Oracle Network Data Model and the Victorian Public Transport Network

Presentation to Victoria Oracle Spatial User Forum

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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
Sample output

From: Melbourne Observation Deck
To: Novotel Hotel, St Kilda

- **WALK** to Stop 2 King St/Collins St (Melbourne City) (0.1 km)

- **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) (0.3 km)
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

- Node
- Link
- Path

L1  L2  L3
N1  L5  N2  L7  N3
L4  N4  L6  N5  L8
L10 N9  L12 L14 N6
N7  L9  N8  L11 N10
L16 N11 L17 L18 N12
L15 L19
Building the route data

Train
- VicMap

Tram
- DOI Stops
- Metlink Stops
- Metlink Routes

Bus
- Metlink Stops
- Metlink Routes

Property
- VicMap

Network Data Model
- Nodes
- Links
- Paths
- Geometry

Route Metadata
Building the route data

Train
  - VicMap

Tram
  - DOI Stops
  - Metlink Stops
  - Metlink Routes

Bus
  - Metlink Stops
  - Metlink Routes

Road
  - VicMap

Network Data Model
  - Nodes
  - Links
  - Paths
  - Geometry
  - Route Metadata

Route Metadata Creation
Building the route data

- Train
  - VicMap
- Tram
  - DOI Stops
  - Metlink Stops
  - Metlink Routes
- Bus
  - Metlink Stops
  - Metlink Routes
- Road
  - VicMap

Network Data Model
- Nodes
- Links
- Paths

Geometry

Route Metadata
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?