Transit Information Systems:
Beyond the Map
Street network with turn restrictions

**fig. 2**
- TurnEdge permissions = {walk, bike, car}
- TurnEdge permissions = {walk, bike}
- TurnEdge permissions = {walk}

**fig. 3**
- TurnEdge permissions = {walk, bike, car}
- TurnEdge permissions = {walk, bike}
- TurnEdge permissions = {walk}
fig. 1: a basic street graph linked to a pattern-based transit graph (Midtown Manhattan)
Now add time….

9:00am

9:05am

9:10am

fig. 1: a basic street graph linked to a pattern-based transit graph (Midtown Manhattan)
= a very large & complex network
We need tools for managing and analyzing network data.
• OpenTripPlanner
• GTFS Data Manager
• Network Analysis Tools
OpenTripPlanner:
The Portland Experience
The Landscape in 2009: Many Projects, Little Coordination
Building the OTP Community

Kickoff Workshop, July 2009
Solving the Data Question

TriMet Summer 2011
OpenStreetMap
Improvement Project

Objectives

- Improve Alignment Accuracy
- Verify Topology & Directionality
- Add Routing Attributes
Putting it All Together

Data Sources

OTP Graph Object

Offline Utilities

Analysis Utilities

(In Development)

Tomcat-Powered OTP Server

Public Interfaces

API

API
OTP Portland Demo
<table>
<thead>
<tr>
<th>Type</th>
<th>Color</th>
<th>Short Name</th>
<th>Long Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>BUS</td>
<td>▼</td>
<td>1</td>
<td>Centennial Oly. Park/Coronet Way</td>
<td></td>
</tr>
<tr>
<td>BUS</td>
<td>▼</td>
<td>103</td>
<td>N. Shallowford Rd./Peeler Rd.</td>
<td></td>
</tr>
<tr>
<td>BUS</td>
<td>▼</td>
<td>104</td>
<td>Winters Chapel Road</td>
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<td>BUS</td>
<td>▼</td>
<td>107</td>
<td>Glenwood Road</td>
<td></td>
</tr>
<tr>
<td>BUS</td>
<td>▼</td>
<td>110</td>
<td>Peachtree St./&quot;The Peach&quot;</td>
<td></td>
</tr>
<tr>
<td>BUS</td>
<td>▼</td>
<td>111</td>
<td>Snapfinger Woods Dr. /Stonecrest</td>
<td></td>
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<tr>
<td>BUS</td>
<td>▼</td>
<td>114</td>
<td>Columbia Drive</td>
<td></td>
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<tr>
<td>BUS</td>
<td>▼</td>
<td>115</td>
<td>Covington Highway/South Hairston Rd</td>
<td></td>
</tr>
<tr>
<td>BUS</td>
<td>▼</td>
<td>116</td>
<td>Redan Road / Stonecrest</td>
<td></td>
</tr>
<tr>
<td>BUS</td>
<td>▼</td>
<td>117</td>
<td>Rockbridge Rd./Panola Rd.</td>
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<td>Kensington/Hairston Rd.</td>
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<td>12</td>
<td>Howell Mill Rd/Cumberland</td>
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<td>E. Ponce de Leon Ave/Tucker</td>
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<tr>
<td>BUS</td>
<td>▼</td>
<td>121</td>
<td>Stone Mountain/Memorial Drive</td>
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<tr>
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<td>▼</td>
<td>123</td>
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<td>BUS</td>
<td>▼</td>
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<td>Clarkston/Northlake</td>
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<tr>
<td>BUS</td>
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<td>126</td>
<td>Chamblee / Northlake</td>
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<td>BUS</td>
<td>▼</td>
<td>13</td>
<td>Fair Street/Morey Park</td>
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</tbody>
</table>
Transit Route and Schedule Manager

Agency: Cobb Community Transit (CCT)
Alignment: OUT15 MARIETTA TRANSFER CENTER TO WILDWOOD
Stop List:

1. ‡ MARIETTA PKWY & FOOD DEPOT +00:00
2. ‡ FAIRGROUND ST & HALEY ST +02:30
3. ‡ FAIRGROUND ST & FRASIER ST +01:00
4. ‡ FAIRGROUND ST & PIERCE ST +01:15

Add stops by selecting from map.
### Service Calendars:

<table>
<thead>
<tr>
<th>Description</th>
<th>Start Date</th>
<th>End Date</th>
<th>Service Days</th>
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<tbody>
<tr>
<td>Weekday Service</td>
<td>03/23/2011</td>
<td>09/17/2011</td>
<td>Mon Tue Wed Thu Fri</td>
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<tr>
<td>Sunday Service</td>
<td>03/23/2011</td>
<td>09/17/2011</td>
<td>Sun</td>
</tr>
<tr>
<td>Saturday Service</td>
<td>03/23/2011</td>
<td>09/17/2011</td>
<td>Sat</td>
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</table>

### Service Calendar Exceptions:

<table>
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<th>Description</th>
<th>Date</th>
<th>Exception Type</th>
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<tbody>
<tr>
<td>Memorial Day Additions</td>
<td>05/30/2011</td>
<td>SERVICE ADDED</td>
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<tr>
<td>Memorial Day Suspensions</td>
<td>05/30/2011</td>
<td>SERVICE REMOVED</td>
</tr>
<tr>
<td>July 4th Additions</td>
<td>07/04/2011</td>
<td>SERVICE ADDED</td>
</tr>
<tr>
<td>July 4th Suspensions</td>
<td>07/04/2011</td>
<td>SERVICE REMOVED</td>
</tr>
</tbody>
</table>
OpenTripPlanner: Analytics Extension
Location Based Accessibility

• Measures Accessibility To or From a Specific Point in the Transportation Network

• Two Modes of Operation:
  • Origin-based (i.e., What Can Be Reached Starting From a Given Point of Origin?)
  • Destination-based (i.e., Who Can Reach a Given Destination Point?)
Systemwide Level of Service

- Assesses Overall Level of Service Provided for One or More Modes on Systemwide Basis
- “Level Of Service” Can Be Defined In Different Ways For Various Modes
  - e.g. Average Frequency/Headways For Transit
- Produce Raster “Heat Maps” Showing Level of Service for Given Study Area
Aggregate Search Analysis

- Involves Batch Execution of Large Set of User Searches to Answer Various Questions
- Variety of Search Data Sources:
  - Regional Origin/Destination Surveys
  - Archived OTP User Searches
- Can Help Identify Latent Demand, Under/Overserved Corridors, etc.
System Modification Impacts

- Compare “Before” and “After” System Snapshots Using Distinct OTP Graphs
- Potential Applications
  - Assess Negative Impacts of Service Cuts
  - Predict Impact of Proposed System Expansions
Demo: Isochrone Generator
8:30 AM, 30-minute Limit
8:30 AM, 60-minute Limit
12 midnight, 60-minute Limit
12 midnight, 60-minute Limit
8:30 AM, 15-minute Intervals