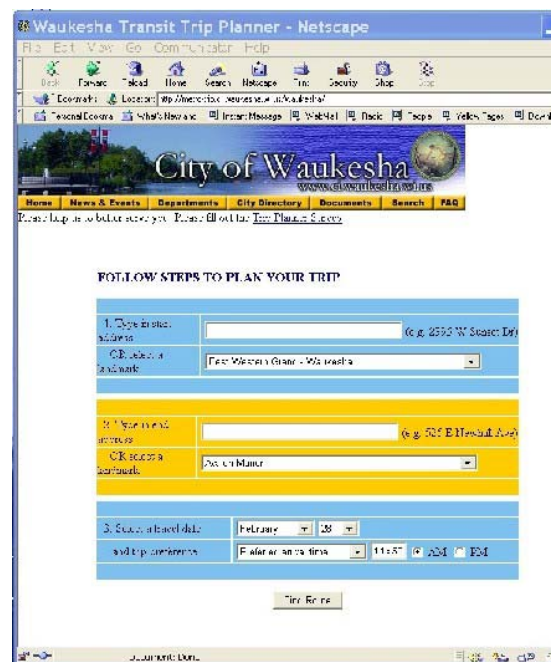# Waukesha Internet Trip Planner

www.ci.waukesha.wi.us/dept/transit.

Summary:

The Internet trip planner is an easy and efficient system for transit riders to use a web page on the internet to get directions for planning a trip between an origin and destination. It provides the user with specific instructions of which routes to take and where and when they may need to transfer. Suggested routes are time sensitive and are changed based on the requested time of day of the trip.
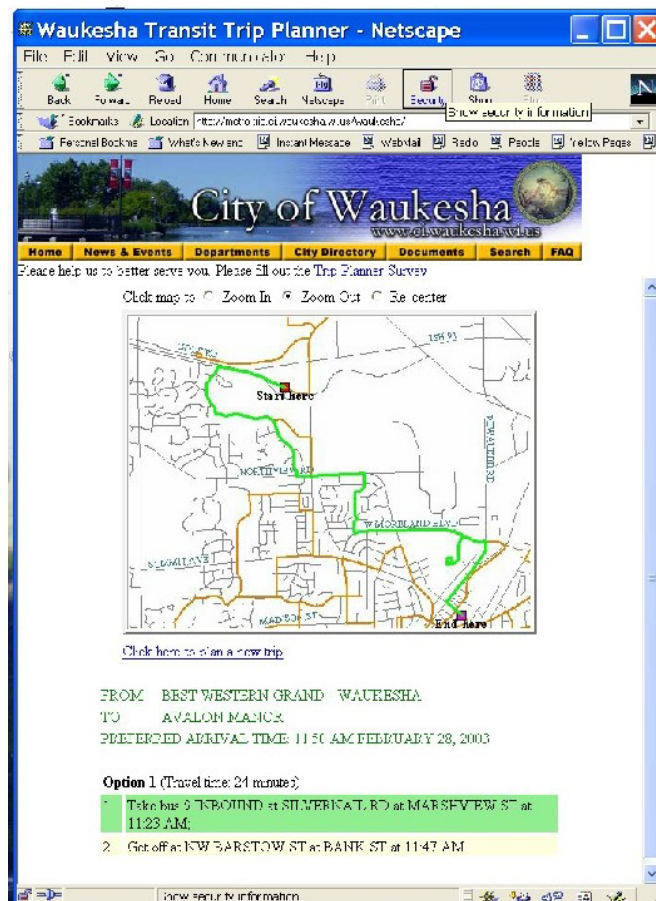
The planner was implemented by Waukesha Metro Transit (Metro) in December 2001 as the first internet trip planner in the state of Wisconsin. It was developed through a collaborative effort between Dr. Zhong-Ren Peng and a team of students at the University of Wisconsin-Milwaukee, Dixon Nuber at the UWM-Center for Transportation Education (CTED), Waukesha Metro Transit (Metro), and the City of Waukesha. Metro bus riders can obtain information about trip directions, bus stop locations, transfer points, schedule information, length of travel time, and a map of the trip. Metro's Internet Trip Planner is the first one in the U.S. to be based on the Internet Geographical Information System (GIS) technology.

A prototype of an internet trip planner existed on the northwest side of Milwaukee, for the usage by persons on Temporary Assistance for Needy Family (TANF) program. This prototype was based on a grant and consisted of 3-4 routes. After this prototype, in collaboration between the University of Wisconsin-Milwaukee Graduate School and the UWM-CTED, an application for a WETAP grant was made to the state to further the prototype into a larger transit area. The City of Waukesha was chosen first to institute and implement an internet based trip planner for its transit riders. One of the main reasons for choosing the City of Waukesha over other cities was its size (not as complicated nor enormous in size compared to for example, City of Milwaukee), and its reception to change. The Waukesha Metro Transit's staff was most interested at the time, and its management structure is such that it is receptive to new technological advancements for the betterment of its constituents. Metro staff had little knowledge about internet trip planner technology at the start of the project, but gained considerable knowledge after its completion. There are similar internet trip planners in other cities in the U.S., but the Metro's Internet Trip Planner is the first one to be based on the Internet GIS technology.

Description:

The internet trip planner is an easy and efficient transit routing system that can be accessed via the web 24 hours a day. Anyone wanting information on how to get from point A to point B can use the internet trip planner to obtain detailed directions within the City of Waukesha. Since its implementation in December 2001, various issues and problems pertaining to the usage of the internet trip planner have been sorted out and the system has been running smoothly since mid 2002. Promotion of the Metro Internet Trip Planner has included word of mouth, advertisement on bus schedules, mention of its existence in print advertisements, and news coverage by Fox 6 News. The usage of the internet trip planner has been monitored by the number of trips planned per day. Since July 2002 the number of trips planned per day has increased from 1.3 to 18.2 in January 2003.

Metro's Internet Trip Planner project began in July 2000 and culminated in a kick-off celebration of the implementation at the Workforce Development Center in Pewaukee in December 2001. A media event was held where stakeholders, local officials, social service and employment agencies, and press were invited to the kickoff celebration.

User Assessment

Customers: The intended audiences of the Metro Internet Trip Planner are workers, job developers, employers, social service agencies, students, and the general public. The internet trip planner is a convenient tool for anyone, especially low income and persons leaving welfare, to map out bus directions to employment sites and social services throughout the City of Waukesha. Many low-income people live in Milwaukee and jobs are available in Waukesha County. The goal of welfare reform is to get people in the workforce. The internet trip planner is an innovation to the employers and job seekers.

The intent of the project was to create a system that anyone in the four-county perimeter could have access to transportation for jobs, education, child care, and as a consequence, assist with welfare reform. With access to transportation, people who are

unemployed will have an easier time to get to the jobs. With any transit system, information is needed to connect people to transit in addition to providing a comfortable atmosphere and convenient routes. It was envisioned that a regional system would be developed with each transit system having its own server and data. The principals involved in the project wanted to try out the technology and implement the first internet trip planner system in Wisconsin.

Some concern was expressed that the intended audience would not have access to the internet. However, surveys of transit riders in Waukesha indicated that about 40 percent of the users had access. This is expected to grow in the future

Agency: The City of Waukesha was selected for this project because of its receptiveness to change and openness to opportunity for improvements. In addition, the Waukesha area was a high growth area at the time, and many people were commuting into the city for work. If a person seeking a position in the Waukesha area was concerned about transportation access, the Human Resources person of a company could provide that information by using the internet trip planner. During the interview, the Human Resources person could access the website to get the best routing option for the potential hire. The W2 agencies could use the tool as well to provide information to those who need transportation to a job.

The city was approached for its transit size (compared to other cities, City of Waukesha does not have a large system). Metro's size, 10 routes, was an ideal size to serve as an incubator for the first implementation of an internet trip planner. The idea was to implement the trip planner on a smaller system, and then proceed to a larger transit system.   In fact, the WETAP grant had three designations: internet trip planner project for the City of Waukesha and Milwaukee County, and workers website.

Technology Assessment:

Relative Benefits: The internet trip planner was added to the transit system website to provide better information to the transit riders. It provides easy access to information, and has been designed to be simple to use. On an average weekday, 2800-3000 trips are made on Metro. Metro is able to gauge the usage of the internet trip planner by the number of trips planned on the internet. The usage has significantly increased. When the internet usage was first tracked, around 4-5 trips were planned per day, but has increased to 15+ per day.

Before the internet trip planner, users of the Metro website only had route schedules for trip planning. Now, the transit riders have 24-hour/seven days a week access to the system. From Metro's perspective, the internet trip planner provides additional information to the transit riders. Metro Marketing Director Brian Engelking asserts, "This is just another way to get information out to the riders." If there were disadvantages, it would have to be that the human element is avoided when riders access the internet to get directions. The riders are interacting with a computer versus speaking to a live

person to obtain trip information. A positive consequence to the internet trip planner, the volume of phone calls requesting directions has been reduced at the transit office.

Trial process: The project started as a class project for a graduate student at UW-Milwaukee to develop a prototype system for an area on the northwest side of Milwaukee with 3-4 routes. A demonstration of the results from this prototype led to the development of the City of Waukesha's Internet Trip Planner project. Before the development of the internet trip planner, work consisted of checking for literature related to the subject, searching on the internet for anything similar and to see if any was in existence. The research aspects involved the development of schedule-based shortest path finding algorithms and the development of object-oriented transit network model.

The most time consuming portion of the project was data collection, cleaning up and processing. With the help of a graduate student, Dr. Peng developed a path finding algorithm that could be used with a GIS model. Bus route and schedule data needed to be collected and prepared of bus routes and schedules in a GIS format. This is a time consuming activity. Data (bus stops, transfer points, and route locations at different time of day) needs to be consistent, accurate, and in order to be linked with a schedule. There are route variations for each transit route. A route could have 20 variations for one day, and could change for the weekend. There are over 800 stops, and some route variations (e.g., express buses) do not make all the stops.

Six weeks before the launch of the new innovation, a focus group of adult riders (6-7 people) was conducted to test the ease of use of the system. A second focus group of 8 social service and employment professions was also conducted. Due to the positive feedback of the project no major changes were made. There have not been any comments about changing the trip planner, and there has been good feedback from people who use the planner.

Observability: Results of the trip planner can be observed through tracking the number of trips planned as well as the volume of telephone requests for information. Usage on the system has increased over time as users have become familiar with the system. The usage of the internet trip planner has been monitored by tracking the number of trips planned. The Waukesha Metro Transit office started tracking the number of trips planned since July 2002. The number of trips planned per day since July 2002 is as follows: July 2002 – 1.3 trips, August 2002 – 2.9, September 2002 – 4.5, October 2002 – 11.9, November 2002 – 11.9, December 2002 - 6.8, and January 2003 – 18.2. The system has been running smoothly since mid 2002. It took about 6 months to sort out various issues and problems in the system.

Complexity: As coordinator of the project, Mr. Nuber's viewpoint was that technology posed the biggest challenge. Since there was no precedence in the state, making technology work the way Metro desired posed a technological challenge. Speaking from experience, Mr. Nuber offers the following advice: remember that it will take longer than one thinks, study the software first, and there will always be data issues. The City of Waukesha's Internet Trip Planner is based on MS Access as a database, but

Milwaukee County's internet trip planner will be based on Oracle as a database due to its record size (amount of data). The implementation of a similar system in a different city depends on its transit size and type of data available (whether the data is in order, accurate, and consistent).

Cost: The Metro Internet Trip Planner was funded by a grant from the Wisconsin Employee Transportation Assistance Program (WETAP), which is jointly funded by the U.S. Department of Transportation, Wisconsin Department of Transportation, and the Wisconsin Department of Workforce Development (DWD). The Metro Internet Trip Planner's total cost of $108,758 was provided for by the WETAP grant of $96,985, and in-kind contributions of $11,773 from UWM and the City of Waukesha.

Consequences of Failure: If the project had failed, the city would not have been able to implement the project. The money used for the project would not have produced a usable result. Once the city invested money in the server and software, there would have been financial liability if the project turned out to be a failure. The failure would have been a negative consequence of the money invested in the project. However, there would not have been any bad consequences since the project was considered research. Research involves risk, and in order to advance technologically, one has to take and accept the risk. Had it not been for the strong support, the implementation could have taken much longer. The project team members were very optimistic with this project. They had the beliefs that "it'll work" and "everything is possible."

Since a lot of progress had been made in the web technology, there wasn't much concern for failure. Because of the good relationships among the principals involved, issues and problems were worked through accordingly.

The City of Waukesha was open to an opportunity to improve services to its residents. No one in the city was opposed to the idea of implementing a system that had the potential to reduce costs and provide better service. During the planning and implementation stages for the internet trip planner, the city only had to purchase a new server and software. Because of the implementation of the internet trip planner, Metro had to clean and sort its data, which resulted in better data that could be used for other purposes.

Implementation Issues: The main obstacle from Metro's point of view was getting the server set up and having it set to work with the existing web. Metro's perspective is that everyone working on a project of this magnitude needs to be committed, with one person coordinating and leading to keep everyone involved on task. Anyone considering implementing an internet planner should not expect the system to run 100% smoothly at first. There will be issues to sort out before and after the implementation. Since people are relying on the information provided through the website, it is necessary to have good data, and to maintain that data when changes to the routes and schedules occur. Having more reliable data going into the project will give fewer headaches and will allow a transit system to complete the project in shorter time.

The duration of the project will depend on the availability of data, whether the data is in order, and the size of the transit system. The most critical issues with data are whether the bus stops and schedules are already in electronic format, and the bus stops and routes are in its respective GPS file format. Assuming all data is in order, the network analysis engine has been developed, and the transit system is acceptable of the change, the project could take as little as 1-2 months to 6-9 months. Larger transit systems could take longer than 6 to 9 months to implement a similar program.

Dr. Peng's team and Mr. Nuber continue to work to implement an internet trip planner for the Milwaukee County and Waukesha County transit systems (currently a separate system from the City of Waukesha transit). The Milwaukee County's internet trip planner is anticipated for completion in December 2003, and Waukesha County in June 2003. The additional systems will have a similar look and feel, so that anyone could plan a trip on the internet. This way a transit rider in one city will know how to plan a trip on the internet trip planner for several systems.

Metro is in the planning stages to construct a new transit terminal, anticipated to complete in summer of 2004. In addition, Metro is working on a contract to implement an automatic vehicle locator (AVL) system, where the location of the buses en route could be identified. In the future, Metro hopes to tie the AVL to the trip planner to get real time schedule information.

The Waukesha Metro Transit Internet Trip Planner can be accessed via www.ci.waukesha.wi.us/dept/transit.

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For further information on workers website, visit:

www.milwaukeeworkers.org (hosted by City of Milwaukee)

www.wowworkers.org (hosted by UWM-CTED)