

# Oracle Network Data Model and the Victorian Public Transport Network

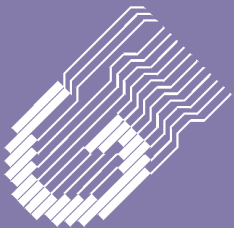
## Presentation to Victoria Oracle Spatial User Forum

**Ross Caldow**

[rcaldow@geomatic.com.au](mailto:rcaldow@geomatic.com.au)

<http://www.geomatic.com.au>

**21 February 2006**

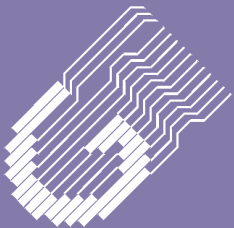


**GeomaticTechnologies**



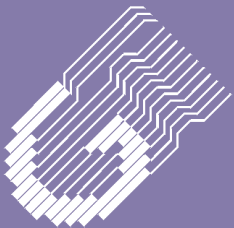
# Geomatic Technologies

- Southbank headquartered company, 70 staff, Brisbane office, Est. 1994
- Leader in the provision of spatially based business solutions to government, road, rail & power utilities:
  - Field based asset mapping and inspections,
  - Spatial data distribution and value added reselling,
  - Digital aerial imagery and terrain models,
  - Enterprise GIS solutions including web & mobile technology,
  - Development, implementation and support of hosted and Application Service Provider (ASP) based solutions.



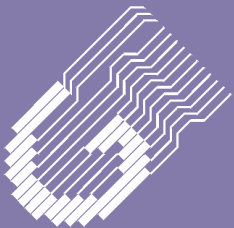
# Background

- Routing a requirement for Victorian Government Initiative
- Datasets include:
  - Tourism Victoria attractions, accommodation, restaurants
  - Vicmap



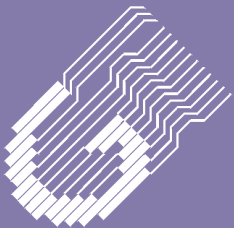
# Objectives

- To provide shortest route from selected locations using Melbourne's public transport network
- To generate meaningful travel directions and maps
- To deliver information as a web service
- To build a routable data set
- Note: timetables/schedules were not to be included

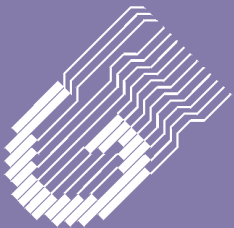
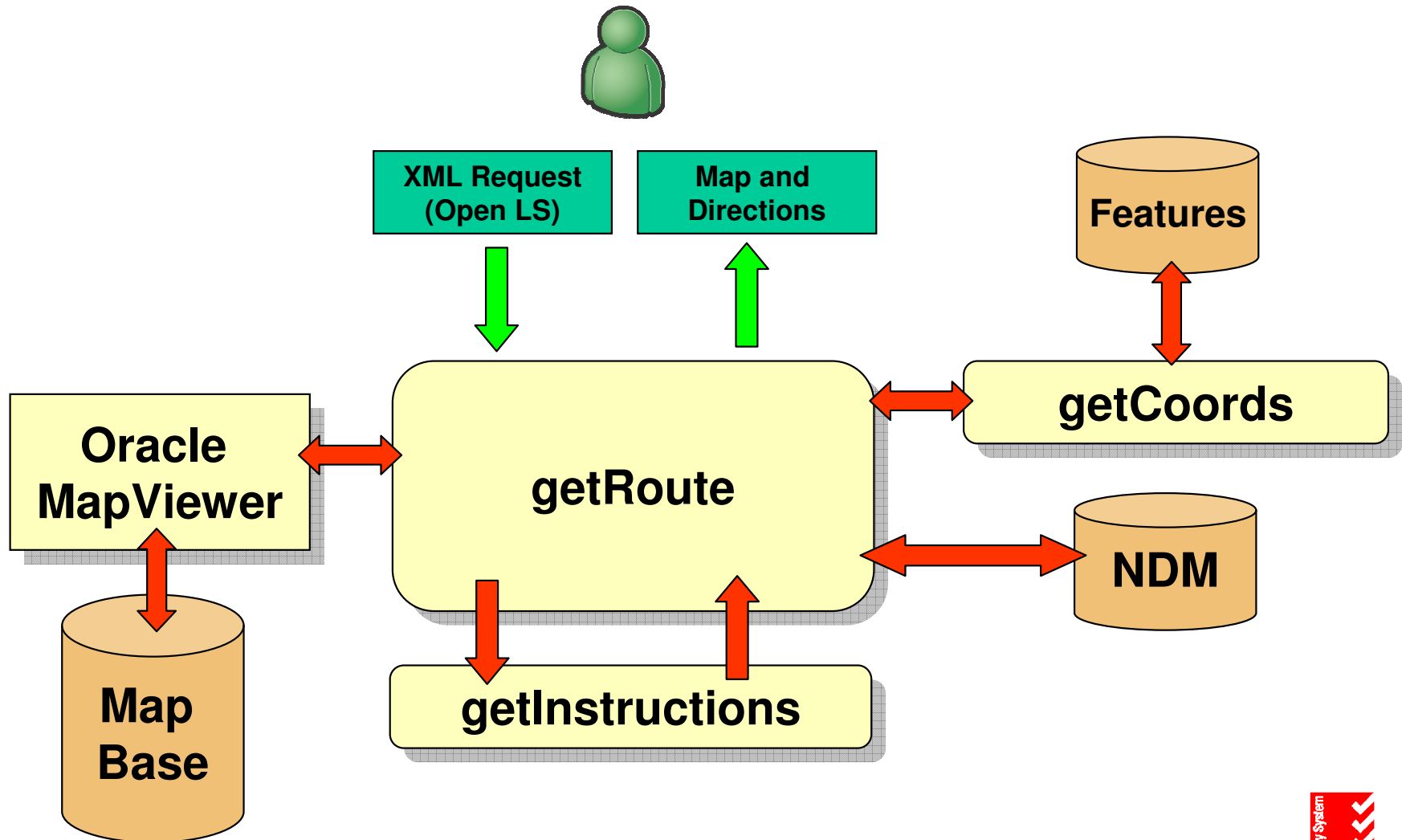


# Technologies

- Oracle10g R2 and Oracle 10g AS Java Edition
- Oracle RouteServer
  - Road focused
  - Single transport mode
- Oracle Network Data Model
  - Java API
  - Network Data Editor tool
- Oracle MapViewer
  - MapBuilder
- Microsoft .NET



# Solution Architecture

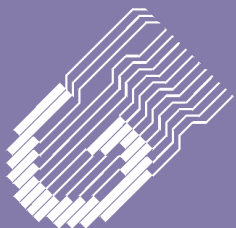


# Sample output

**From :** Melbourne Observation Deck

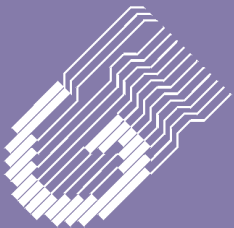
**To :** Novotel Hotel, St Kilda

- **WALK** to Stop 2 King St/Collins St (Melbourne City) (0.1km)
- **TRAM** No. 109 Port Melbourne from Stop 2 King St/Collins St (Melbourne City) to Stop 125 Port Junction/79 Whiteman St (Southbank)
- **TRAM** No. 96 St Kilda Beach from Stop 125 Port Junction/79 Whiteman St (Southbank) to Stop 137 Alfred Pl/The Esplanade (St Kilda)
- **WALK** to Novotel St Kilda (16 The Esplanade St Kilda) (0.3km)



# Transport data in Victoria

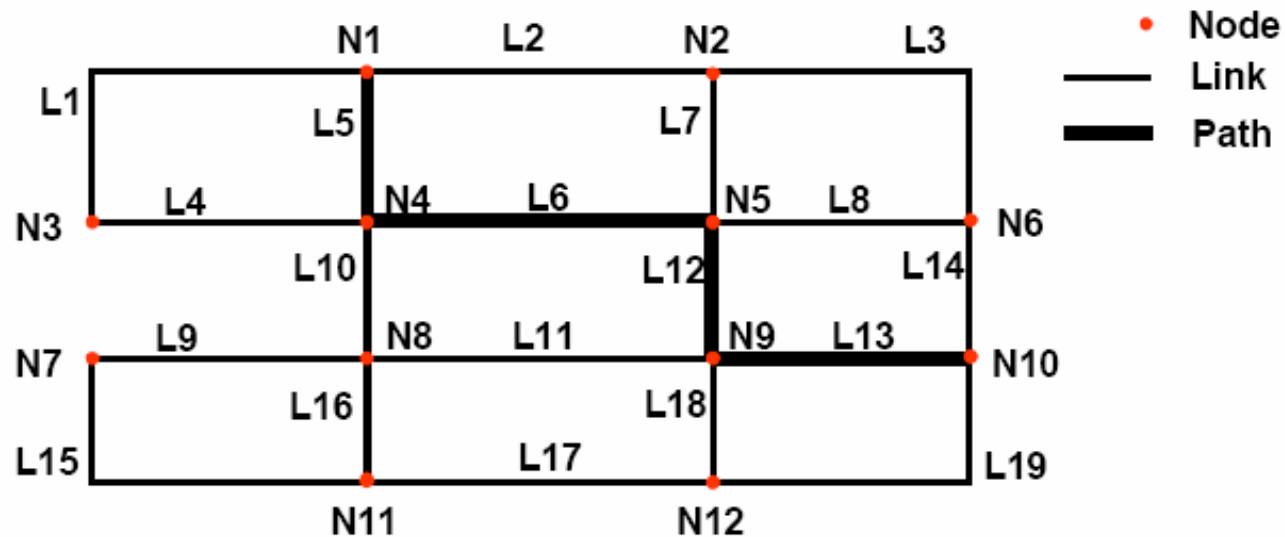
- Vicmap Transport
  - Roads (node/links)
  - Rail (Trams, Trains)
- Metlink/ Dept of Infrastructure
  - Tram – 29 routes,
  - Bus – 289 routes, over 23,000 stops
- Custom built during project
  - Node/links
  - Route metadata





# Oracle NDM Concepts

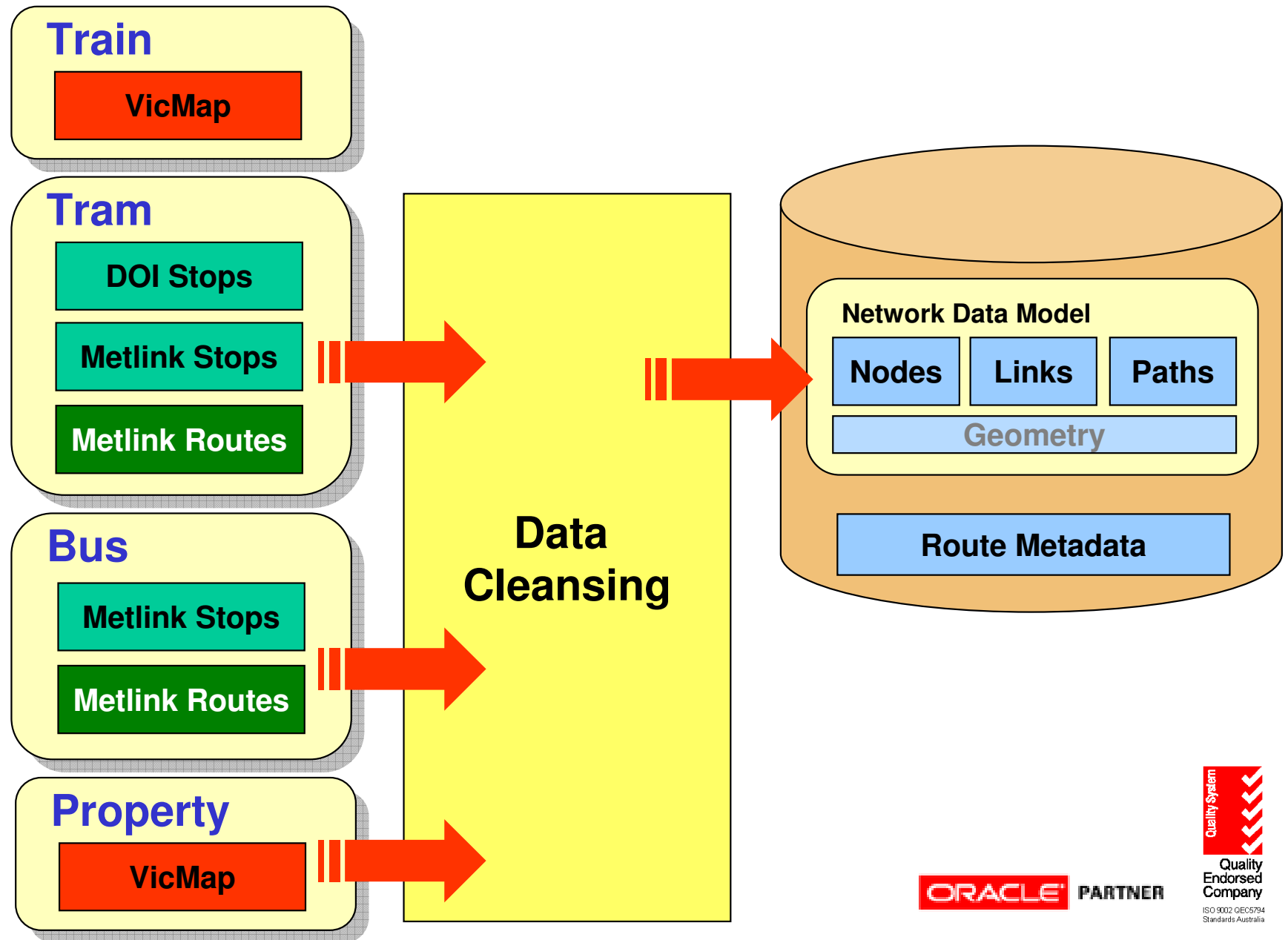
A Simple Network



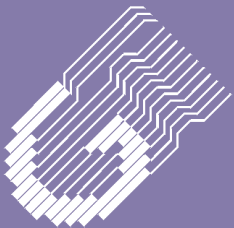
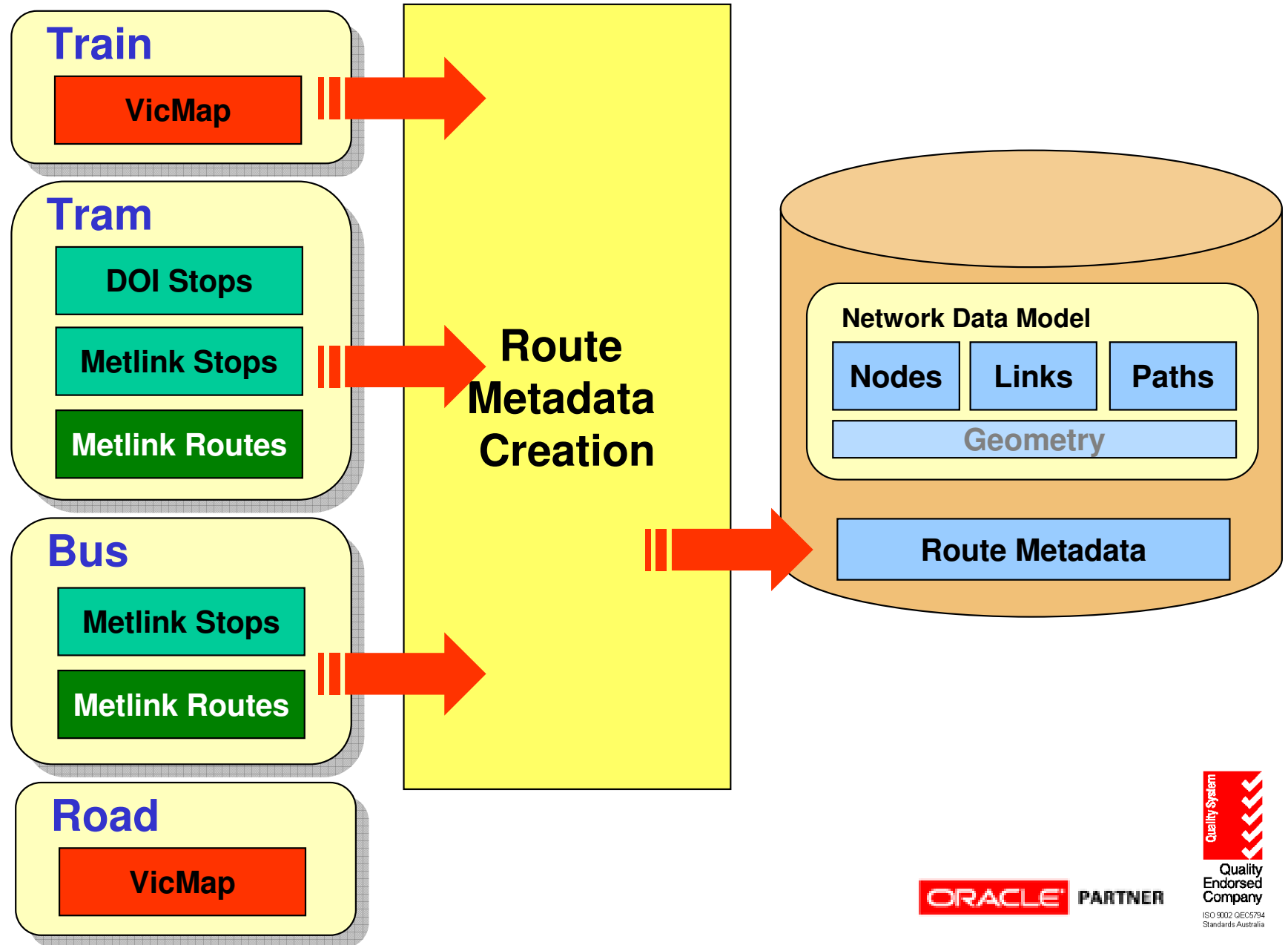
ORACLE

ORACLE PARTNER

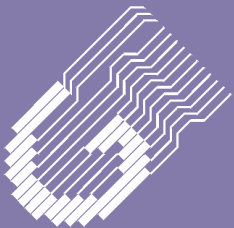
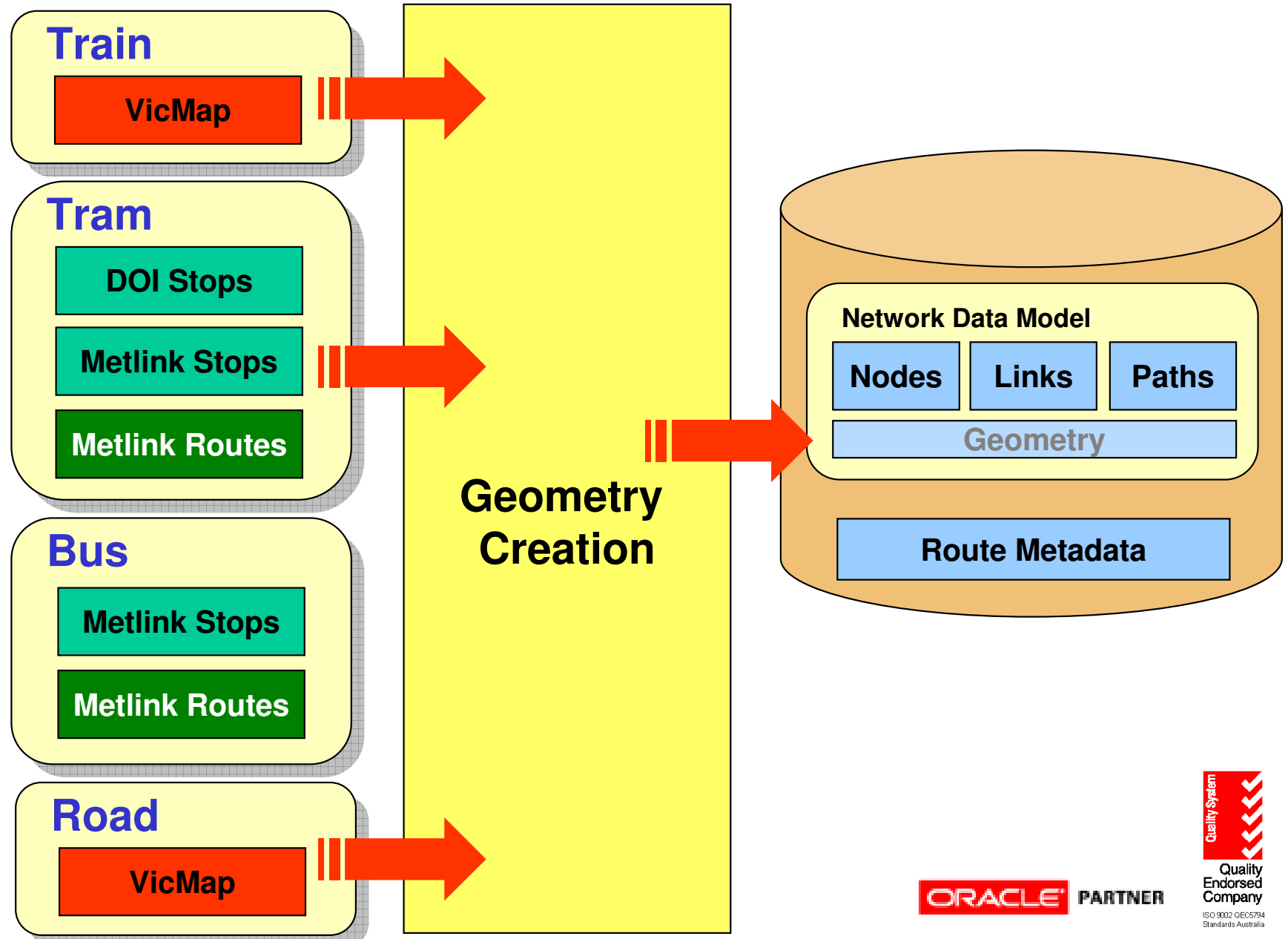
# Building the route data



# Building the route data

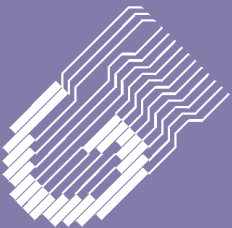


# Building the route data

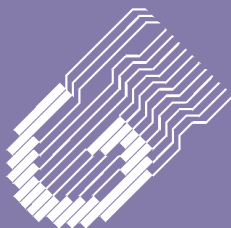
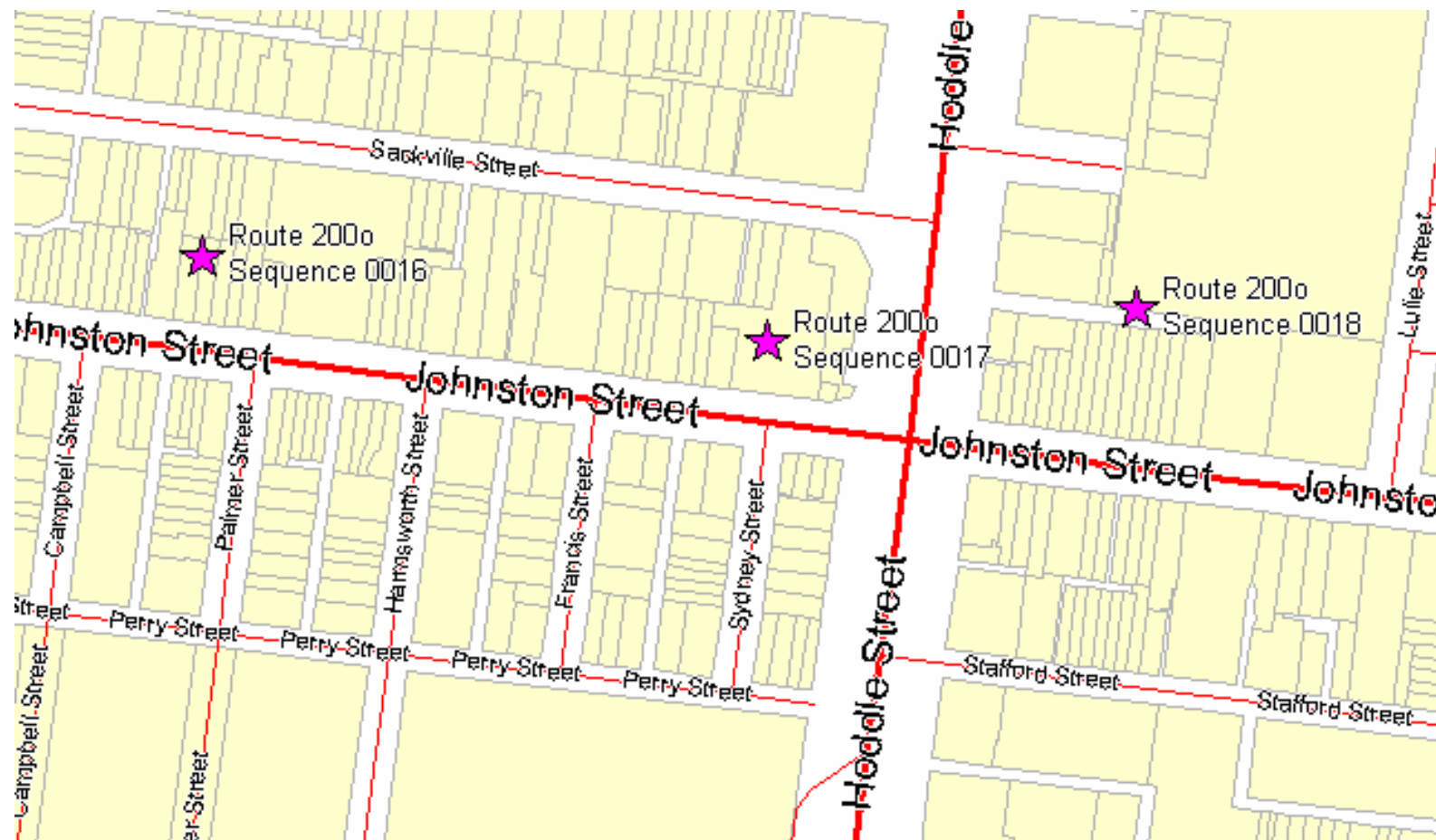


# Data issues

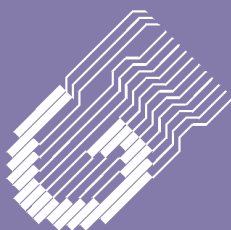
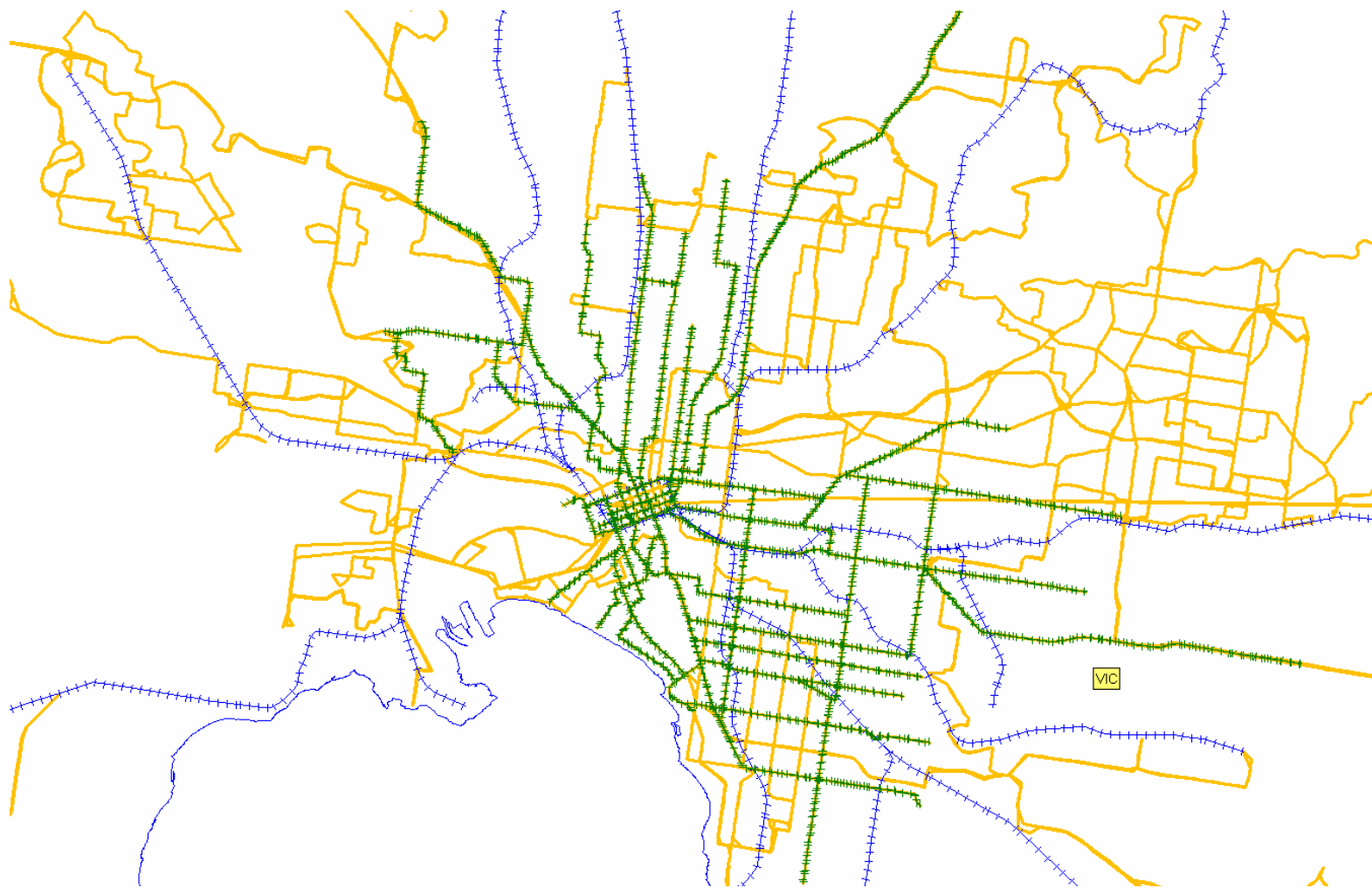
- Data Cleansing
  - Reconciliation of stops with map base
  - Sequencing of stops
  - Duplicate removal within routes
  - Duplicate nodes between routes
- Geometry
  - Union of road network for route
  - Splitting road segments based on stop positions
  - Fixing directions of both links and geometry



# Data issues

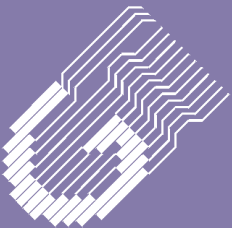


# Transport Network – Physical



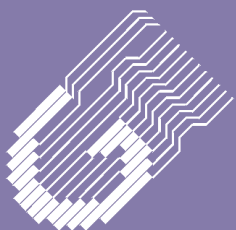
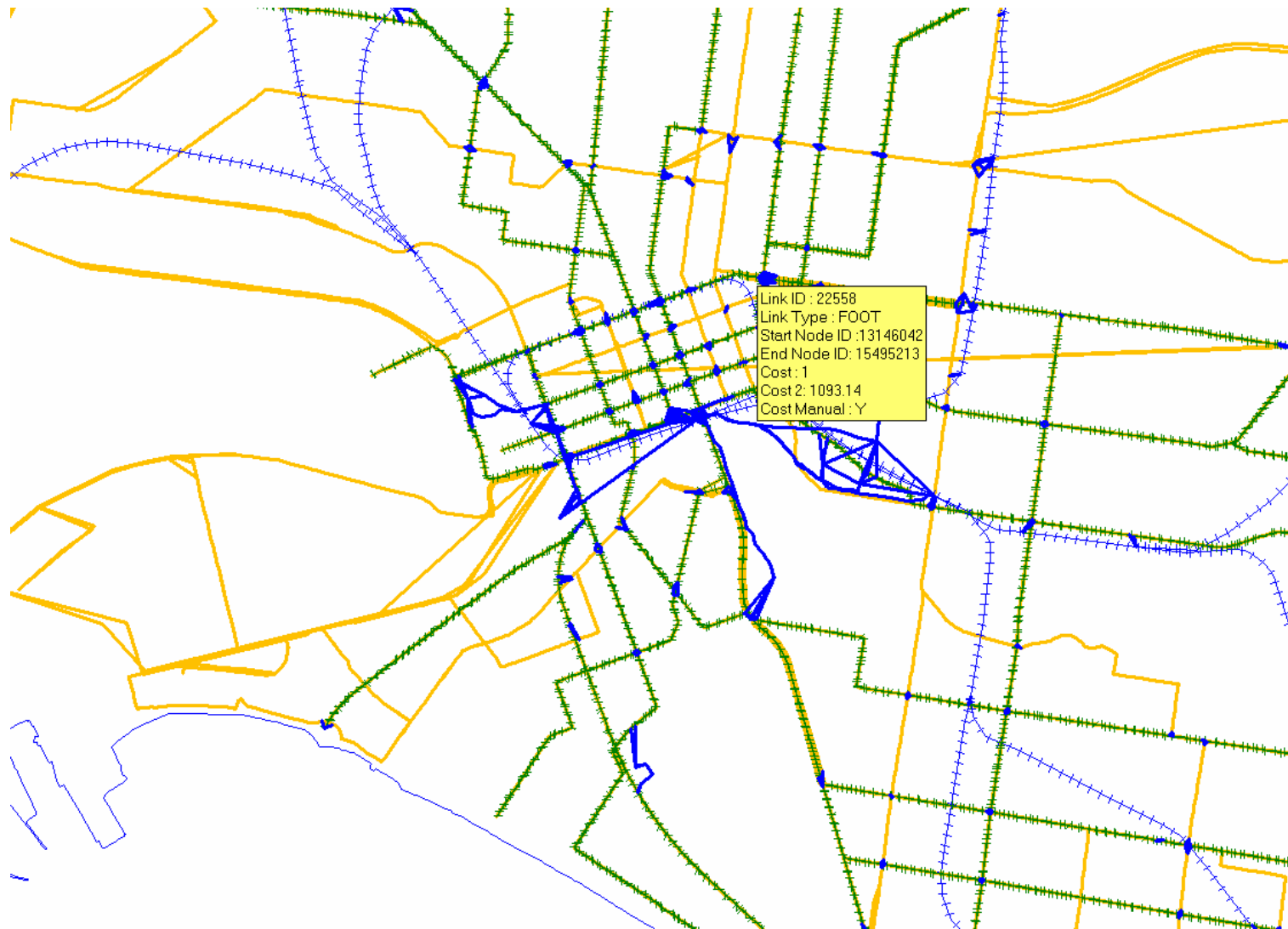
# Putting it all together

- Connections between modes
  - Foot links
- Determining the 'least cost'
  - Multiple costs on links
  - Travel time
  - Distance
- Network Management with SQL and Oracle Network Data Editor
- Directions to include:
  - Route Name, Destination, Stop Name, Walking distance (in kms)



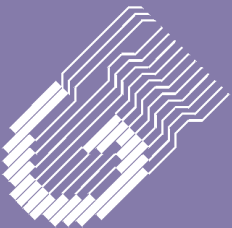


# Transport Network – Multi-mode

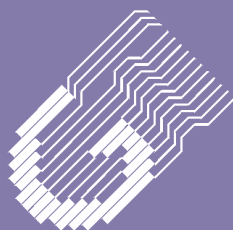


# Route display with MapViewer

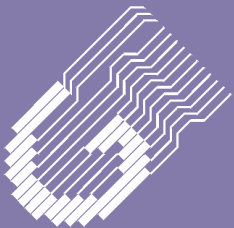
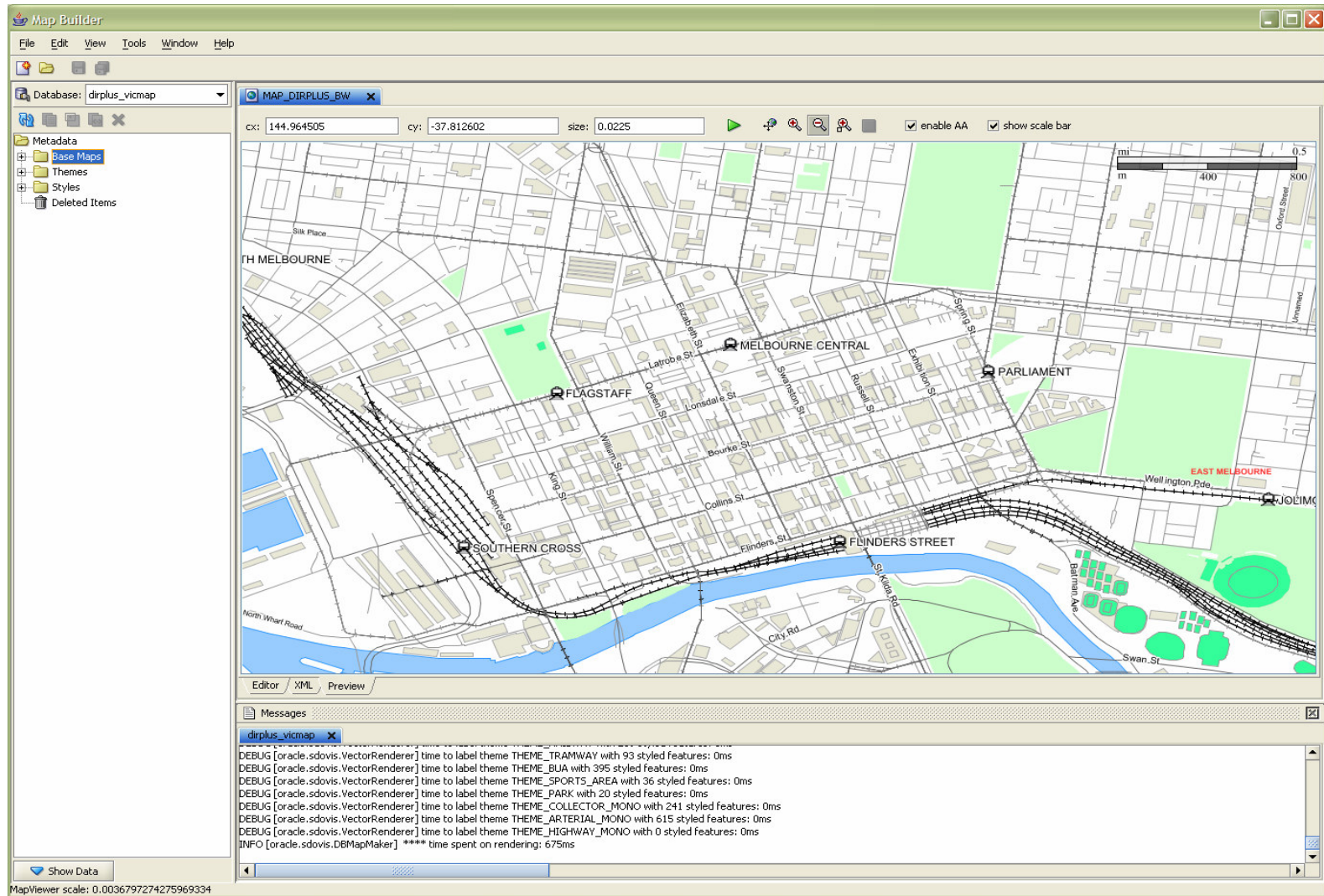
- JDBC Themes for non-base data
  - Route Start/End
  - Route geometry
- PNG output
- Web service builds directions and map into single response
- Map authoring with Oracle MapBuilder



# Routing with MapViewer



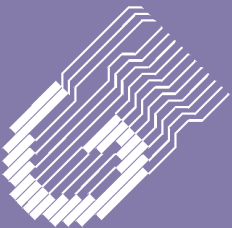
# Oracle MapBuilder



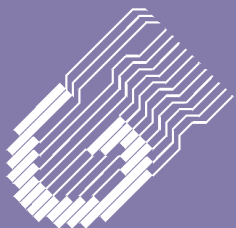
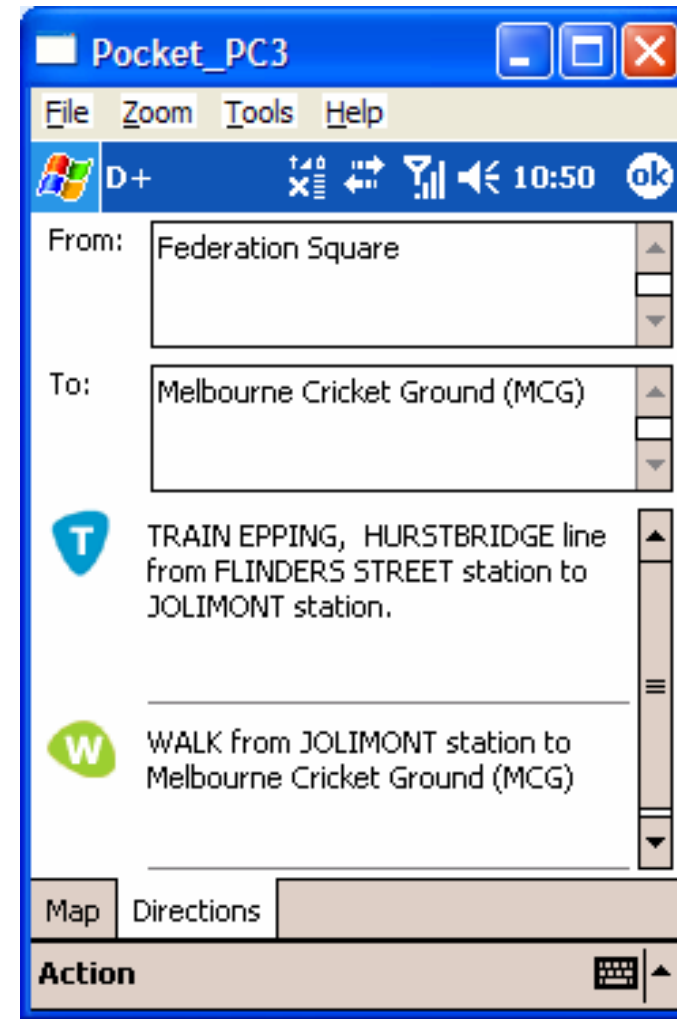
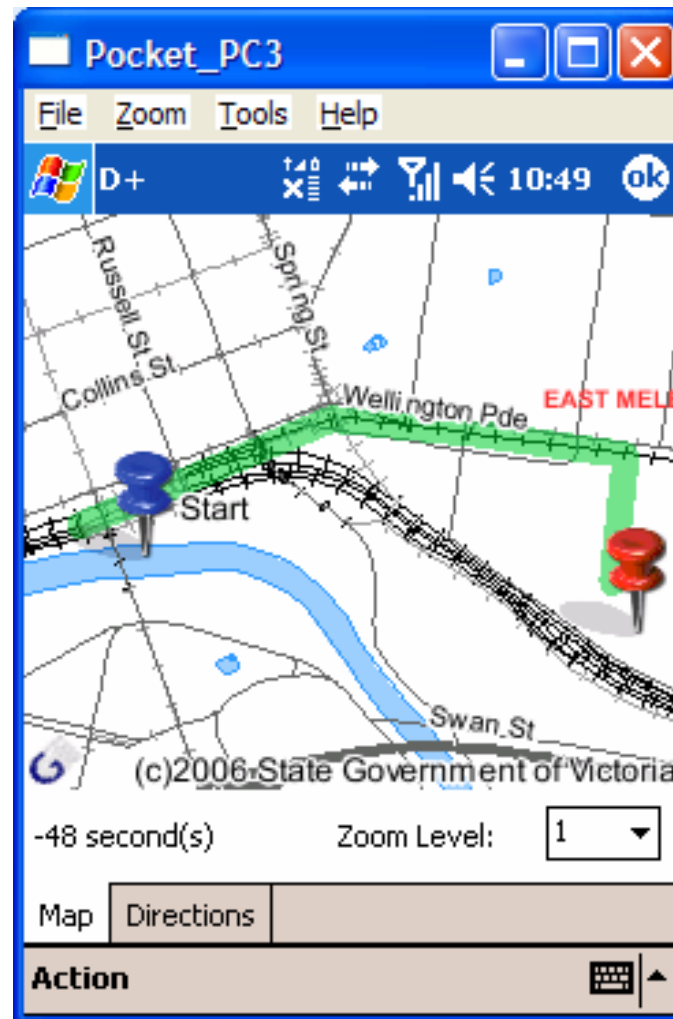


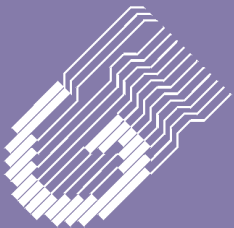
# Outcomes and planned Deployments

- First deployment scheduled for March 2006
  - Mobile device
- Web based deployments to follow in April 2006
- Bus and tram data returned to government custodians



# Mobile deployment





# Questions?