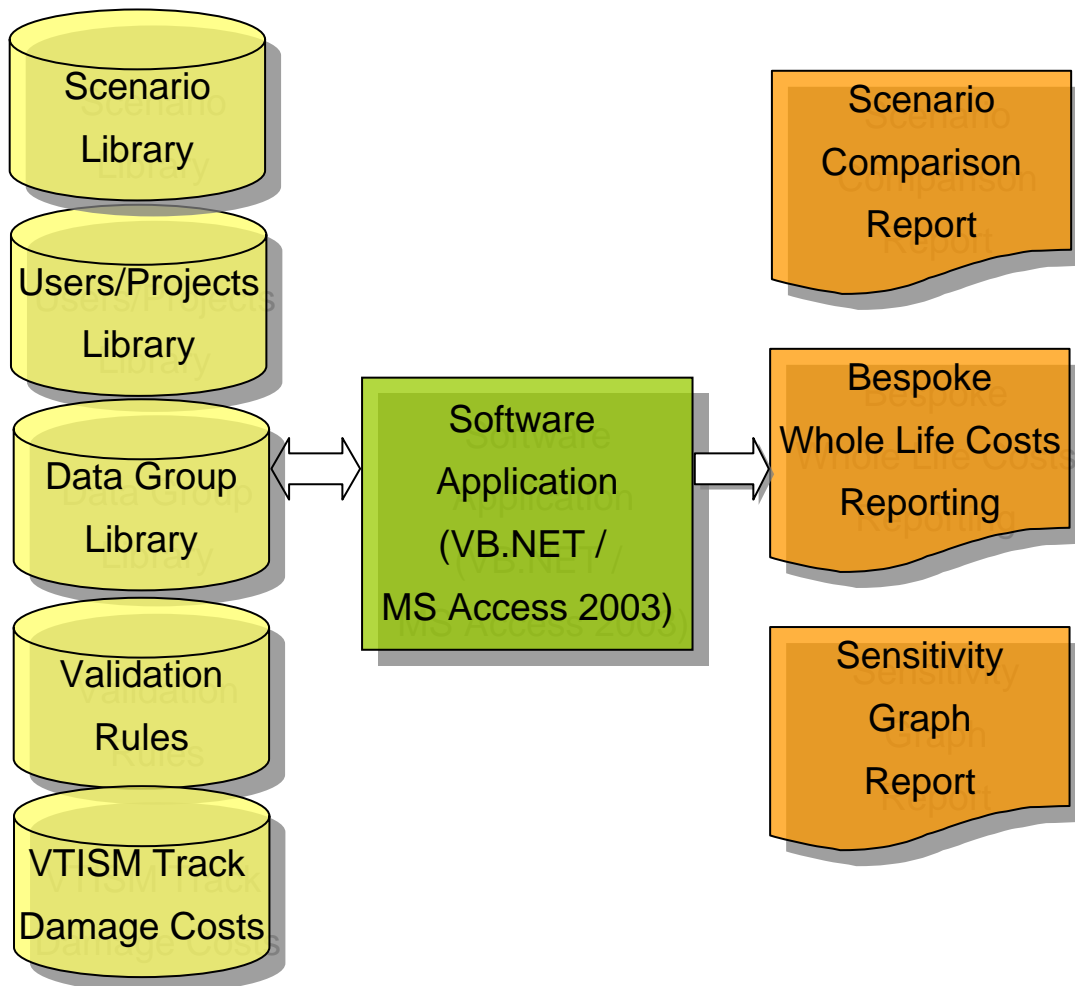


Phase 1 Model Scope





Phase 2 Model Scope - VBA



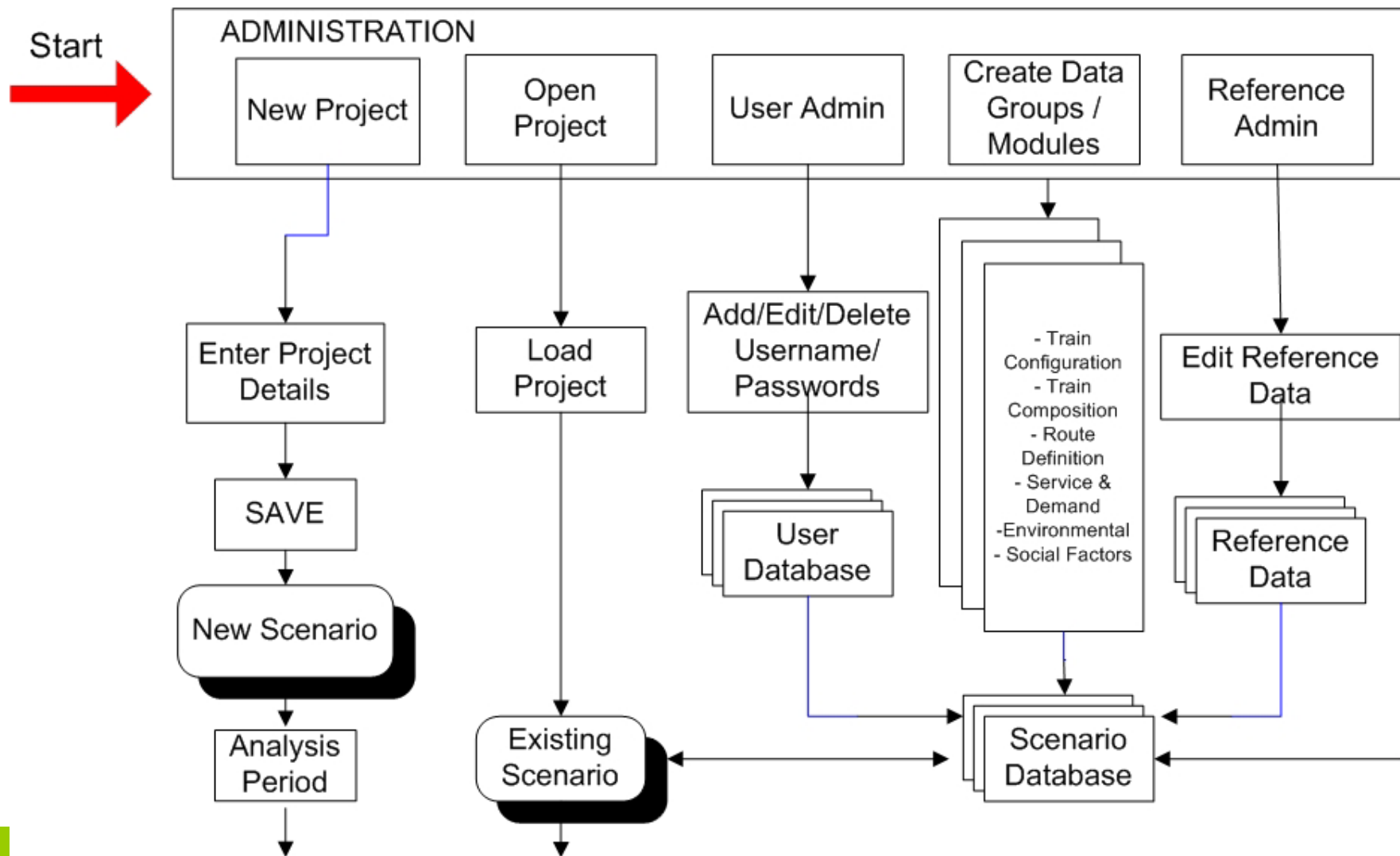
Improvements to MS Excel model:

- Multiple train configurations - routes - service patterns model
 - Refurbishment lifetime profile
 - Tilt modelling
 - VTISM import / export
 - Scenario comparison report, e.g. NPV ranking
 - Data entry wizard assuring fool-proof workflow
 - Improved security and traceability of scenarios
- ***Improved usability, robustness and performance***



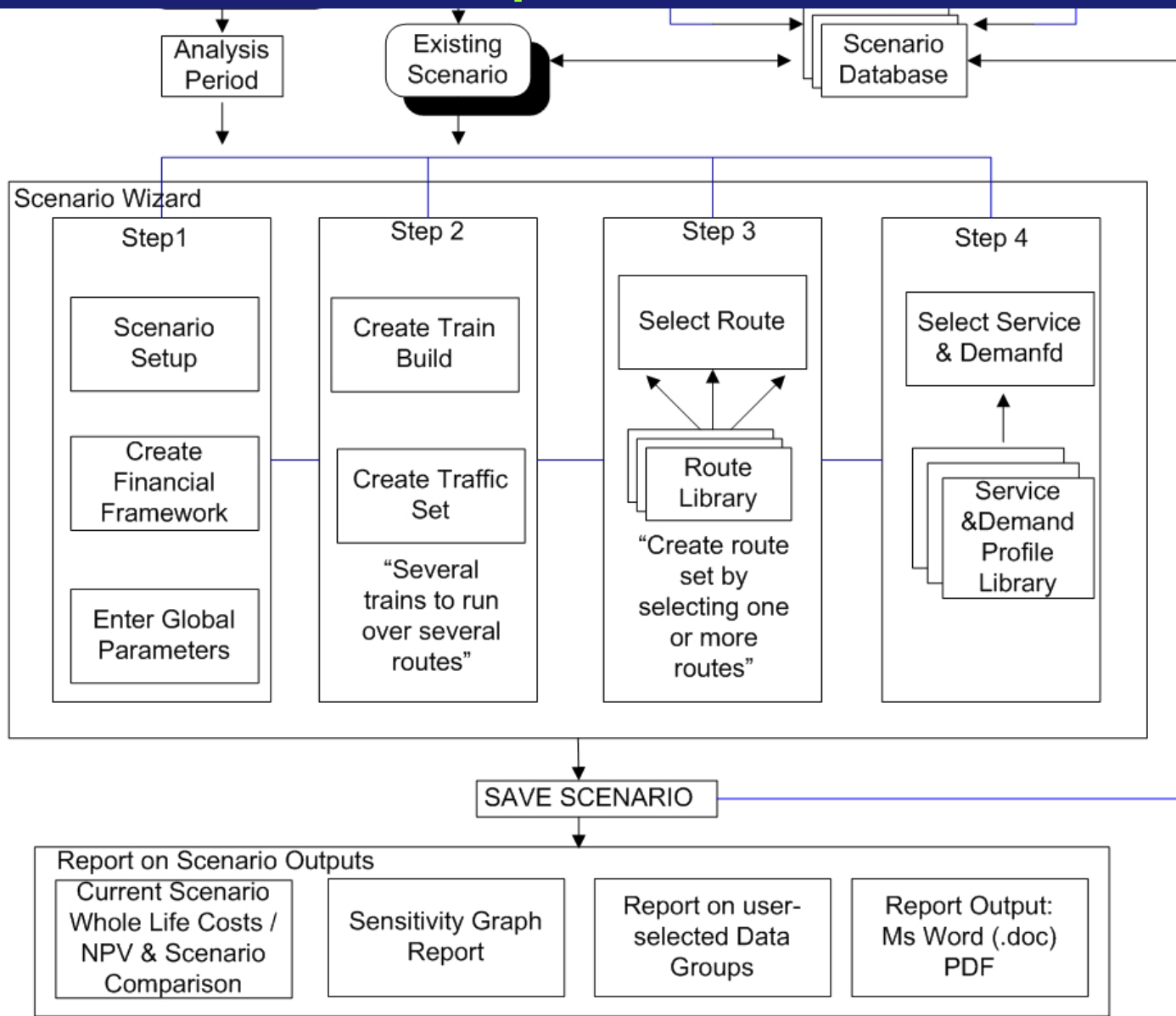
Phase 2 Model Scope -VBA

RS-WLCM Phase 2



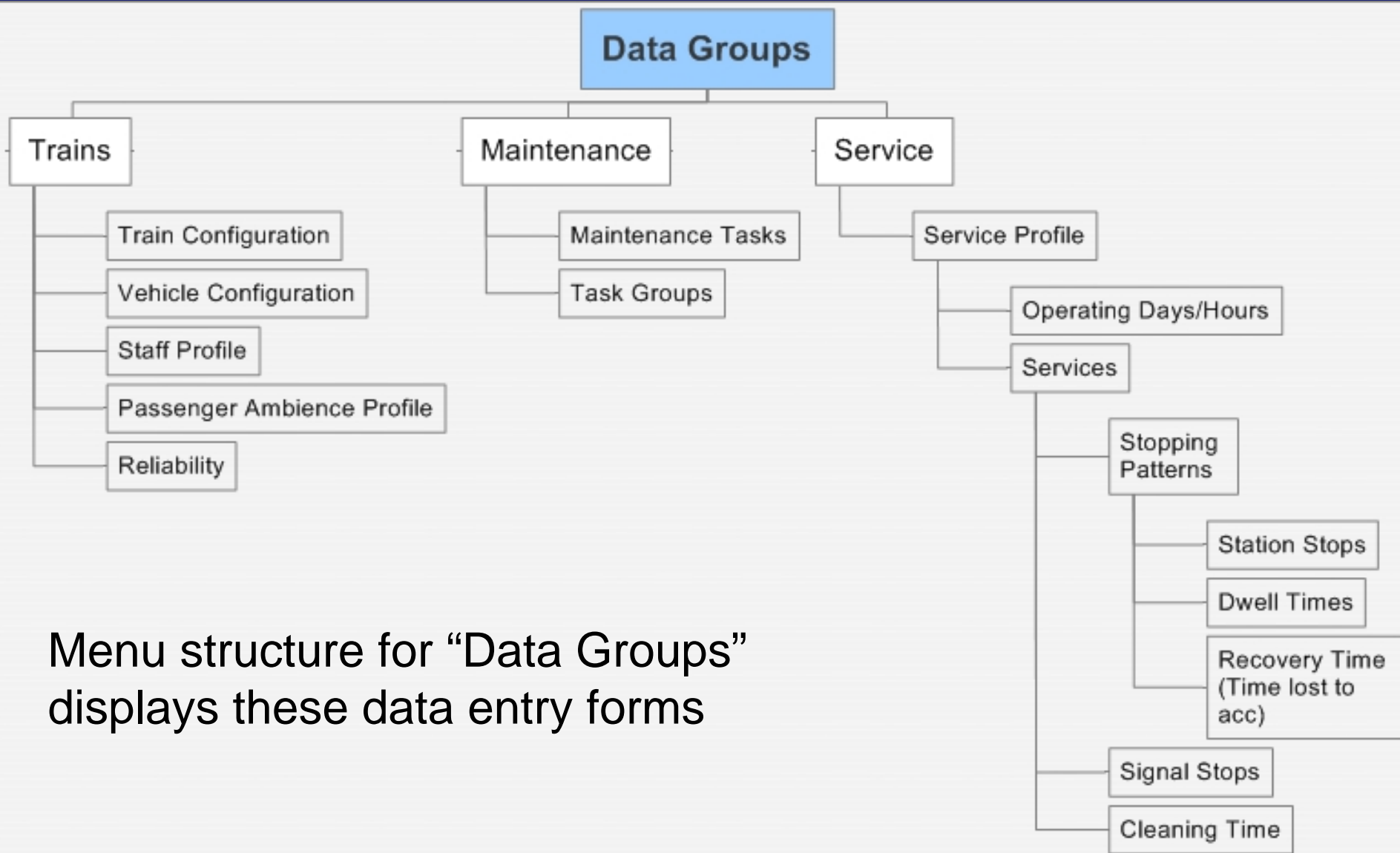


Phase 2 Model Scope -VBA





Create Data Groups

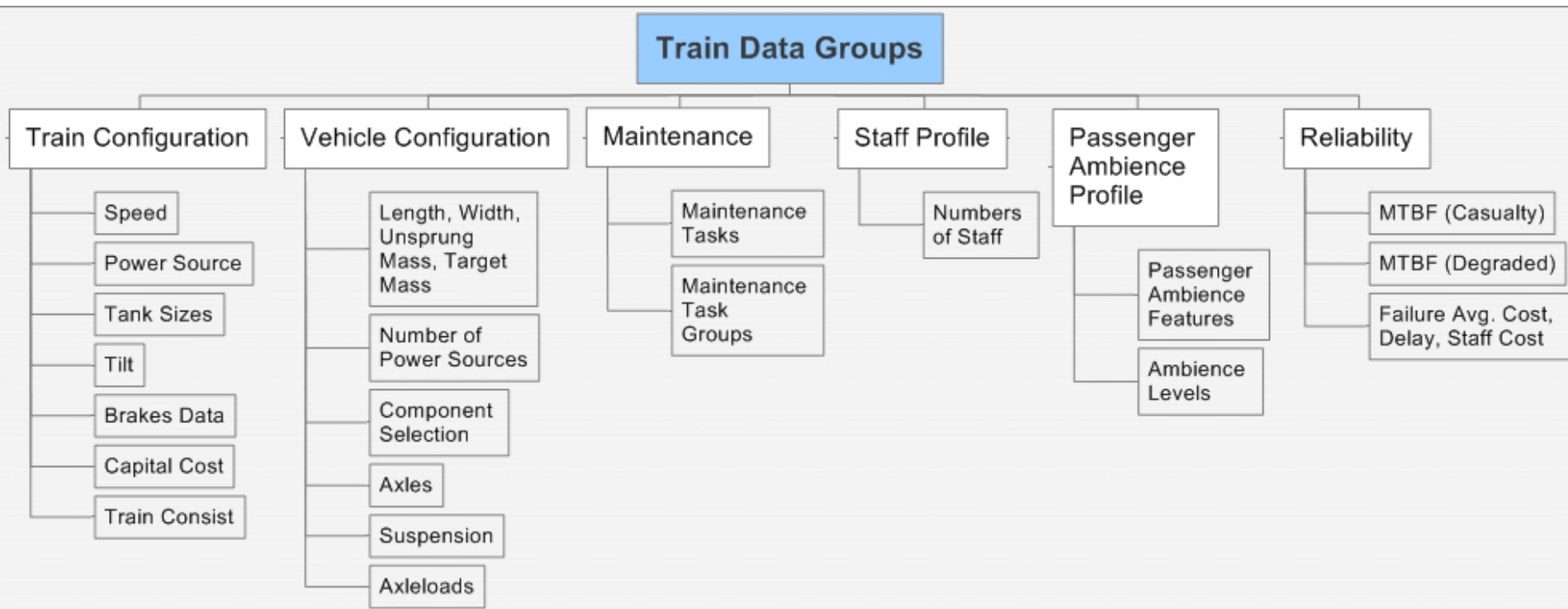


Menu structure for “Data Groups” displays these data entry forms



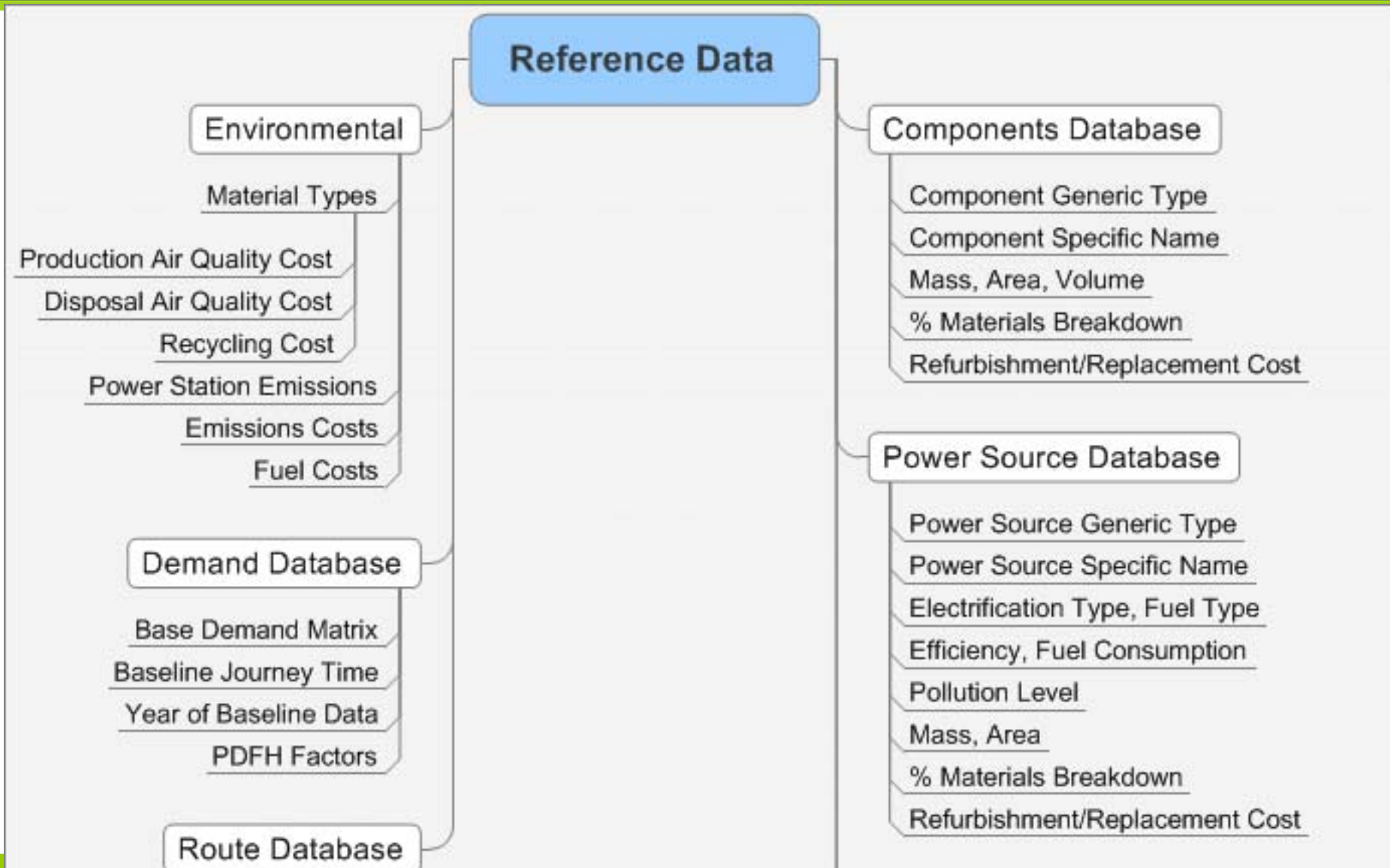
Create Data Modules

Summary of Data Modules in “Train” Data Group





Reference Data





Reference Data

Reference Data

Route Database

T-SPA Route ID

Electrification Type

Section Data

Original Linespeed

Tilt Active Linespeed

Avg. Gradient

Mileage

Congestion Level

Detailed Curve Data

Cant

Curvature

Is Tilt Possible

Maintenance Task Database

Component Generic Type

Maintenance Tasks by Component Type

Downtime

Labour Man-hours

Spares

Special Materials

Task Groupings

Finance

Congestion Costs

Fares

First Class

Second Class

Annual Inflation

Discount Rate



Software Testing & Acceptance

- Usability trials, feedback and training
- Software testing and acceptance
 - Unit / System Testing against Customer & Functional Requirements
 - Acceptance Testing against Stakeholder requirements
 - TickIT certification



Summary

- Delivering a tool for the industry to identify the costs of building and operating a train to provide a given service
- Answer specific questions, such as:
 - What is the best vehicle length and train formation?
 - What is the journey time / mass / energy use trade-off?
 - How does passenger comfort influence demand?
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