EMERGING WORKSITE TRIP-REDUCTION INFORMATION TOOLS

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Funded by the Florida Department of Transportation and the National Center for Transit Research
- Advise on two emerging technologies
  - Multimodal trip planning
  - Crowd-sourced data/applications
- Discuss potential to support worksite trip reduction
- Explain how to prepare in your community
• Cities, transit agencies, TMAs, very large employers are the most likely hosts
• Individual smaller employers can benefit
  – However, most probably won’t want to tackle a trip planner on their own
• Instead, employers may want to support implementation by transit agencies or TMAs
Why multimodal trip planners?

• If you want to drive, the question is “How do I get there?”
  – Road networks are dense, connected, complete
  – Google, Mapquest, Yahoo can easily tell you

• For bike/walk/bus, the question is “Can I get there (by a safe route)?”
  – Networks are sparse, incomplete, or both
  – Route-specific info is more important than when driving
EXAMPLE: BIKE LANES
**Trip Planning Software Types**

- **Unimodal**
  - Similar to what Google Maps/Transit/Bikes, Yahoo Maps, Mapquest offer
  - One mode per trip:
    - [Bus](#)
    - [Car](#)
    - [Bike](#)
    - [Pedestrian](#)

- **Multimodal**
  - Options to mix modes for a trip
  - Examples
    - Bike to bus, ride bus, bike or walk to final destination
    - Drive/bike to park-and-ride, take bus
    - Wheelchair-accessible routes
    - Various access to/from bike-sharing, car-sharing
• Have you used:
  – Google Transit
  – Google Bikes
  – Both
  – Neither (but know about them)
  – Neither (but don’t know about them)
  – Mapnificent
• Custom-built software and data are expensive
  – Goroo® in Chicago cost more than $1 million and is still being improved

• Web-based software is proprietary and closed
  – Google, Yahoo, etc. are free to use, but
    • Services depend on the needs and desires of the providers
      – If you want different functionality, you wait for them to provide it
    • Providers limit use and presentation of their systems (frequency, branding)
DETOUR (BACKGROUND STORY)
OpenTripPlanner

- Free, open-source software
  - opentripplanner.org
- Development spearheaded by Tri-Met in Portland, with grant funding
  - Work began in 2009
  - Active worldwide developers’ group
- Available for anyone to download, install, modify (and, with approval, contribute improvements back)
- Non-profit OpenPlans can provide installation, customization, maintenance support
  - Similar arrangement to RedHat support for Linux
OPENTRIPPLANNER – TRUE MULTIMODAL

USF’s OTP Demo for Tampa, Fl - http://opentripplanner.usf.edu
  – Example: Bike->Bus->Bike
OpenTripPlanner – Interlining Between Transit Systems

**Trip Planner**

**Start at E 132nd Ave**

**Walk to 22nd St @ 131st Ave**

- About 3 minutes: 0.2 mi
  1. Walk west on E 132nd Ave (127 ft)
  2. Left on N 22nd St (0.2 mi)

**HART**

- **BUS 12**
  - 4:22 PM: Depart 22nd St @ 131st Ave (South to Downtown)
  - 1 minute
  - 4:23 PM: Arrive 22nd St @ 131st Ave University Village

**USF Bull Runner**

- Walk to University Club to ADM
  - 2 blocks: 0.1 mi
  - 4:27 PM: Depart University Club to ADM
  - 2 minutes
  - 4:36 PM: Arrive ADM I

**Walk to footway**

- About 2 minutes: 0.1 mi
  1. Walk south on footway (233 ft)
  2. Right to continue on footway (0.1 mi)
  3. Right to continue on footway (75 ft)

**End at footway**

**Trip Details:**
- Travel: Wed, Jul 27th 4:18 PM
- Valid: July 27th, 2011 @ 4:12 pm
- Time: 21 minutes
- Walk: 0.3 mi
Why don’t we just use Google Maps?

- In USF community, Google Maps can’t find USF building names or abbreviations
- Google Maps gives walking directions on Alumni Dr. (where there are no sidewalks) and using a cross-street (instead of the nearby crosswalk)
OTP Wheelchair Accessible Routing Options

Regular route with stairs
Wheelchair-accessible route
To provide this kind of service, you need data

- Transit routes and schedules
- Street network (plus addresses, points of interest for geocoding)
- Bicycling facilities (lanes, routes, parking)
- Sidewalks, crosswalks, and other pedestrian infrastructure
- Park-and-ride lots, car-sharing, and/or bike-sharing stations
• It takes time to get the data together
  – (which is why we’re discussing this today)

• This is one reason we think Google, Yahoo, and others won’t be providing this kind of service nationally
  – You can’t just go and buy or license a file that shows every bicycle lane or sidewalk or crosswalk in the country
  – This is still *local* data
General Transit Feed Specification (GTFS)

– Over 140 agencies in US have transit data in this format, more than 447 world-wide
– Most agencies did this to get on Google Transit
– But, GTFS is open-data format that anyone can use
  • Used by many mobile apps
  • OpenTripPlanner
  • Becoming a *de facto* standard
– See “GTFS Data Exchange” for list of agencies with GTFS data
  • Or, ask your local agency
– Major transit scheduling software packages can prepare GTFS
OpenStreetMap.org

- Think “Wikipedia for geographic data”
- People contribute data under a Creative Commons Attribution-ShareAlike 2.0 license
- Edit online, using custom GPS traces, or programmatically
- Anyone can download and use the data (not just the maps)
National Elevation Dataset (NED)

– Provides elevation data for biking/walking in OTP
– Currently used to produce elevation graph, and for some biking routing decisions
Open Data Sources for OpenTripPlanner

Geographic Information Systems (GIS) files
– OpenTripPlanner can also support loading GIS (e.g., .shp) files
– Local government sources:
  • City
  • County
  • Special Districts (parks, etc.)

• Ask your local government what data might be available
  – Especially if there isn’t much OpenStreetMap activity in your area
POSSIBLE APPLICATIONS

• Transit agency/metro scale
• College/university campus
• Downtown or other district
• TMA
• Multi-site employer
• Safe routes to school
• Routing to, on, from transit in a metropolitan area
  – Transit agency, MPO, county or city government as manager
  – Transit agency has to be a partner if not manager (if area has multiple agencies, then involve all)
  – Likely draw on mix of local government GIS files and crowd-sourced data (OpenStreetMap) for geocoding and for modes linking to transit
Portland, Oregon

TriMet was key player in creation of OpenTripPlanner
- High demand in Portland for multimodal trip planning
- Primary motivation was to merge existing transit trip planner, with separate bike trip planner into one tool

TriMet will release production site with OpenTripPlanner in Fall 2011

TriMet is supplying its own GTFS data, using local regional datasets to improve bike-walk-street data in OpenStreetMap

Regional funding is supporting project
• Pune, India
  – Production deployment of OpenTripPlanner
    – http://punebusguide.org/guide/
• Modified to support Devanagari script, including right-to-left interface
Examples — Transit Agency / Metro Scale (4)

- Tel Aviv, Israel
  - Production deployment of OpenTripPlanner
    - [http://businfo.co.il/](http://businfo.co.il/)
- Translated to Hebrew
  - Also uses right-to-left interface
- First launch implemented in 4 weeks
- Funded by regional transportation authority
  - After significant reorganization of regional transit routes
• Poznan, Poland
  – Production deployment of OpenTripPlanner
  – Implemented by goEuropa

• Uses customized website interface, but uses OTP to plan routes on server
• Marketing and service opportunities
  – Realtors could provide custom commute information to clients and new residents
  – Employers could provide similar information for employees
  – Hotels, convention centers, concert venues, special districts could highlight access for their customers
• Issue: screening of transit routes for reasonability
A “Google Maps” for a university campus – incredible demand at USF

Could locate buildings by name or 3 letter abbreviation and plan routes using actual campus pedestrian infrastructure

Better integration with surrounding community via local transit/bike/walk

Various stakeholders - Facilities Planning, class projects (GPS mapping, Android apps)

Challenges – funding
• Many campuses operate their own bus/shuttle systems
• Integration with parking, visitor access
  – Is being discussed but is not yet part of OpenTripPlanner
• Expect interest in disability-accessible routing
  – Data on stairs, curb cuts
  – Interest at USF in using trip planner to prioritize improvements in infrastructure
• Downtown/district scale
  – Can promote commercial/social features within an area
  – Likely stakeholders:
    • Businesses/retailers
      – Enroll them into reporting data on how to reach them on foot, bike, etc.
    • Nearby communities, neighborhoods
    • GIS community for data
• Similar marketing and service opportunities as for transit/metro provider
• Similar sources of data but focused on members
• Work with ETCs and walkers/bikers if needed, to map cycling and walking infrastructure serving each member employer
• Could provide each employee customized route plans for getting to work by different modes
  – Employers know the start times
  – Screen routes for reasonableness
• Again, similar sources of data, but focused on access to worksites
  – Include private buses or shuttles
• Might include information to help visitors reach sites and find parking
• Work with walkers and bikers to collect data, identify best routes
• Safe-routes-to-school
  – Enhance livability within neighborhoods
  – Highlight the walkable/bikable routes in your community
  – Neighborhood/community organizations, parent-teacher associations (PTAs) are likely stakeholders
  – Probably build off a metropolitan-scale implementation, add sidewalk and other data focused on school access
HOW DO I GET A MULTIMODAL TRIP PLANNER IN MY COMMUNITY?
OpenTripPlanner is available now, but . . .

- OTP is still in early stages
  - Currently requires high-level tech skills for setup
- However, it is progressing quickly
  - Moving from prototype to production
- In the near future, we expect to see:
  - Better developer/user documentation to help lower learning curve/implementation costs
    - Including OTP/OSM relationships
  - Integration of carsharing/bikesharing
- In a few years, it will be “cheaper” and “better”
- But, you should start preparing now!
WHAT DO YOU NEED TO DO?

• Consult with stakeholders
  – Need to find champion to promote, fund, house, maintain
  – Agree on target market, application, branding

• For each stakeholder:
  – How can OTP help?
  – How can they prepare?

• Discuss data needs
  – What data are available?
  – Who has it?
  – What’s missing?
  – How to get it?
  – Who should (could) you involve?

• Work with local university/stakeholder to create demo site to build interest
Some things to think about as you plan

CURRENT OPENTRIPPLANNER STATUS
CURRENT AREAS OF OTP WORK

• OpenTripPlanner is functional now
  – Fall 2011 launch of TriMet OpenTripPlanner production website
  – OpenPlans in discussions surrounding other U.S. deployments

• But it is still being improved:
  – Android app
  – “Bike triangle” for trip preferences
  – General system/routing improvements
LONG-TERM OPENTRIPPLANNER ROADMAP

• OpenTripPlanner routing engine as analysis tool
  – Can be used to determine local access to transit, community resources
  – Can drive research analysis
    • E.g., Relationship of housing prices to transit access

• OpenTripPlanner software as data management tool
  – Create/maintain transit data sets

• Inter-regional deployments
Multimodal trip planning is a new field, and there are still . . .

OPEN ISSUES
OPEN ISSUES

• Better OTP documentation for developers/users
• Relative sparseness of OSM data in U.S.
• How to crowd-sourcing bike/walk level/quality of service?
• Personalizing bike, wheelchair routes/directions
• How to handle missing pedestrian infrastructure?
• Micro-mapping intersections
  – Sidewalk separate from street, on street, hybrid
There’s more than just multimodal trip planning

APPs
• When data are available, people *can* use them to solve problems
• Increasingly, people *do*
• And they make the solutions available, often for free
• *Cognitive surplus*—the free time of an educated, internet-connected citizenry
TRANSLATE THIS DRAUMS

- Some transit agencies make their GTFS and automatic vehicle locator (AVL) data available
- People have written smart-phone apps to use this data and let people know when buses will arrive
  - Customized to local conditions
  - Often at no cost to the agency
  - Helps people feel more comfortable using transit
  - [http://www.citygoround.org/apps/](http://www.citygoround.org/apps/)
- OpenTripPlanner also shares data via API
EXAMPLE APPS (1)

• OneBusAway
  – Real-time transit info for Puget Sound region, WA (Web, Phone, SMS, iPhone, Android, Windows Phone 7)
  – Complete open-source system, from server to phone

• PDX Bus
  – Real-time transit info for Portland, OR (iPhone)
  – Open-source iPhone app
• Where Can I Live?
  – Maps areas that meet housing cost and travel time criteria using urban rail transit (select European cities, desktop)
    – http://www.where-can-i-live.com/londonproperty
• Mapnificent ([http://www.mapnificent.net](http://www.mapnificent.net/))
  – Displays areas reachable by transit within a user-set maximum travel time (40+ US cities, increasing, desktop)

• Walkscore ([http://www.walkscore.com/transit-map.php](http://www.walkscore.com/transit-map.php)) offers similar (better) information but is available only for 4 cities
  – Opportunities
    • Work with realtors
    • Information for interviewees, new employees
    • Has API for use with other applications
MAPNIFICENT (15 MINUTES FROM ACT CONFERENCE HOTEL)
MAPNIFICENT (20 MINUTES FROM ACT CONFERENCE HOTEL)
NOT ALL APPS ARE CROWD-SOURCED OR USE OPEN DATA

• Google has just released Transit Navigation for Google Maps on Android phones, based on GTFS data, to alert users when to get off the bus.
• Some AVL vendors provide desktop apps and options to send alerts by text message.
• Several bike-sharing systems have smartphone apps to help find docks with bikes or spaces.
• But open data allows customization for local problems and expectations.
DEMONSTRATION OF REAL-TIME BIKE-SHARING DATA
What should I take away from today’s presentation?

CONCLUSIONS
**Takeaways**

- Start discussions with stakeholders now
- Get your data together
  - GTFS
  - OpenStreetMap
  - Local GIS
- Benefits of open software/data
  - No vendor lock-in
  - Can modify software and data without going through vendor contracting and paperwork
  - Free apps
  - Reduced consequences of failure
- Multimodal
  - Park-and-Ride lots, carsharing, bikesharing
  - Think of bike/walk as part of trip, not whole trip
• Project Website:

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