Dynamic Ridesharing: Background and Options for UBC

UBC TREK Carpool Team. July 25, 2001

I. INTRODUCTION

Dynamic ridesharing, also called real-time ridesharing or single-trip ridesharing, differs from regular carpooling and vanpooling in that ridesharing is arranged for one-time trips rather than for trips made on a regular basis, and requests for ridesharing can be made close to the time when the travel is desired.

Dynamic rideshare groups may form instantly among drivers and passengers meeting at a convenient roadside location, or through an information technology-based ride-matching system. These two mechanisms of dynamic ridematching are not incompatible, and their parallel implementation could serve to overcome the limitations of each.

Section II of this paper outlines the objectives of a dynamic ridesharing program for UBC. Section III provides examples of dynamic ridesharing in North America. Section IV contains a list of recommendations for a dynamic ridesharing program at the University of British Columbia. Section V identifies potential problems and responses to these, and Section VI concludes the report.

II. OBJECTIVES

A dynamic ridesharing program at UBC would aim to achieve the following objectives:

1.) Reduce the risks associated with hitch-hiking
In the face of the present transit strike, students are increasingly turning to hitchhiking as mode of transportation. The risks associated with taking rides from strangers can be mitigated through a more formalized program which limits participation to members (staff, students, and faculty) of the UBC community, and by providing safety tips to participants.

2.) Convert single occupancy vehicles to carpools
The greatest potential for reducing total vehicle trips to UBC lies in increasing the occupancy of vehicles already coming to campus. Because many students have variable, non-standard schedules, traditional carpooling is often not an appealing transportation option. Dynamic ridesharing is a more flexible form of carpooling, and could be instrumental in helping UBC achieve its transportation demand management objectives.

3.) Save commuters money
UBC commuters would save on the cost of driving by engaging in dynamic ridesharing. Passengers would be encouraged to give drivers a monetary contribution, the suggested level of which would be established and promoted by TREK.

4.) Foster community development
Dynamic ridesharing creates new opportunities for interaction among members of the UBC community. Interactions based on the principle of mutual aid have the potential to foster a sense of community and cooperation among students, faculty and staff.

III. BACKGROUND

CASUAL CARPOOLING

Casual carpooling, or instant ridesharing, is a type of ridesharing arrangement whereby drivers wishing to form carpools pick up passengers waiting by the roadside.

Casual carpooling has proven successful on the Oakland Bay Bridge in the San Francisco Area, the Shirley Highway corridor in the Virginia / Washington, D.C. area, and to a lesser extent in Houston, Texas (Casey *et al*., FTA). In each of these areas, individuals form instant carpools on a daily basis to take advantage of the travel time savings afforded by HOV lanes, which require vehicle occupancy of three or more. Individuals wanting rides gather at park-and-ride lots and other locations and are picked up by drivers going to the same destination.

In all of these examples, casual carpooling was initiated by commuters and continues to operate without any formal planning or sanction by agencies or organizations. One likely reason for the success of casual carpooling has been identified as the ease and speed with which a ride may be obtained (Casey *et al.*).

DYNAMIC RIDEMATCHING SYSTEMS

In the 1990s, successful experiences with casual carpooling, and the availability of Intelligent Transportation Systems (ITS) and other advanced technologies, resulted in the inception and development of real-time or dynamic ridematching systems. The concept of real-time ridematching attempts to formalize the casual carpooling phenomenon.

Real-time ridematching systems generally function as follows: a person wishing to obtain a ride initiates a request to a ridesharing operations center or central database. The database is searched for a match with trips offered by drivers who have registered for this program. Usually, persons wishing to obtain a ride obtain a list of possible matches and must then call or email persons on the list to try to arrange for the trip. This can be a time consuming and onerous process, which may inhibit participation (Casey 1996).

EARLY ATTEMPTS

Early dynamic ridematching demonstrations used telephone technology and met with limited success (FTA). A model for a voice mail-based system in Seattle was developed but never implemented. The Sacramento real-time ridematching demonstration, called *Rideshare Expres*s, tested the provision of instant ridematching services through Transportation Management Associations in 1994 and 1995. Some 360 individuals registered as drivers offering rides, but only ten requests for matches and one actual match were recorded. One component of the Los Angeles SMART TRAVELER project provided commuters with the opportunity to use a telephone-based dynamic ridematching system during the aftermath of the 1994 Northridge earthquake. Twenty to forty calls per week were recorded over a three-month period, but actual matches were not monitored.

The Bellevue Smart Traveler project, undertaken by researchers at the University of Washington and others, was implemented from November 1993 to March 1994. Telephone and paging technologies were used to provide three types of personal commuter services: dynamic ridematching, current traffic information, and transit information. Over the 5-month period of operation, the 53 participants offered approximately 496 rides. Participants sought 145 rides, but received information on possible rides only 40 times. Six ride matches were recorded by the system, but it is possible that more rides were actually made but not recorded. Researchers identified the following conclusions from the Bellevue Smart Traveler project:

• Participants were amenable to the dynamic ridesharing idea, liked the technology and presentation of information, but were unwilling or unable to form rides for a variety of reasons. These included the small number of participants, the short duration of the project, the lack of HOV lanes serving Bellevue, limitations with the technology, and concerns about riding with strangers.

• Providing additional incentives to participants such as financial incentives from employers, stronger management support, prearranged pick-up and drop-off points, and additional HOV facilities may increase the use of real-time ridematching capabilities.

• Technology improvements identified for future projects included two-way paging, adding capacity to list more than two ridesharing messages, and using the internet.

WEB-BASED RIDEMATCHING

A well-documented example of an internet-based ridesharing system is the Seattle Smart Traveler (SST), which was tested at the University of Washington from March 1996 to June 1997. Students, faculty and staff of the university were able to access the system through e-mail and a web page, both of which were available on a 24-hour basis. A time range was used for both requested arrival and departure times. A search structure was developed using a series of pull-down menus listing possible origins and destinations in four levels of detail. The system automatically sent an email to the requestor listing the

email addresses and phone numbers of potential matches. Making contact and arranging a ride was left up to participants.

A total of 400 individuals registered for the SST; 700 trips were requested, 150 matches made, and at least 41 individuals actually established a carpool for the requested trip. This match rate is fairly typical of traditional ride-matching programs. Faculty and staff comprised most (approximately 68 percent) of the users, probably because this was the group to whom the program was initially marketed.

There was only a 20% overlap between regular carpool database registrants and SST registrants, indicating that SST is reaching a clientele that did not exist for a long-term, regular carpooling effort. The SST was in operation for 15 months without any major technical problems. The self-contained nature of the SST provided for relatively easy maintenance and operation.

An evaluation of the SST identifies the following issues that may have limited use of the system:

• The project may have been implemented a little before the real boom in Internet use.

• The technology available at the time for developing the dynamic ridematching capabilities was somewhat cumbersome. With the technology available today, the number of screens required to register and request a match could be greatly reduced.

• Other incentives are still needed to help promote ridesharing. These may include HOV facilities, parking incentives, and other techniques to encourage carpooling.

III. RECOMMENDATIONS

Based on the experiences documented above, market research data from previous programs (Michalak et al.), and UBC's particular situation, the following recommendations are proposed for the implementation of a casual carpooling / dynamic ridematching system at UBC:

1. UBC should develop, implement, and support a Casual Carpooling Program as soon as possible.

Casual carpooling, without any supporting ridematching system, has proven successful in several settings, and can be implemented without significant cost. A casual carpooling program should be implemented immediately, before the end of the current transit strike if possible.

People looking for a ride would be encouraged to display hand-held, 8 ½ by 11 inch signs showing their destination. A customizable sign template could be printed from the TREK

website, and durable foam-core signs could be ordered through TREK. Drivers could display their destinations on a windshield sign, also provided by TREK.

Those seeking a ride home would stand at high-traffic locations throughout campus, such as parking lot exits. Those coming to UBC would position themselves at the sides of arterial roads serving UBC commuter traffic.

2. UBC should further consider the feasibility of introducing an internet-based dynamic ridematching system.

Internet usage has increased and software capabilities have improved since previous dynamic ridematching experiences. UBC's characteristics as a major commuter destination, with high densities of commuters living in particular areas, makes it an ideal site for implementation of a state of the art internet-based dynamic ridesharing system. The cost of developing a ridematching system may be significant. Less expensive options are feasible and may be implemented immediately, but may not attract as many users or be as effective at generating matches as a specially designed software program. Three software options to support a dynamic ridematching system are as follows:

A. **Ride-matching software:** web-based program developed specifically for dynamic ride-matching. The Seattle Smart Traveler demonstration project accomplished this with a total of $205,000 US, which supported one full-time staff person over two years, a computer programmer during the system development, marketing and promotion, and other supporting assistance.
B. **E-mail accounts:** UBC exchange account on which ride requests and offers are posted and removed daily or weekly (perhaps one account for each of these). Offer different accounts for various commuter origins / destinations. For example, accounts could be carpoolday.kits@ubc.ca; carpoolweek.kits@ubc.ca; carpoolday.new-west@ubc.ca; carpoolday.richmond@ubc.ca, etc. This approach requires no more funding than the wages of a student employee to monitor and clear the accounts as needed.
C. **Electronic bulletin board**: participants post ride offers and requests on a web-based bulletin board, which may be divided into sections by origin / destination.

3. Safety features and guidelines should be developed and communicated to program participants.

Individuals participating in any ridesharing situation assume some personal risk. This risk, and participants' liability, must be communicated clearly. In order to minimize risks, the following safety features could be included in a ridematching and casual carpool program:

- Users of the internet ridematching system should have the option of, and be encouraged to, record ride matches on the system. This would create a log of the individuals sharing a ride, and the license plate number of the car involved.

- Provide free telephones at casual carpool pick-up locations. Ride-takers would be encouraged to phone (preferably) someone they knew, or (if that is not possible) a central number, and leave a message with the time and the license plate number of the car they are entering.

Participants should also be encouraged to adhere to a few simple safety guidelines. These should include:

- Do not enter a car, or take a passenger, without seeing a UBC ID card. You may wish to take note of the other person's ID number.

- Always take note of the license plate number of cars you enter.

- When taking a matched ride, if the license plate of the car that meets you is not the same as that shown on the system, do not get into the car.

4. Incentives should be provided to encourage driver participation.

Many ride-sharing programs, including the Commuter Connections database, suffer from a surplus of riders and shortage of drivers. One potential incentive would be a "suggested contribution", promoted by UBC TREK, which passengers would be expected (but not required) to pay drivers. This amount would be approximately equal to the bus fare charged for the same trip.

Additionally, TREK could provide rewards, such as free day parking passes, bus tickets, TREK paraphernalia, and gift certificates, to drivers registered in a dynamic ridesharing database.

IV. POTENTIAL PROBLEMS AND RESPONSES:

The following potential problems have been identified from the experience and evaluations of other dynamic ridematching programs.

Ridematching process is too time-consuming

The process of finding and then contacting a potential match can carry a high time cost relative to the benefit of a one-time match. This is thought to have inhibited participation in some dynamic ridesharing programs.

response: implement a ridematching software system in tandem with a casual carpooling program. Advertise casual carpooling as the faster alternative. Target marketing of the ridematching program to commuters who:

A) travel longer distances, and so for whom the process of ride-matching constitutes a smaller percentage of total trip time;
B) prefer certainty of pick-up time; and
C) are concerned about their personal safety and would like the opportunity to screen matches.

Small number of matches to requests

A small participant pool and large coverage area can result in users being unsuccessful in their match attempts, leading to declining use of the system.

response: sign up potential members in advance; launch program only after pool reaches a pre-determined threshold of effective size. This strategy applies only if software option A) above, special ridematching software, is used.

Personal safety concerns inhibit participation

response: participants will primarily be UBC faculty, staff, and students. Casual carpooling programs elsewhere in which the participants are of a similar socio-economic group (e.g. white collar workers in the Washington D.C. area) have been successful because of the lack of perceived risk in sharing a ride with those 'similar' to oneself.

Not enough drivers

response: Some kind of reward for the driver is an important aspect of any successful ridesharing program. This may be access to HOV lanes, free parking, or a cash payment. For UBC, a cash payment would be the easiest reward to implement (see Recommendation 4 above).

V. CONCLUSIONS

Experiences of casual carpooling and dynamic ridesharing elsewhere demonstrate the viability of these ridesharing mechanisms. The recommendations set out in this document put the UBC TREK Program Centre in a position to move forward with the logistical and technical development of such a program.

The current transit strike provides a unique opportunity to attract participants to new transportation options. If a dynamic ridematching / casual carpooling program could be launched before the end of the strike, it would attract those who normally rely on transit and become established as a known and used transportation option for UBC commuters.

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