TCRP

SYNTHESIS 43

TRANSIT
COOPERATIVE
RESEARCH
PROGRAM

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Effective Use of Transit Websites

A Synthesis of Transit Practice

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TRANSIT COOPERATIVE RESEARCH PROGRAM

The nation's growth and the need to meet mobility, environmental, and energy objectives place demands on public transit systems. Current systems, some of which are old and in need of upgrading, must expand service area, increase service frequency, and improve efficiency to serve these demands. Research is necessary to solve operating problems, to adapt appropriate new technologies from other industries, and to introduce innovations into the transit industry. The Transit Cooperative Research Program (TCRP) serves as one of the principal means by which the transit industry can develop innovative near-term solutions to meet demands placed on it.

The need for TCRP was originally identified in *TRB Special Report 213—Research for Public Transit: New Directions*, published in 1987 and based on a study sponsored by the Federal Transit Administration (FTA). A report by the American Public Transportation Association (APTA), *Transportation 2000*, also recognized the need for local, problem-solving research. TCRP, modeled after the longstanding and successful National Cooperative Highway Research Program, undertakes research and other technical activities in response to the needs of transit service providers. The scope of vice configuration, equipment, facilities, operations, human resources, maintenance, policy, and administrative practices.

TCRP was established under FTA sponsorship in July 1992. Proposed by the U.S. Department of Transportation, TCRP was authorized as part of the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA). On May 13, 1992, a memorandum agreement outlining TCRP operating procedures was executed by the three cooperating organizations: FTA, the National Academy of Sciences, acting through the Transportation Research Board (TRB), and the Transit Development Corporation, Inc. (TDC), a nonprofit educational and research organization established by APTA. TDC is responsible for forming the independent governing board, designated as the TCRP Oversight and Project Selection (TOPS) Committee.

Research problem statements for TCRP are solicited periodically but may be submitted to TRB by anyone at anytime. It is the responsibility of the TOPS Committee to formulate the research program by identifying the highest priority projects. As part of the evaluation, the TOPS Committee defines funding levels and expected products.

Once selected, each project is assigned to an expert panel, appointed by the Transportation Research Board. The panels prepare project statements (requests for proposals), select contractors, and provide technical guidance and counsel throughout the life of the project. The process for developing research problem statements and selecting research agencies has been used by TRB in managing cooperative research programs since 1962. As in other TRB activities, TCRP project panels serve voluntarily without compensation.

Because research cannot have the desired impact if products fail to reach the intended audience, special emphasis is placed on disseminating TCRP results to the intended end-users of the research: transit agencies, service providers, and suppliers. TRB provides a series of research reports, syntheses of transit practice, and other supporting material developed by TCRP research. APTA will arrange for workshops, training aids, field visits, and other activities to ensure that results are implemented by urban and rural transit industry practitioners.

The TCRP provides a forum where transit agencies can cooperatively address common operational problems. TCRP results support and complement other ongoing transit research and training programs.

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The members of the technical advisory panel selected to monitor this project and to review this report were chosen for recognized scholarly competence and with due consideration for the balance of disciplines appropriate to the project. The opinions and conclusions expressed or implied are those of the research agency that performed the research, and while they have been accepted as appropriate by the technical panel, they are not necessarily those of the Transportation Research Board, the Transit Development Corporation, the National Research Council, or the Federal Transit Administration of the U.S. Department of Transportation.

Each report is reviewed and accepted for publication by the technical panel according to procedures established and monitored by the Transportation Research Board Executive Committee and the Governing Board of the National Research Council.

Special Notice

The Transportation Research Board, the Transit Development Corporation, the National Research Council, and the Federal Transit Administration (sponsor of the Transit Cooperative Research Program) do not endorse products or manufacturers. Trade or manufacturers' names appear herein solely because they are considered essential to the clarity and completeness of the project report.

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PREFACE

A vast storehouse of information exists on many subjects of concern to the transit industry. This information has resulted from research and from the successful application of solutions to problems by individuals or organizations. There is a continuing need to provide a systematic means for compiling this information and making it available to the entire transit community in a usable format. The Transit Cooperative Research Program includes a synthesis series designed to search for and synthesize useful knowledge from all available sources and to prepare documented reports on current practices in subject areas of concern to the transit industry.

This synthesis series reports on various practices, making specific recommendations where appropriate but without the detailed directions usually found in handbooks or design manuals. Nonetheless, these documents can serve similar purposes, for each is a compendium of the best knowledge available on those measures found to be successful in resolving specific problems. The extent to which these reports are useful will be tempered by the user's knowledge and experience in the particular problem area.

FOREWORD

By Staff
Transportation Research Board

This synthesis will be of interest to transit agency professionals and the consultants who work with them in dealing with website design. Transit executives and website managers and designers can use this report to learn from the experiences of other agencies and to compare their own experiences with those of others. It explores current practices and recent experiences concerning website design, marketing, and administration.

Administrators, practitioners, and researchers are continually faced with issues or problems on which there is much information, either in the form of reports or in terms of undocumented experience and practice. Unfortunately, this information often is scattered or not readily available in the literature, and, as a consequence, in seeking solutions, full information on what has been learned about an issue or problem is not assembled. Costly research findings may go unused, valuable experience may be overlooked, and full consideration may not be given to the available methods of solving or alleviating the issue or problem. In an effort to correct this situation, the Transit Cooperative Research Program (TCRP) Synthesis Project, carried out by the Transportation Research Board as the research agency, has the objective of reporting on common transit issues and problems and synthesizing available information. The synthesis reports from this endeavor constitute a TCRP publication series in which various forms of relevant information are assembled into single, concise documents pertaining to a specific problem or closely related issues.

This document from the Transportation Research Board integrates information from several sources. It is based on data collected from a review of the relevant literature and survey responses from 47 transit agencies, a cross section of the U.S. transit industry. Also, information was collected for this report from surveys and interviews with website managers, analyses of server logs showing website usage, as well as market research results from several agencies.

To develop this synthesis in a comprehensive manner and to ensure inclusion of significant knowledge, available information was assembled from numerous sources, including a number of public transportation agencies. A topic panel of experts in the subject area was established to guide the researchers in organizing and evaluating the collected data, and to review the final synthesis report.

This synthesis is an immediately useful document that records practices that were acceptable within the limitations of the knowledge available at the time of its preparation. As the processes of advancement continue, new knowledge can be expected to be added to that now at hand.

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This study was managed by Donna L. Vlasak, Senior Program Officer, who worked with the consultant, the Topic Panel, and the J-7 project committee in the development and review of the report. Assistance in project scope development was provided by Stephen F. Maher, P.E., Manager, Synthesis Studies. Don Tippman was responsible for editing and production. Cheryl Keith assisted in meeting logistics and distribution of the questionnaire and draft reports.

Christopher W. Jenks, Manager, Transit Cooperative Research Program, assisted TCRP staff in project review.

Information on current practice was provided by many transit agencies. Their cooperation and assistance was most helpful.

EFFECTIVE USE OF TRANSIT WEBSITES

SUMMARY

As the Internet permeated nearly every facet of American life over the last half-dozen years, virtually every large and mid-size public transportation agency and many smaller agencies created websites. Transit websites offer information on fares, schedules, routes, service disruptions, special events, and park-and-ride services. They also provide employment postings, procurement information, minutes of the governing board, planning studies, and various other kinds of information. Some transit websites also provide customized trip planning services, whereas others can be used to download schedules to mobile handheld devices.

Providing this information over the Internet is a natural extension of the marketing and communications programs of transit agencies. From modest beginnings, many transit websites have grown into comprehensive tools that allow bus and rail customers to plan trips and find other important information. Transit sites attract a large and rapidly growing audience, with usage increasing 30 to 100 percent or more annually.

This report synthesizes current practices and recent experiences concerning website content, design, marketing, and administration, based on information collected from 47 transit agencies representing a cross section of the U.S. transit industry. Information was collected for this report from surveys and interviews with transit website managers, analysis of server logs showing website usage, market research results from several agencies, and a review of relevant literature. Transit executives and website managers and designers can use this report to learn from the experiences of other agencies and to compare their own experiences with those of others.

Major findings are as follows:

- Transit websites appeal to a wide audience, ranging from daily bus and rail commuters to nonriders.
  - Transit sites reach a substantial audience. Data from a variety of transit properties indicate that between 8 and 20 percent of all transit users have visited the local transit agency's website. Site usage continues to outpace the growth in the overall number of Internet users.
  - Transit agencies with primarily low-income riders experience substantial site usage by bus and rail customers.
  - Nonriders and infrequent riders express strong interest in using transit websites. Transit sites can offer them needed information through an attractive medium at times and places suiting their convenience.

- Internet users are predominantly looking for service-related information to help plan their trips. Providing this information can increase ridership among current customers and expand a transit agencies' ridership base.
  - Schedules, maps, fare information, and trip planners are the most popular aspects of transit websites. However, Internet visitors are also looking for information on

the transit agency itself, "how to ride" information, information on employment, procurement opportunities, and agency news.
  - Disseminating service information such as maps, schedules, and service diversions makes transit easier to use and thus can lead to increased ridership among regular transit users as well as occasional riders, infrequent riders, and nonriders.

- To be effective, transit websites must achieve ease of use for a diverse set of audiences.
  - Web visitors are looking for information, not entertainment. To compete for attention against literally thousands of other sites, transit sites must support users in easily and efficiently obtaining desired information. In effective sites, ease of use considerations govern home page design, use of graphics and links, printability of pages, use of portable document file (PDF) formats, and accessibility to people with disabilities.
  - Transit websites must recognize and meet the varied needs of frequent and infrequent riders, residents and visitors, and disabled as well as able-bodied persons. Site navigation must take into account, for example, that some users will know exactly which schedule they want and others will know their destination, but nothing about which transit services are available.

- Other benefits of transit websites include improving a transit agencies' image in the community, distributing a variety of nonservice kinds of information, and reducing operating costs in certain areas.
  - An Internet presence can convey an up-to-date image; provide efficient distribution channels for job, procurement, and planning information; reduce costs for printing and distribution of maps, schedules, and brochures; and reduce call volumes to telephone information centers.

- Transit websites are increasingly exploiting opportunities for interactive and real-time services.
  - For many transit agencies, the next step in web development is to offer trip itinerary planners and real-time information. These vital aids provide service information for particular trips and help customers avoid delays.
  - Other promising features still in their infancy are e-mail alerts, e-commerce, wireless downloads, and mobile services.

- Transit agencies are increasingly automating production of information for the Internet and integrating website needs into agency business processes. Automation and integration will be critical to fulfilling the potential effectiveness of transit websites.
  - Reformatting printed schedules for the web can be extremely time intensive. Automation is required to prepare and upload large amounts of information to the Internet accurately, and to keep the information up-to-date and to do so at a reasonable cost. Going hand-in-hand with automation, integration of the Internet effort with business processes ranging from production of schedules to publication of job listings and procurement opportunities enables agencies to maintain and expand their websites at an affordable cost.
  - As agencies integrate their Internet needs with business practices, interdepartmental relationships become more critical. Interdependence can create conflict over decisions about application software, hardware requirements, and development priorities. These conflicts need to be resolved for the website to rise to a new, higher level of capability.

- Fully utilizing the Internet's potential will require increasing sophistication in the types of services provided through the Internet and the research, development, and evaluation process.
  - Trip itinerary planners, real-time information, e-commerce, and wireless capabilities move transit web managers into increasingly complex and challenging areas, and the sophistication of the development process will need to keep pace. Usability testing will be critical as the industry refines its methods of offering information and moves to more sophisticated applications.

CHAPTER ONE

INTRODUCTION

BACKGROUND

The proportion of American households with home computers reached 56 percent in 2001, up from 37 percent in 1997 and 15 percent in 1989 (U.S. Commerce Department 2002). With seven in eight computer-owning households having Internet access, the proportion of U.S. households connected to the Internet passed the 50 percent threshold in mid-2001. Added to home Internet users are those with Internet access at school, work, libraries, and elsewhere, boosting the on-line population to between 54 and 64 percent of all American adults (Newburger 2001; Pew Internet in American Life Project 2001; "U.S. Online Population Holds Steady" 2001; U.S. Commerce Department 2002).

As American society has moved into a service-based economy, public transit agencies "have realized the importance of image and quality communications" (Texas Transportation Institute 1999). National and international studies have found that disseminating basic service information such as bus and train timetables and maps can promote transit and increase ridership (Transportation Research Board 2001). Websites are an obvious tool for enhancing the image of transit agencies, promoting transit services, and communicating with the public.

Information available at transit websites ranges from basic service information on fares, schedules, and routes, to procurement notices, job postings, board minutes, and planning studies. From often humble beginnings, transit website managers have used a process of experimentation, customer feedback, and periodic redesign to develop their sites into extensive tools for bus, rail, and paratransit customers to plan trips and for customers and other stakeholders to find a variety of other kinds of information. This work has been conducted primarily on an individual agency basis. Several papers have been presented at national conferences on the experience of particular agencies (Dorfman 1997; Donovan 1998; Moore 1999; Wyatt and Luk 1999). The Volpe National Transportation Systems Center has compiled a searchable database of transit website features (Volpe 2001) and conducted two small usability studies (Richmond et al. 2001; Zuschlag and Richman 2001); however, there has to date been no systematic overview of the state of the practice.

This report documents and summarizes transit agencies' experience with website development and synthesizes current practices for website content, design, and administration by transit agencies throughout the United States. Website managers and executive staff can use this report to learn from the experiences of other agencies and to compare their experiences with those of others.

METHODOLOGY

Findings in this report are based on the results of a literature review, two surveys of website managers, analysis of server logs showing website usage, market research results from several agencies, and telephone interviews with website managers.

A total of 47 transit agencies provided information for this study as follows:

- Thirty-four agencies responded to an initial survey that was sent to 58 agencies. The survey addressed website design, administration, content, usage, goals, and evaluation.
- Thirty-two agencies responded to a follow-up survey sent to the original 34 responding agencies and 13 additional agencies. This survey was based on results of the initial survey and follow-up telephone interviews. It collected more detailed information on audience; benefits; design goals; specific site features; map, schedule, portable document file (PDF), and Americans with Disabilities Act (ADA) issues; usage; promotion; staffing; administration; and cost (see Appendix A for the two surveys).
- Fourteen agencies provided detailed data on website usage from server logs. Server log statistics show website hits, page views, visitor sessions, and, in some cases, a detailed profile on duration of sessions, pages visited, time of visit, browser used, etc.
- Eight agencies provided market research results based on telephone, on-board, or on-line surveys. These data show Internet access among transit customers, awareness of transit websites, and rates of customer usage.

The two surveys conducted for this study were directed to the agency manager responsible for website planning, management, and design. Respondents, typically senior staff in the information technology or marketing departments, are referred to as "agency website managers" in this report.

Participating agencies represent a cross section of the transit industry in terms of agency size, location, and

TABLE 1
TYPES OF INFORMATION PROVIDED BY TRANSIT AGENCIES FOR THE STUDY BY AGENCY SIZE

Agency size (No. of buses and rail cars)	Total Providing Information	Returned Original Survey	Returned Follow-Up Survey	Provided Usage Stats	Provided Market Research
1,000+	5	3	2	2	3
500–999	11	8	10	4	1
100–499	14	11	10	5	3
Under 100	17	12	10	3	1
Total	47	34	32	14	8

TABLE 2
PARTICIPATING TRANSIT AGENCIES BY AGENCY SIZE AND SERVICE CATEGORY

Agency size (No. of buses and rail cars)	Total Providing Information	Motor Bus	Light/Heavy Rail	Commuter Rail
1,000+	5	5	5	2
500–999	11	11	8	0
100–499	14	13	4	1
Under 100	17	17	0	0
Total	47	46	17	3

mode. Table 1 shows the distribution of agencies by size and types of information provided. Table 2 shows participating agencies by size and service category.

ORGANIZATION OF REPORT

This report is organized topically, synthesizing information from the literature review, surveys, data, and interviews for each topic area. Chapter 2 provides an overview of the approach of transit agencies to website development, areas of emphasis, and experience with setting goals and evaluating their efforts. Chapters 3 and 4 focus on the Internet audience—its overall size, the potential and actual audience of transit websites, and how visitors to transit websites actually use the sites. Chapters 5, 6, and 7 move from users to the sites; examining issues of design, navigation, and content. Chapter 8 reports on the current state of the practice related to site administration, promotion, and costs.

Chapter 9 recaps key considerations for transit website design and discusses research activity that will be vital to support continued development of effective transit websites.

CHAPTER TWO

OVERVIEW OF TRANSIT WEBSITE DEVELOPMENT

Transit websites began as a foray into a promising territory; however, there were many unknowns and uncertainties. How is the Internet's potential best utilized? What content should be made available over the Internet? How should content be organized? Should sites employ the most sophisticated technologies available? Who and how many people will visit the sites? How should agency staff go about developing a website? Who needs to be involved? Who should be in charge?

Initial approaches to site development varied among agencies. Some sites were developed through an extensive internal process involving task forces, needs assessments, and vision statements. In some smaller agencies, the website was developed by a single employee, motivated by a mixture of curiosity, experimentation, and a desire to inform the public. As the web matured and as the public and agency personnel became more experienced and sophisticated about the Internet, transit agencies' approaches to web development became more institutionalized and formalized.

Transit websites are currently in various stages of development. Despite the differences, however, several common threads run through transit agencies' experiences with the Internet. This chapter provides an overview of their experiences with the growth of transit sites, content development, audience identification, site redesigning, goal determination, and evaluation of effectiveness.

SITES ARE RELATIVELY NEW AND EXPERIENCE RAPID GROWTH

Use of the Internet by transit agencies to inform the public and promote transit services is relatively new. The first transit websites were begun in the mid-1990s, at a time when only a small fraction of transit riders had Internet access. The site for only one of 33 agencies surveyed dates as far back as 1994. More than one-half of the transit websites in the sample were begun between 1995 and 1997, and some sites were started quite recently, including five sites that were first developed in the 18 months prior to the survey (Table 3).

The number of people visiting transit websites has grown rapidly. Survey respondents report increases in site usage of 10 to 500 percent between mid-2000 and mid-2001. The median increase was 60 percent, whereas, because of very rapid growth for several sites, the mean increase was 101 percent. (See chapter 3 for an analysis of site visitation data from 29 transit agencies.)

TABLE 3
YEAR WEBSITES BEGUN

Year	No.	Percent
1994	1	3
1995	7	21
1996	6	18
1997	6	18
1998	3	9
1999	4	12
2000	3	9
2001	2	6
Started 1996, expanded 2000	1	3

Note: Number of respondents: 34.

INTERNET USERS ARE LOOKING FOR SERVICE INFORMATION

In general, web development efforts among state and local government sites focus on offering practical services to citizen "clients," such as access to publications and the ability to file taxes online, register vehicles, and apply for licenses (West 2001). Transit sites follow this orientation. Overwhelmingly, transit agency web staff report that Internet users are primarily interested in the basic customer information—maps, schedules, fares, and so forth—that help them plan trips. Riders also look to the Internet for current information on construction diversions, special events, and unplanned incidents.

All or nearly all transit websites offer schedules, maps, and information on fares. Of the 33 web managers surveyed, all report having fare information, 97 percent have schedules, and 94 percent offer route maps. In addition, 79 percent offer system maps (Table 4). As described in chapter 4, schedules, maps, and fare information receive the heaviest volumes of usage. A majority of sites also offer information on special events, service disruptions, and park-and-ride services.

Some agencies provide interactive trip planning (27%), elevator or escalator maintenance information (18%), and real-time information (9%). That only a minority of transit agencies provide these types of information reflects the technically demanding and operationally challenging nature of these features. In several cases, interactive trip planning is offered by means of a link to the site of a regional

TABLE 4
FEATURES PROVIDED ON WEBSITE

Features	No.	Percent
Fares	33	100
Schedules	32	97
Route maps	31	94
Accessibility information	30	91
ADA (paratransit) services	29	88
Employment	28	85
Press information	27	82
System maps	26	79
Special event information	26	79
Procurement information	23	70
What's new	22	67
Links to any other sites	22	67
Agency history	21	64
Links to area transit sites	21	64
Links to other transportation sites	21	64
Planning studies	20	61
Purchase tickets/passes/farecards by mail	20	61
Service disruption information	19	58
Park-and-ride information	19	58
Board meeting agendas	19	58
Public involvement information	19	58
Budget/ridership/annual reports	15	45
Interactive trip planning	9	27
Board minutes	9	27
Store/sales (other than fare media)	9	27
Elevator maintenance information	6	18
Real-time information	3	9

Note: Number of respondents: 33.

transportation agency. Because of public demand, some agencies plan to offer these features as soon as they develop the necessary databases and software. (These features are discussed further in chapter 7.)

Another major user group is disabled persons. Of the 33 responding agencies, 91 percent offer accessibility information and 88 percent offer information on paratransit services. (Design issues related to accessibility for disabled persons are discussed in chapter 6.)

JOB, PROCUREMENT, AND STAKEHOLDER INFORMATION IS ALSO POPULAR

Although bus and rail customers are the primary audience of transit websites, potential employees, vendors, the press, and various stakeholder groups are also important and frequently served audiences.

Two-thirds or more of the agencies surveyed offer employment, procurement, and press information. The initiative for reaching potential employees, vendors, and the press often arises from the affected internal departments—human relations, procurement, and public affairs—or senior management. Transit agencies appreciate that the Internet offers a fast and relatively cheap method of reaching these audiences and that the agency benefits from making information available on the web.

Job and Procurement Information

Although three-quarters of the agencies surveyed offer job listings and two-thirds post job descriptions, capabilities in these areas vary. One-half of the agencies surveyed post an employment application that can be printed out and returned by mail or fax, and approximately one-fifth allow job applicants to fill out an application on-line (Table 5). Some agencies are developing additional capabilities and will offer on-line application filing. In other agencies, the human resources department requires an original signature on employment applications; the application may be available on-line, but it can only be returned by mail.

TABLE 5
EMPLOYMENT FEATURES (INFORMATION/CAPABILITIES)

Features	No.	Percent
Job listings	26	81
Job descriptions	21	66
Employment application (print out and mail/fax)	14	44
On-line filing of employment application	6	19
None	5	16

Note: Number of respondents: 32.

Sixty percent of surveyed agencies list procurement opportunities on their website; one-third include the full text of bid specifications and one-quarter include the full text of requests for proposal (RFPs). Five of the 10 responding agencies that provide full specifications and/or RFPs charge for the service.

Stakeholder Information

Between one-third and two-thirds of the agencies surveyed provide various types of board, planning, and public involvement information on the Internet. This category includes planning studies (61%), transit board meeting agendas (58%), and public involvement information (58%). Approximately one-quarter of the agencies also post board minutes.

Agencies with multi-modal and/or planning responsibilities are the most likely to post extensive stakeholder information. Examples include Sound Transit in the Seattle area, the Orange County (Calif.) Transportation Authority (OCTA), and the Los Angeles County Metropolitan Transportation Authority (LACMTA) [see Appendix B for uniform resource locators (URLs) of these and other agencies]. OCTA and LACMTA provide planning and project information to the public as a prime mission of these agencies. Other agencies have also found the web to be a valuable conduit for project development information. One agency was spurred by the success of a website created by residents who opposed siting a new bus garage in their neighborhood. When the transit agency proposed a new location, staff put extensive information about the proposed site on the Internet.

DEVELOPMENT OCCURS ITERATIVELY WITH PERIODIC REDESIGNS

Website development is an evolving, iterative process. Transit staff revamp content and design as they accumulate experience with the Internet, as the sites grow, as goals evolve, and as transit agency capabilities become more sophisticated.

Examples of Redesign Goals

The following examples illustrate current or recent experience with site redesigns.

- The Alameda–Contra Costa Transit System in the Oakland area redesigned its site, giving it a fresh look that better reflected the agency's image. The agency also added content, better organized the site contents, added outreach to customers by means of targeted e-mails, and took steps to ease the updating process.
- The Metropolitan Atlanta Rapid Transit Authority's (MARTA) redesign "flattens" the site so that more content is within one or two mouse clicks of the home page. MARTA is also adding information for visitors and people moving to Atlanta, such as listing apartment complexes that are near transit stops.
- Like MARTA, the Chicago Transit Authority's (CTA) redesign efforts are aimed at producing faster download times, minimizing the number of mouse clicks to key information, and making information easier to locate. Large graphics were eliminated and the site structure was flattened and reorganized.
- The OCTA placed specific links to bus schedules and service changes on the home page to increase the accessibility of the most-visited parts of the site. The agency also simplified the structure of the site and grouped information in a more logical fashion.
- The Toledo Area Regional Transit Authority matched its website design with the design of printed marketing materials.
- In the Cincinnati area, the Southwest Ohio Regional Transit Authority made schedule and map information easier to find and placed key links at the top of the navigation bar.
- In establishing its website, the primary goal of Red Rose Transit in Lancaster, Pennsylvania, was to place all the schedules on the site and make sure that the information was correct. Among the goals for further development include training staff to update the website and thus reduce vendor costs.

(Specific design approaches used by these and other agencies are discussed in chapters 5 and 6.)

Frequency of Site Redesigns

Redesign typically takes place at intervals of 15 to 30 months. Two-thirds of website managers in the follow-up survey (18 of 27) have either redesigned their sites within the past year or are currently in the midst of a redesign. Of five sites redesigned 6 to 12 months prior to the survey, one website manager planned to redesign the site within the next 6 months and three planned a redesign in the next 6 to 12 months—amounting, on average, to approximately 18 months between redesign efforts.

Agencies with less-frequent redesign schedules are primarily smaller transit agencies with 50 or fewer buses.

Informal Customer Feedback Used to Guide Redesign Plans

Website managers rely primarily on customers' e-mail feedback, staff testing, and analysis of visitor usage statistics

to evaluate the quality of their sites and to prioritize the next steps for development. More than 80 percent of survey respondents use e-mail feedback, often generated through a prominent link on the site; for example, "Send comments on this site to webmaster@transitagency.com." Nearly three-quarters also rely on staff testing of their sites and one-half analyze visitor volumes (Table 6).

TABLE 6
METHODS OF OBTAINING FEEDBACK AND EVALUATING THE QUALITY OF THE SITE

Methods	No.	Percent
E-mailed comments	28	82
Staff testing	24	71
Visitor volumes	17	50
Customer usability testing	13	38
Analysis of searches	11	32
On-line surveys	9	26
Market research	8	24

Note: Number of respondents: 34.

A few web managers use more formal methods of feedback and testing. One-quarter to one-third of responding agencies indicate that they conduct customer usability testing and/or market research. Follow-up interviews indicated that most staff checking off these choices on the survey form had less-formal feedback such as e-mailed comments in mind, although several examples of usability testing and market research were discovered (these are discussed in chapters 3 and 8).

Redesign Goals

Focus on Improving Customer Information

Over the past several years site redesigns have focused on improving the presentation of service information. One-half or more survey respondents reported that the main goals of the last redesign included improved navigability, reorganizing content, and making the most popular pages more directly accessible from the home page (Table 7). These redesign goals can enhance users' ability to access service information.

Web managers continue to focus on improving schedule, map, and fare information on their sites. Improved navigability and providing shorter paths to the most popular pages are common priorities for the next redesign, although they are mentioned less frequently than for the last redesign. Emerging goals involve adding capabilities that enhance access to service information, including services that e-mail customers with service or other information, trip itinerary planners, and wireless capabilities (Table 8). (These capabilities are discussed in chapter 6.)

TABLE 7
GOALS OF LAST REDESIGN

Goals	No.	Percent
Update the look of the site/make it more attractive	23	72
Improve navigability	20	63
Reorganize content to a more logical structure from users' perspective	18	56
Make most popular pages more directly accessible (fewer clicks) from home page	14	44
Add new features	20	63
Make the site more interactive	9	28

Note: Number of respondents: 32.

Adding New Information and Audiences

Another goal is to expand the types of information provided and the audiences served by transit websites. Major areas of development included adding or expanding procurement information and e-commerce, which were cited by more than one-half of respondents as priorities for further site development. Both of these are motivated in part by bottom-line considerations. Procurement information on the web can decrease the number of bid specifications and RFPs mailed to potential bidders. In addition, by potentially expanding the pool of bidders, project costs may be reduced. E-commerce offers the potential to reduce costs for sales of fare media and create or grow revenue streams for various transit-related products.

Adding or expanding employment/jobs information and board information, planning reports, or other public involvement information were cited by about one-third of respondents (Table 8).

Web managers, senior executives, or other agency staff may initiate reaching out to new audiences. According to web managers, as staff in procurement, human resources, planning, and other departments increasingly recognize the importance and power of the web, they request that information from their area of responsibility be added to the site.

Automation

Another priority for site development is automating the process for generating and posting updates. Automation can greatly reduce the time required for this process and thus expand the amount and timeliness of information on the site. Automation signals the maturation of the Internet's role within transit agencies as meeting website needs becomes an integral part of planning the flow and management of information in transit agencies.

Some agencies have worked to automate their procurement functions through the Internet as much as possible. A

TABLE 8
PRIORITIES FOR SITE DEVELOPMENT

Priorities	No.	Percent
Add/expand procurement information	19	59
Automate process of generating/posting updates	15	47
Add/expand e-commerce	15	47
Add/expand service that e-mails customers with service or other information	15	47
Add trip itinerary planner	14	44
Improve navigability	13	41
Add/expand employment/jobs information	11	34
Update the look of the site/make it more attractive	10	31
Make the site more interactive	10	31
Add/expand Board information, planning reports, other public involvement information	10	31
Reorganize content to a more logical structure from users' perspective	9	28
Add/expand wireless capabilities	9	28
Add information targeted to visitors	8	25
Make the most popular pages more directly accessible (fewer clicks) from home page	6	19
Make site customizable by user	3	9
Eliminate frames	1	3
Other	6	19
Priorities not yet developed	3	9

Note: Number of respondents: 32.

prime example is the OCTA, which makes all RFPs and bid specifications available for free on its website. Vendors are required to register on the site. In return, they receive e-mail notification of procurements relevant to their business lines. Amendments to the procurement documents are also posted on-line and vendors are notified by e-mail. Proposals must still be submitted in writing.

Interactivity

Another common priority is making the site more interactive, such as by adding service information e-mails. In the dot-com world, interactivity is seen as a way to build positive relationships between companies and their customers. (See chapter 6 for further discussion of interactivity.)

Schematic Summary of Development Process

Website development can be summarized schematically, as represented in Figure 1. The usual starting point in site development is to put maps, schedules, fare information, and other frequently used customer service information on the sites. Service information is initially presented in static form; for example, schedules change only with quarterly schedule revisions.

From this starting point, web managers may *add functionality* to enhance basic service information. Functionality enhancements include trip planners, e-mail updates, and real-time service information.

A second development direction is to *expand the range of audiences* served. Additional audiences include potential vendors, potential employees, the press, and various stakeholder groups.

Finally, periodically throughout this process sites are reorganized and redesigned to improve navigation, shorten the most frequently traveled paths through the site, and freshen the site's appearance.

GOALS, BENEFITS, AND EFFECTIVENESS

Establishment of goals and evaluation of the effectiveness and benefits of websites could seem to be a daunting task for web managers. In practice, however, agencies have tended to take a simple and straightforward approach to the task of setting goals and evaluating benefits.

Goal Statements and Written Policies

Just over one-half the web managers surveyed indicated that their agencies have written goals and objectives for their websites. Agency goals tend to focus on providing information, building ridership, and cost savings. The following are examples of goals or vision statements from transit agencies in Cleveland, Ohio, and Portland, Oregon.

- *Greater Cleveland Regional Transit Authority (GCRTA) website vision statement*—GCRTA's current emphasis is on "back to basics." This means (1) focusing on the transit customer—identifying, serving, and satisfying their needs; (2) improving the Authority's financial health—through revenue enhancement and cost cutting; and (3) improving public

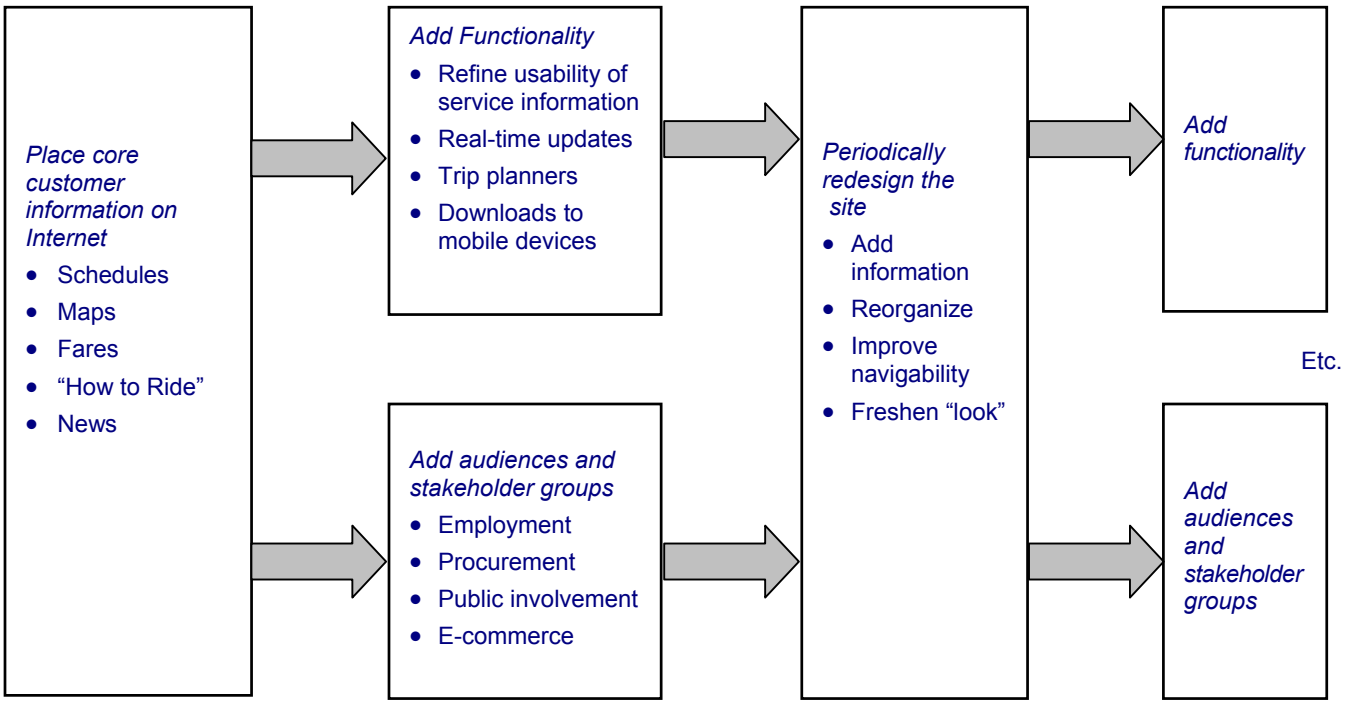

FIGURE 1 Schematic summary of transit website development process.

image—sustaining broad community support among taxpayers and opinion leaders.

GCRTA's website is intended to improve customer service and satisfaction through providing a clear, quick, concise means of distributing information critical to its constituents. This includes schedules, fares, maps, employment information, customer service, public comment events, and more. We seek to identify and implement new web applications that will help sustain and build ridership, orient new riders to the system, and better serve business and leisure travelers to the Greater Cleveland area.

Our site should improve our financial health by facilitating transfer from paper documents and mail-based distribution to more economical media and channels. We shall promote delivering e-commerce capabilities through e-enabling IT architectures and e-business process management capabilities. The site is an integral marketing tool that is used to advertise our products and services such as the Commuter Advantage Program of transit pass distribution at area workplaces, UPass programs at area universities, and broader fare media sales efforts.

Finally, GCRTA's website is consistent with a continuously improving "high tech" presence in the community. New and refurbished stations, additions of new vehicles to the bus fleet, and co-sponsorship of popular community events are underscored by our website's appearance and functionality. They combine to convey the image of a transit system up to the expectations and challenges of the 21st Century. GCRTA's website is intended to convey the sense of quick, convenient, and enjoyable navigation that we want our constituents to experience with our transit service.

- *Portland Tri-Met's website mission statement*—Aggressively channel all appropriate internal and external information, messages, and transactions into a web-enabled environment to fulfill and exceed rider, community, business, and jurisdictional expectations.

Goals

1. Provide comprehensive current travel information to the public.
2. Provide current and potential riders with easy-to-use information about the regional public transportation system including information regarding Tri-Met's programs, products, and services.
3. Provide Tri-Met's jurisdictional and business partners, employers, customers, and other stakeholders with an easy, accurate, and fast way to do business with Tri-Met.
4. Increase public awareness and participation in the mission of the agency by providing a clearinghouse of information on agency activities.

We will achieve these goals by keeping current with technology, providing adequate staff support, understanding

trends in e-commerce and e-government, linking all of our systems together, and continuously amending plans to adapt technology with Tri-Met's work plans.

Only about one-quarter of surveyed agencies have written policies covering topics such as content and links on the site. The majority of agencies do, however, link to other transportation sites.

Evaluation of Benefits

Agency web managers believe that the main benefits of their websites are making information available to the public, improving the agency's image, attracting new customers, and increasing ridership (Table 9). Some of these benefits are readily shown. Site usage data, for example, demonstrate that sites distribute information to thousands of people. In terms of agency image, the simple existence of an attractive website "conveys the image that we are part of the modern world, believe it or not," as one web manager commented.

TABLE 9
MAIN BENEFITS OF WEBSITES

Benefits	No.	Percent
Making schedules and/or maps easily available	32	100
Attracting new customers	21	66
Improving agency's image in the community	20	63
Increasing ridership among existing customers	20	63
Providing information for public involvement	13	41

Notes: Number of respondents: 32.

Ridership Impacts

The impacts of websites on ridership have not been widely evaluated. There is, however, fragmentary evidence showing that websites can spur ridership. First, telephone surveys conducted by various agencies have found surprisingly high levels of interest in transit sites by nonriders and infrequent riders, as discussed in chapter 3.

Second, two small on-line surveys conducted in college towns suggest that transit sites can spur ridership. In an on-line survey conducted in Santa Cruz, California, three-quarters of a small number of respondents (52) said that "the presence of Metro information on the web" increases the likelihood of their riding Metro buses. In a 1997 on-line survey of visitors to the Ann Arbor Transportation Authority's website, again with a small sample (59), two-thirds of respondents said that the availability of transit information on the Internet increases their likelihood of riding Ann Arbor buses (Ann Arbor Transportation Authority 1997).

Cost, Hiring, and Procurement Benefits

Three relatively more quantifiable factors are also cited by some agencies as important justifications for websites: saving money in other areas, meeting hiring needs, and meeting procurement needs.

Cost savings might be achieved through reduced printing of maps and schedules, reduced mailing costs, and reduced calls to customer service centers. Slightly over one-half of web managers believe that savings have been achieved in these areas (Table 10). Only one, however, reported quantifying those savings. The OCTA reduced the number of customer information center calls by nearly 50 percent through a combination of information on the website and publication of the *Bus Book*, a comprehensive listing of bus schedules. Savings in customer call center costs, which are contracted out, are approximately $500,000 a year. The *Bus Book* is believed to have made the larger contribution to reductions in call center volumes, but the website was also important.

TABLE 10
COST SAVINGS FROM WEBSITE

Level of Cost Savings	No.	Percent
No or insignificant cost savings	7	22
Cost savings, but can not/have not quantified	16	50
Cost savings that have been quantified	3	9
Cost savings unknown	6	19

Note: Number of respondents: 32.

Hiring and procurement may also benefit from a web presence. In most agencies, a significant number of potential employees have used the web for information and sometimes to obtain job applications. Most agencies report that a significant number of job applicants obtain information and applications from the web. The impact of this activity is difficult to evaluate, however, because applicants might have applied for jobs without using the Internet. Fewer than one-half of transit agencies believe that the number of job applicants has increased because of the website (Table 11).

Budget Justifications

Transit agencies have allocated staff and other resources to develop and maintain websites without extensive evaluations of their impact or effectiveness. According to web

TABLE 11
IMPACT ON JOB APPLICATIONS

	No.	Percent
Have a significant number of job applicants used the site for information, applications, etc.?		
Yes	17	53
No	11	34
Have the number of job applicants increased because of the website?		
Clearly has increased	4	13
Probably has increased	9	28
Probably not increased	3	9
Clearly not increased	3	9
Don't know	12	38

Note: Number of responses to each question: 32.

TABLE 12
FACTORS AFFECTING FUNDING OF WEB EFFORT

Factors	No.	Percent
Agency sees as necessary for "up-to-date" image	27	84
Senior executive staff see website as priority; haven't needed to work to convince them of benefits	20	63
Usage statistics have been adequate to show value of site	19	59
Agency believes website saves money in other areas	13	41
Good press has helped show value of site	12	38
Agency believes website helps meet hiring needs	9	28
Agency believes website helps meet procurement needs	8	25
Other justifications used for funding	8	25

Note: Number of respondents: 32.

managers, the primary factors influencing agency funding are the need for an "up-to-date" image, support from senior staff, and usage statistics (Table 12). Some agency web managers also cite favorable print and television coverage.

CHAPTER THREE

HOW LARGE IS THE AUDIENCE?

The Internet offers transit agencies the opportunity to reach a very large and diverse audience. The audience may include frequent and infrequent transit riders, nonriders, local residents, tourists, business travelers, potential employees, vendors, and community activists.

Few transit agencies have systematically profiled the potential audience for their websites or quantified the extent to which they reach the potential audience. There is value to undertaking this exercise, however, for at least two reasons. First, audience analysis reveals that the potential audience of transit websites is larger than might be expected. The potential audience includes nonriders who might be expected to have scant interest in transit sites and low-income riders who might have limited access to the Internet.

Second, audience analysis can show the extent to which transit agencies currently reach the potential audience. This information provides a basis for evaluating agencies' current sites and direction for where to focus future development of the sites.

This chapter demonstrates the value of audience measurement and provides a baseline for individual agencies to evaluate the size of their potential and actual audiences.

INTERNET ACCESS

The size of the potential audience is affected by how many people have Internet access. This section reports on Internet access for the United States as a whole and for several transit agencies.

According to the U.S. Commerce Department (2002), as of August 2001, 56.5 percent of U.S. households had a computer and 50.5 percent had access to the Internet. When access at work is added to access at home, 56 percent of adults reported going online in November/December 2000 (Pew Internet in American Life Project 2001). Adding other locations such as school, library, and cyber café to work and home locations, the Harris Interactive survey found that 64 percent of U.S. adults were on-line in 2001, although other surveys show somewhat lower levels ("U.S. Online Population Holds Steady" 2001; U.S. Commerce Department 2002).

Transit users' Internet access mirrors the national average in several major cities, while falling well below the national average in several other areas. Telephone surveys conducted by transit agencies in these respective cities show that

- In Cleveland, New York, and Chicago, 60 to 70 percent of transit users have Internet access—similar to or somewhat above the national averages.
- Forty-nine percent of "regular riders" on Dallas Area Rapid Transit (DART) have Internet access. Regular riders are defined as riding DART at least once per week.
- Lower rates of access are found among Los Angeles transit customers (28% have Internet access) and the OCTA's senior riders (33%) and Hispanic riders (35%).
- Commuter rail riders in suburban New York show a relatively high Internet access rate of 80 percent.

Internet access is lower for certain customer groups, mirroring national variations by age and income. In New York City, for example, 75 percent of persons age 18 to 34, but only 27 percent of persons age 65 and over, have Internet access. Likewise, 85 percent of respondents with incomes over $50,000 have access to the Internet compared with 38 percent of those with incomes under $25,000.

Internet access is sometimes lower for frequent riders than for occasional riders and nonriders. Whereas 49 percent of DART's regular riders, for example, have Internet access, 63 percent of occasional riders (defined as those who ride between once a month and once a week) and 78 percent of infrequent riders (those who ride less than once a month) have Internet access. The access figure for nonriders is 67 percent.

Internet access has increased rapidly over the past several years. Internet access at home increased from 18 percent of households in 1997 to 26 percent in 1998 and 50.5 percent in 2001 (U.S. Commerce Department 2002). Another survey found a rapid increase in Internet access from home or work in just 6 months, rising from 47 percent in mid-2000 to 56 percent at the end of 2000 (Pew Internet in American Life Project 2001). Surveys conducted in New York City show a similar trend, as depicted in Figure 2.

Although some surveys show continued growth in Internet access in 2001 (U.S. Commerce Department 2002), other sources found that Internet access has leveled off ("Spending Carefully or All Teched Out?" 2001; "U.S.

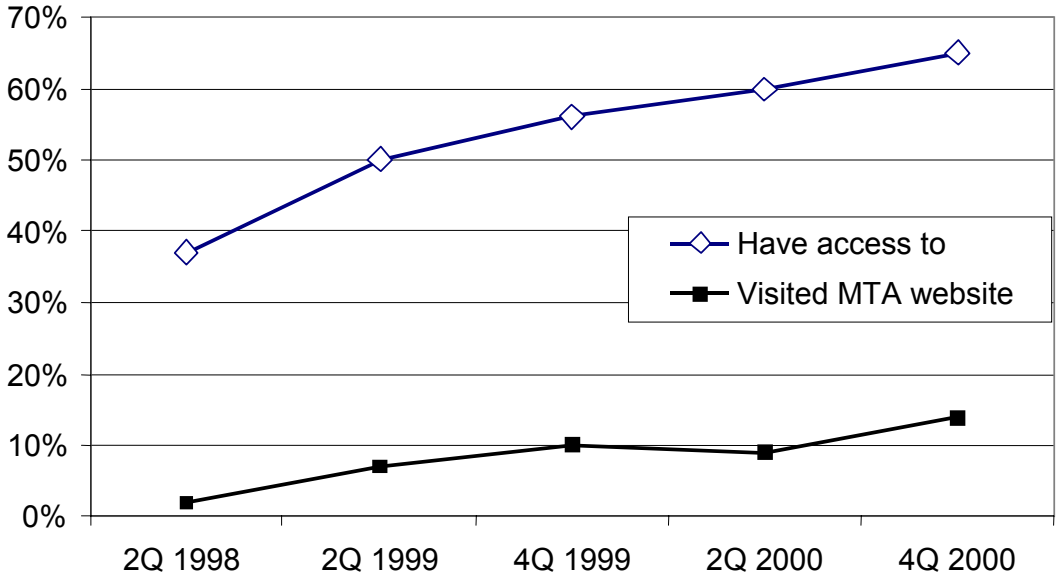

FIGURE 2 New York City growth in Internet access and visitation.

Online Population Holds Steady" 2001). Nevertheless, transit website usage continues its rapid growth. Usage data through the end of 2001, provided by nine transit agencies, showed growth of from 30 percent to 110 percent between November and December of 2001 and the same months in 2000. Some agencies did report a drop in the fall of 2001 compared with earlier in the year. Where it occurred, the drop-off appeared to be a combination of normal seasonality and declines in tourism and travel from the recession and the aftermath of the September 11 attacks in New York and northern Virginia.

POTENTIAL AUDIENCE FOR TRANSIT WEBSITES

Not all persons with Internet access are necessarily interested in visiting the local transit agency's website; therefore, what is the potential audience for transit websites?

The potential audience can be defined in several ways. First, it might be defined as those persons with Internet access who are interested in using the web to obtain information. According to the U.S. Census Bureau (Newburger 2001), 64 percent of those with Internet access use the web to search for information. (By comparison, 88 percent use e-mail; 53 percent check news, weather, and sports; and 20 percent job search.) By this approach, the potential audience for transit websites would be adults with Internet access who use the web to search for information. This group is approximately 36 percent of the adult population (56 percent with Internet access at home or work, of whom 64 percent search for information on the web).

The potential audience might also be based on expressed interest in viewing transit websites. Data are available on this for two cities. In 2000, both transit riders as well as nonriders in Los Angeles County were asked in a telephone survey if they would use their Internet access "to get information on transit service." Of respondents with Internet access, 52 percent of regular transit riders and 58 percent of others say they would use the Internet to obtain transit information.

Another survey was conducted of bus passengers for GO Transit in Toronto, Canada. Results showed that 45 percent of all respondents and 70 percent of Internet users said they would use the Internet to get information on GO services and fares (Wyatt and Luk 1999).

It should be noted that the concept of "potential audience" is somewhat irregular. Not everyone who expresses interest in visiting a transit website will actually find the need to do so. On the other hand, some may not be interested until they later have a specific need to visit.

In sum, the potential audience for transit websites appears to be between 50 and 70 percent of persons with Internet access. As of the end of 2000, this segment comprised approximately 25 to 50 percent of current transit users, depending on city, and approximately 50 percent of potential riders.

Most remarkable is the high level of interest in transit websites from infrequent riders and nonriders as shown in the data from Los Angeles. As will be seen later, infrequent riders and nonriders do frequently visit transit sites and may benefit particularly from schedule, routing, and other information. Their interest in transit websites creates the opportunity to use the Internet to increase bus and rail ridership.

REACH OF WEBSITES AMONG TRANSIT RIDERS

The reach or actual audience of transit websites can be estimated based on

- Server log data, which measure the number of computer users visiting a website; and
- Telephone surveys conducted by transit agencies, which show the proportion of respondents who have visited the agency's website, and server log data.

Both of these data sources have important limitations. Telephone survey results are based on respondent self-reporting and were available from only seven transit agencies. Server logs measure computer activity as opposed to the activity of site visitors, a somewhat arcane but important distinction. (See Appendix C for a detailed discussion of the data and measurement issues.) Despite these limitations, usage patterns and rough estimates of the actual audience can be developed.

Server Log Data

As would be expected, site usage correlates strongly with transit agency size. Figure 3 shows the relationship between site visitation and ridership at 29 agencies. Visitation is measured by the number of visitor sessions. Ridership is measured using average weekday ridership—essentially the number of passenger boardings on an average weekday. Clearly evident in Figure 3 is that the number of website visitors increases with ridership. This relationship can be quantified using the following ratio:

$$\frac{\text{Visitor sessions per month}}{\text{1,000 average weekday trips (boardings)}}$$

The 29 transit agencies that provided usage data average 289 visitor sessions per month for every 1,000 trips per day, as of the spring and summer of 2001. For example, agencies that provide 20,000 trips on an average weekday have an average of approximately 5,800 website visitors per month. Agencies with 1 million weekday trips average approximately 289,000 website visitors per month.

Telephone Surveys

Based on telephone surveys conducted by seven transit agencies, between 8 and 20 percent of transit users have ever visited the local transit websites. Approximately 4 to 10 percent of customers, or one-half of those ever visiting, visited the local transit agency site in the past month (Table 13).

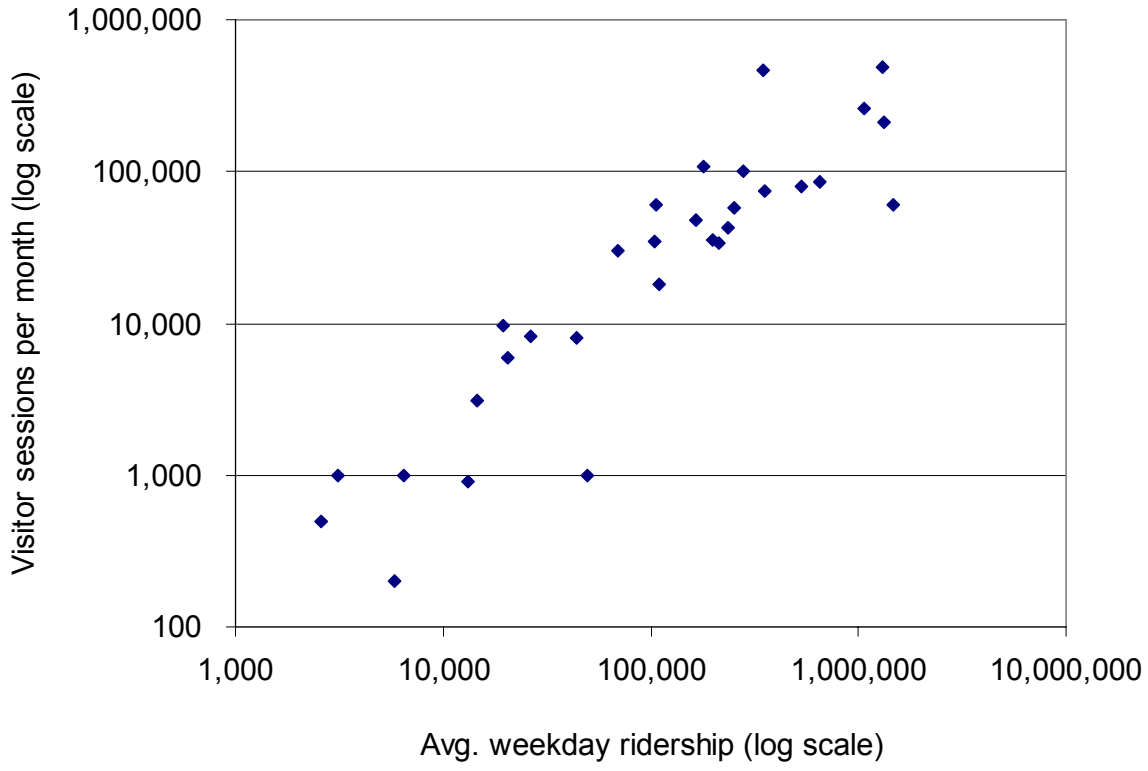

FIGURE 3 Website usage and transit ridership.

TABLE 13
INTERNET ACCESS AND SITE VISITATION RATES BASED ON AGENCY TELEPHONE SURVEYS

Agency	Survey Date	Base	Percent with Internet Access	Percent Visited Website	Percent Visited Website in Past 30 Days
Dallas—DART	2000	Ride at least once/week	49	14	NA
Cleveland—RTA	2001	Used transit in past 2 years	60	8	NA
NYC Transit	4Q 2000	All residents	65	14	8
Chicago—CTA	1999	Riders	70	16	7
San Francisco—BART	Dec. 99/Jan. 00	Riders	NA	19	10
New York—Metro–North Railroad	4Q 2000	Riders	80	19	NA
New York—Long Island Rail Road	4Q 2000	Riders	80	20	NA

Notes: DART = Dallas Area Rapid Transit; RTA = Regional Transit Authority; CTA = Chicago Transit Authority; BART = Bay Area Rapid Transit; NYC = New York City; NA = not available; Q = quarter.

These visitation data can be compared with the size of the potential audience (discussed earlier) to estimate the actual reach of transit websites relative to the potential audience. This comparison indicates that transit websites reach 30 percent of the potential audience on an "ever visited" basis and 15 percent on a "visited in past month" basis. In other words, approximately one in three potential users have ever visited the local transit agency's site, and approximately one is six visited during the past month. Note that these are order-of-magnitude estimates and there is likely to be substantial variation among transit agencies.

In sum, transit agency websites are currently reaching a very substantial audience, but are far from reaching the total potential audience.

CHAPTER FOUR

USAGE PATTERNS

In addition to measuring the overall size of the Internet audience, it is important to know how visitors use transit websites. How often and how long do they visit? What information are they most interested in? How do they work their way through the site? What browsers do they use? Sites designed with usage patterns and client-side technology in mind can better serve transit website visitors.

The results described here are based on the survey of transit web managers, data from telephone surveys conducted by transit agencies, and server logs. Because of limitations to server log statistics (as discussed in Appendix C), data from cookie-based statistics provided by DART are cited separately, because these data appear to more accurately reflect visitors' experiences. (Cookies are small files placed on a computer that allow for the tracking of computer activity.)

ENTRY PAGES

Most transit website visitors enter the site through the agency home page. This finding highlights the importance of the home page as the gateway to the rest of the site.

Server log data from various agencies indicates that 45 to 75 percent of visitors start with the transit agency home page. However, these figures are particularly subject to server log issues from changing Internet Protocol addresses and the use of caches; therefore, the figures may be seriously in error. DART's cookie-based statistics show that 82 percent of visitors came first to the home page. This may better reflect the true industry-wide experience, although it should also be noted that schedules are accessible directly from DART's home page, giving users less reason to bookmark and go directly to a schedule page.

Other popular entry pages tend to involve schedules and maps, but are widely dispersed. Visitors may also arrive at inside pages from links at other sites.

MOST-USED CONTENT

Both survey responses and server logs show that schedules, maps, and other service-related information is the most-used information on transit websites. Of 28 agencies answering an open-ended question concerning the most-used pages of their websites, 96 percent named schedules or timetables and 61 percent cited maps. Other mentions included trip planning, fares, employment, expansion information, board materials, purchasing information, bikes on transit, events, news, and ticket purchasing.

Server logs confirm the survey findings. For nearly every agency examined, the most popular pages aside from the home page concern schedules. Pages related to maps consistently rank in second or third. Other individual pages accounting for at least 1 percent of all hits include

- Fares
- Pass information
- "About the agency" pages
- Employment
- Trip planner
- Various "how to ride" pages
- News
- Events
- Service expansion information.

FREQUENCY OF VISITS

Internet users visit transit websites primarily on an occasional basis. Telephone survey results indicate that users visit transit websites an average of once per month. In both New York and Chicago, approximately one-half of all users had visited in the previous month. DART statistics support this conclusion; one-half of DART visitors in August 2001 had visited previously. DART's data indicate that there is a core of frequent users; 35 percent of the traffic from return visitors was from users returning the same day.

DURATION AND DEPTH

The duration of visits is fairly brief, as would be expected of goal-oriented visitors seeking one or two specific pieces of information such as a schedule or map. The mean duration of visitor sessions varies by transit agency but is usually in the range of from 2 to 10 min, with 7 to 9 min the most common. DART's median session duration was 5 min; the mean is clearly longer and may fall into the 7- to 9-min range seen in other server log data.

These times are shorter than the average Internet session of 32 min on-line per session ("July 2001 Internet Usage Stats" 2001). Users are visiting both transit and other websites during a given on-line session.

Because of technical issues with caching and changing Internet Protocol addresses, server log data appear inaccurate in terms of number of pages visited. DART's cookie-based data show an average visit depth of four pages; 14 percent viewed one page and 38 percent viewed five or more pages, showing once again that visits are often fairly short.

TIME OF DAY/DAY OF WEEK

Peak usage occurs during the day and is fairly steady between 10 a.m. and 5 p.m. The number of visitors per hour is often 6 to 8 percent of the total daily visitor sessions. Saturday and Sunday usage is typically one-half to three-quarters that of weekdays. Depending on the agency, 15 to 27 percent of visitor sessions take place on weekends, with a median of approximately 20 percent.

Although the peak is during the business day, the majority of usage for most transit sites occurs during evenings and weekends. These visits are presumably most often using dial-up connections at home. Depending on the transit agency, between 37 and 62 percent of visits occur between 9 a.m. and 5 p.m., with a median of about 50 percent. These figures include daytime weekend usage, indicating that weekday working hour usage is less than one-half of the total usage at most agency sites.

Usage varies somewhat by day of the week, but there is no consistent pattern between agencies. Some agencies experience greater usage earlier in the week, whereas in other agencies usage peaks later in the week.

CLIENT-SIDE TECHNOLOGY

Websites should be designed with visitors' connection speeds, screen resolutions, and browser technologies in mind. Otherwise, websites can be too slow to load or difficult or impossible for some visitors to view.

Transit websites generally are designed for the "lowest common denominator," so that virtually anyone can obtain desired information. In practice, this means that sites are designed for viewing with either 28.8k or 56k modems, for 800 × 600 screen resolutions, and for 4.× or above browsers. The vast majority of visitors to transit websites can view web pages designed for this level of client-side technology.

Connection Speed

Connection speed is a key issue for home users, particularly those who rely on dial-up connections. Nielson/Net Ratings data show that as of July 2001, 4 percent of home users have 14.4k modems, 15 percent have 28.8/33.6k modems, 63 percent have 56k modems, and 18 percent have high-speed connections ("Move to Broadband Changes How the Web Is Surfed" 2001).

The majority of agencies surveyed design for 28.8k modems (52%) or 14.4k modems (6%). Sites designed for these speeds are thus suitable for all but the 4 percent of Internet users who still have 14.4k modems. The other 42 percent of agencies surveyed design for 56k modems, a design standard currently satisfactory to 81 percent of Internet users. In addition, even those with 28.8k modems will be able to navigate these sites, albeit somewhat more slowly than may be intended.

Note that actual connection speeds tend to be lower than the listed modem speeds. Testing of sites in real-world conditions can help identify actual download speeds.

Screen Resolution

Screen resolution determines how much of the monitor is taken up by a web page. If the page is designed for the users' screen resolution, the page fills the screen horizontally. Users with higher-resolution screens will see extra white space down the right column of the screen; users with lower-resolution screens will have to scroll horizontally across the page to view the entire screen.

Four-fifths of agencies surveyed design for screen resolutions of 800 × 600 and the remainder design for 640 × 480 resolution. A review of several studies found that only about 7 percent of users are using 640 × 480 pixels and that the majority use an 800 × 600 resolution ("Research-Based Web Design and Usability Guidelines" 2001). DART's usage data indicate that 5.5 percent of visitors have screens with 640 × 480 resolution, 51 percent have 800 × 600 resolution screens, and the remainder use higher-resolution screens.

Thus, for most users, transit site web pages will fill the screen and users will not need to scroll horizontally.

Browsers

Nearly all transit websites are designed for browsers of 3.0 and above or 4.0 or above. Only 10 percent of survey respondents design for more advanced browsers. Server logs from transit agencies indicate that 91 percent of Microsoft Internet Explorer users have IE 5.× or above and 97 percent of Netscape Navigator users have version 4.× or above. Thus, the vast majority of potential users are able to view transit sites with their browsers.

CHAPTER FIVE

HOME PAGE DESIGN AND SITE NAVIGATION

The home page is the gateway to a website's information. The majority of transit website visitors enter through the home page. Although home pages may include pertinent information, particularly notices of service changes or real-time service problems, the primary function of the home page is to serve as the portal to information contained within the site.

To be effective, home pages should load quickly, so that users do not become bored or impatient and abandon the site. Once loaded, the home page should be visually attractive. The design should allow visitors to readily navigate to the information they want. The home page should also help alert visitors to information of timely importance. Finally, home pages—like the entire site—should be accessible to people with disabilities.

These design objectives sometimes conflict. For example, larger graphics may look appealing but increase download times. The objectives can also be mutually supportive. Clear navigation and the presence of desired information, for example, will make the site "look" better than would be the case if users cannot find the information they seek. As Nielsen (2001) notes, "The more a design supports users in easily and efficiently doing what they want to do, the more they like the design."

This chapter discusses the following five topics of particular relevance to home page design and site navigation:

- What priority should be given to visual appeal versus functionality?
- How can ease of use be maximized?
- How should links be organized?
- What substantive information should be placed on the home page?
- How quickly should the home page load for dial-up users?

FUNCTIONALITY VERSUS VISUAL APPEAL

One common question about home page design is whether designers should concentrate on making the site visually attractive or focus simply on functionality. To better understand the approach of transit agencies to this issue, survey respondents were asked which of the alternative approaches, as articulated in two statements, best describes their approach to website design:

- Sixty-nine percent of responding agencies reported that they "aim to create a simple, functional design that lets visitors quickly access desired information."
- Twenty-eight percent of responding agencies reported that they "aim to create a very attractive ('wow') design that will help develop a better image for the agency in the community, while also providing desired information."

The emphasis on functionality reflects transit website managers' recognition that transit sites primarily serve visitors' information needs. This emphasis appears to suit customers. Usability lab testing conducted for the Metropolitan Transportation Authority Long Island Rail Road (LIRR) found that customers want a functional, intuitive site; they "are not expecting 'bells and whistles' from an LIRR web page" (Global Strategy Group Inc. 2001). Agencies emphasizing functionality include Tri-Met in Portland, Oregon; the Toledo (Ohio) Area Regional Transit Authority; C-Tran in Vancouver, Washington; and Red Rose Transit in Lancaster, Pennsylvania.

Conversely, agencies choosing a "wow" design place priority on using the Internet to remake the agency's image in the wider community. Website design in these agencies tends to be particularly closely integrated with marketing and public relations efforts. These agencies are also the most likely to use splash pages. Examples include sites for the Port Authority of Allegheny County in Pittsburgh and the Charleston (South Carolina) Area Regional Transportation Authority.

NAVIGATION AND EASE OF USE

Usability experts suggest a number of steps to maximize ease of navigation. The following list is based on Nielsen (2000), Nielsen and Tahir (2002), and "Research-Based Web Design and Usability Guidelines" (2001). Note also that the Volpe Center is developing usability guidelines specifically for transit websites that will be available on its site and/or the FTA's site in 2002.

Keys to site navigability are

- Put important information at the top of the page.
- Group related information while giving the greatest visibility to the information used most frequently.
- Within the structure of the site, raise information to the highest level; do not make visitors dig deep into the site.

- Use terminology that visitors readily relate to their needs.
- Place navigation elements on the right or left sides or across the top.
- Format information for scannability; "79 percent of our test users always scanned any new page they came across; only very few users would read word-by-word" (Nielsen 2000).
- Align page elements vertically for ease of scanning.
- Use consistent logos so that users know what site they are on.
- Place logos, recurring text, buttons, and graphics at the same place on each page.
- Minimize scrolling and place key content "above the fold" so that it appears on the screen when the page is first viewed.

Transit websites have embraced and implemented many of these design principles. For example, most sites are designed for scannability, using lists instead of sentences and paragraphs. Most sites use the agency's logo consistently and repeat graphics and key navigation buttons at or near the top of each page.

Transit sites are also increasingly raising information to the highest level, thus reducing the number of "clicks" required to find popular information. For example, DART's home page prominently displays drop-down menus listing each bus and rail line, identified by number (Figure 4). Visitors looking for a schedule can click on the drop-down menu and go directly from the home page to the desired schedule.

Other sites make schedules accessible one or two pages removed from the home page, including the OCTA; Lehigh and Northampton Transportation Authority in Allentown, Pennsylvania; Port Authority of Allegheny County in Pittsburgh; and the Regional Transit District in Denver. Typically, a link to "schedules" or "timetables" leads directly to a listing of bus and/or rail routes. Visitors can then click a link to reach a desired schedule, map, or both (Figure 5).

ORGANIZING LINKS

One particularly difficult design issue raised frequently in interviews concerns organizing links on the home page. Issues include

- How many links should be displayed on the home page?
- Should links be grouped by topic, should they be alphabetized, or should the most-used links be given more prominent display?
- What terminology should be used?

FIGURE 4 DART home page prominently displays drop-down menus listing each bus and rail line for easy access to schedules.

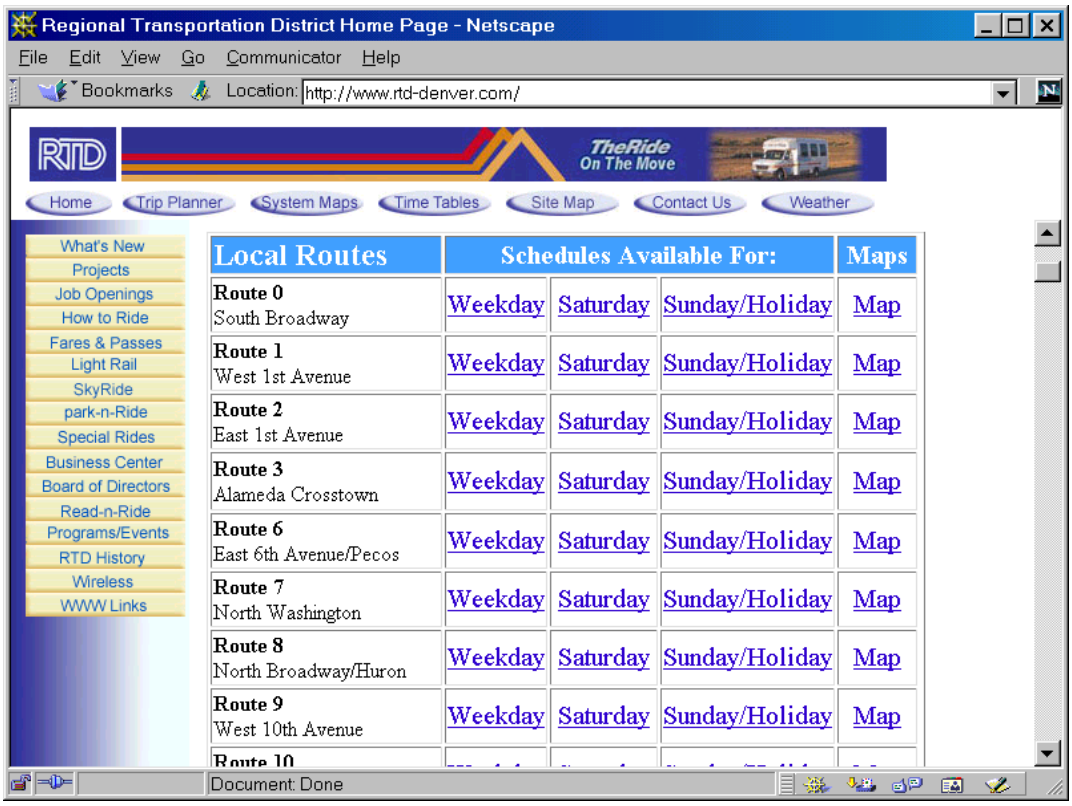

FIGURE 5 Denver Regional Transit District's listing of schedules.

Although a variety of approaches are used, there seems to be a gathering consensus based on experience and a modest amount of usability testing for the following approach:

- The home page contains 5 to 10 links that are repeated as a standard design element on every page. This provides consistency and allows visitors to jump to any section of the website from any other section.
- The standard set of links include several that employ specific and transparent terminology and lead directly to the most-used service information.
  - Schedules and Maps (less frequently, Timetables is used in place of Schedules),
  - Fares (or Passes and Fares),
  - Trip Planner,
  - Jobs (or Employment or Career Opportunities),
  - Store (Shop), and
  - Contact Us.

Agencies have moved away from opaque terms such as "Riding the Bus" and "Service Information" that are too vague for users to relate to their needs.

- Somewhat more general links are used to cover the rest of the site. Careful grouping of information can maintain ease of navigation. Several examples illustrate approaches to grouping the information.
  - Tri-Met in Portland uses "Other Tri-Met Services" for employer services, elderly and disabled services, and event and visitor information. "More About Tri-Met" leads to statistics about the transit agency, board information, and planning information (Figure 6).
  - San Francisco's Muni uses "Community Rider Info" (rider tips and rules, visitor information, accessibility information, boards and committees, proposed service, community activities, and links) and "About Muni" [general manager's (GM's) message, construction project information, jobs].
  - The Bay Area Rapid Transit District (BART) uses "News" (press releases and newsletters) and "About BART" (history, facts, board, airport extension, renovations, jobs, police, reports, advisory groups, planning, doing business).

Other sites using a handful of standardized links on every page include the Santa Clara (California) Valley Transportation Authority, Metropolitan Atlanta Rapid Transit Authority (MARTA), CTA, New Jersey Transit, LYNX (Orlando, Florida), and the Massachusetts Bay Transportation Authority in Boston.

Additional support for this approach is found in a Volpe Center study of web users' cognitive structure for transit website information. The study asked 29 individuals in Boston and Seattle to place information typically found on transit websites into several groups. This study found that

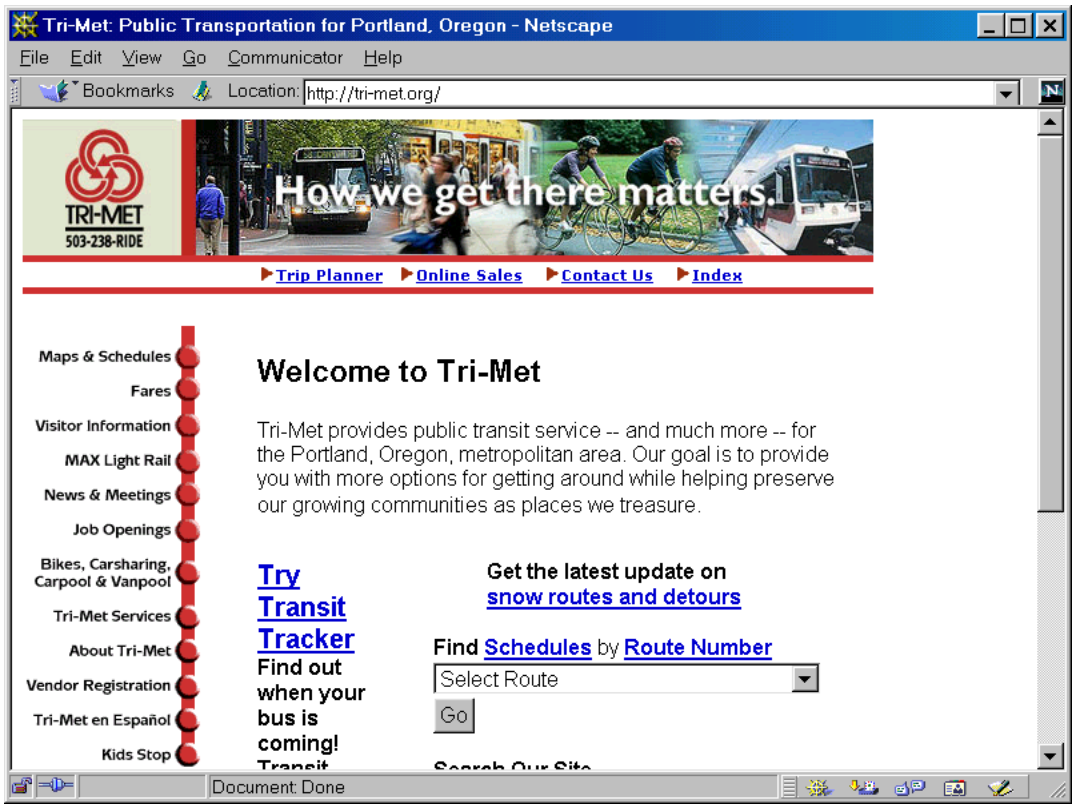

FIGURE 6 Tri-Met's (Portland, Oregon) home page has a few most-used links.

50 "units of information" representing different content areas could be assigned to the following 8 functionally similar groups: Routes and Schedules, Fare Information, Business, Rules and Tips, Accessibility, Comments and Questions, Rider Alerts, and Kids Section (Richman et al. 2001).

Although a number of agencies have moved to the approach to formulating and organizing links described previously, other approaches are also in use. One alternative is to use an extensive list of specific links grouped by topics. The Greater Cleveland Regional Transit Authority website is an example of this approach (Figure 7).

Another approach uses pop-up menus for each of several major topic areas. When the user points to the topic area on the screen, an additional menu of choices pops up, as illustrated by the LACMTA's home page (Figure 8). The six general categories (Metro Transit, Transportation Programs, Pressroom/Stakeholders, MTA Board of Directors, Contacting MTA, and Other MTA Information) lead to a total of 69 links. The advantage of this approach is that users can go directly from the home page to any one of the 69 links—which include Timetables, Trip Planner, and Fare Information—but are not confronted with the 69 links all at once.

This approach serves agencies such as the LACMTA that have major planning, highway, and other responsibilities and cannot focus their home page just on transit service information. A disadvantage to this approach is that users looking for a map must associate the topic such as "map" with the category "Metro Transit." Note also that because pop-up menus are not accessible to screen readers, the MTA provides separate text-only pages.

PLACING SUBSTANTIVE INFORMATION ON THE HOME PAGE

Home pages often contain alerts about schedule changes, route changes, service diversions, delays, and new services. New programs, new methods of fare payment, and developments in planning or other nonservice areas are also sometimes highlighted. Thus, the home page can alert visitors to information that might be important to them even though it was not the reason they visited the site.

Agencies tend to highlight alerts and other news prominently in the middle of the page. The information tends to be visually separate from the standard links, conveying that the information is fresh and subject to continuing change.

Contact Information

Nearly all transit home pages provide mechanisms to contact the agency. Sites usually link to the webmaster's e-mail address for feedback on the Internet site. Links and/or

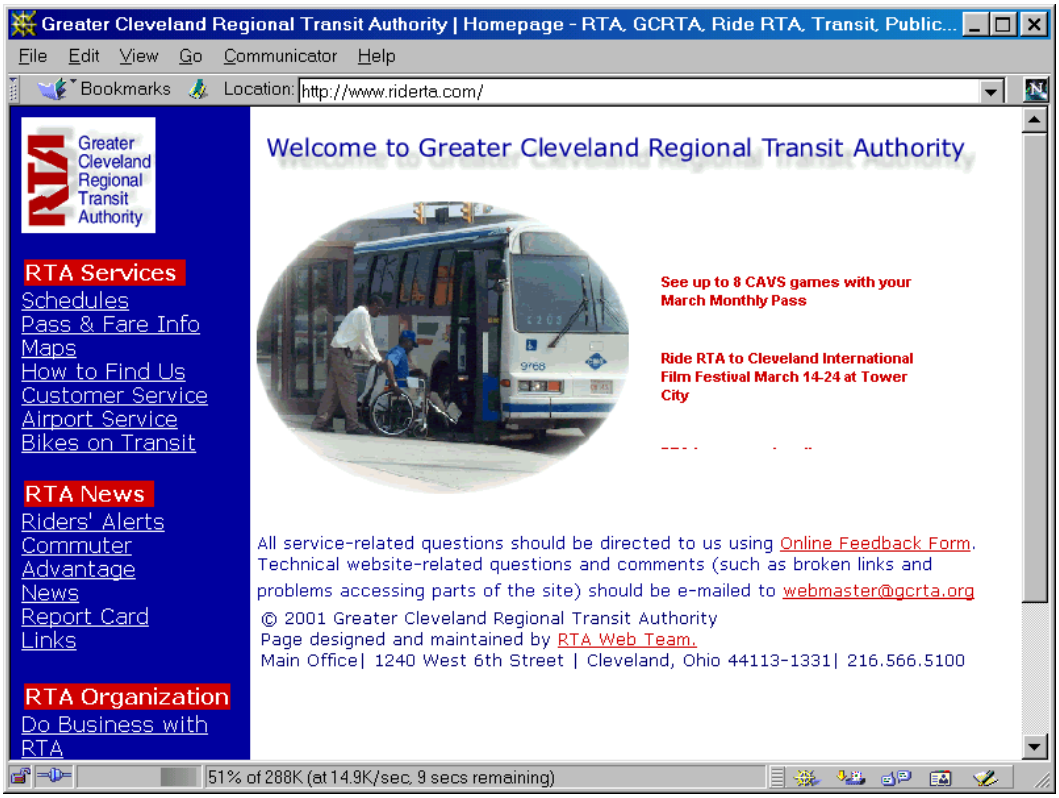

FIGURE 7 Greater Cleveland Regional Transit Authority's links are organized by topic (note the link for airport service).

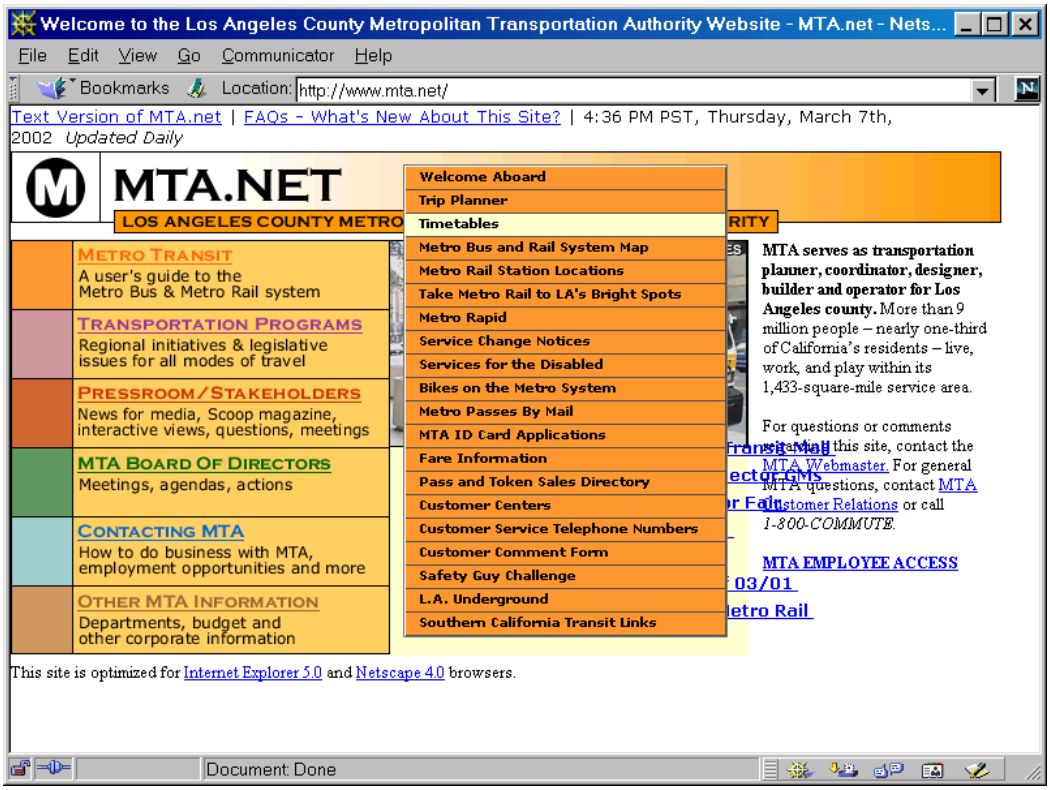

FIGURE 8 LACMTA's home page with additional links shown when the mouse is moved over a primary topic area.

telephone numbers are typically provided for complaints and sometimes compliments about service.

Some sites (usually for smaller agencies) provide a link to the GM's e-mail address. Experience with these links, designed to make the GM very accessible, is instructive. Agencies that initially located the GM's e-mail link prominently on the home page soon found that this individual received a range of comments that were more appropriately sent to the complaint line or webmaster. Agencies revised their designs to highlight these more appropriate links.

RESPONSE TIMES AND FILE SIZES

The noted usability expert Jakob Nielsen (2000) states that "fast response times are the most important design criterion for web pages." Nielsen recommends a "minimum goal for response times" of 10 s "because that's the limit of people's ability to keep their attention focused while waiting." For longer delays, users turn to other tasks while waiting for the computer response. Staying within 10-s response times "means that the user can stay focused on navigating the site."

Other usability testing supports Nielsen's findings. One study found that web users rated download times as follows:

- Good: up to 5 s.
- Average: 6 to 10 s.
- Poor: more than 10 s ("Research-Based Web Design and Usability Guidelines" 2001).

This study recommends keeping downloads within 10 s based on a 56k modem. (Note that actual connection speeds are lower than 56k—typically 40 to 45k and in some circumstances much lower.)

Usability experts recommend a number of practices to reduce download times. These include limiting page size to 30k, using graphics sparingly, and avoiding complex table layouts that take browsers more time to display.

There is in practice a wide range of download times. Nielsen reports that the 10 most widely used sites on the Internet averaged 8 s to download. He attributes the popularity of these sites, in part, to fast download times (Nielsen 2000). Download times of less than 10 s appear to be more the exception than the rule, however. Nielsen's sample of corporate home pages downloaded in an average of 19 s (Nielsen 2000). His book analyzing 50 popular websites found that they averaged 26 s to download (Nielsen and Tahir 2002).

To obtain a sense of how quickly transit websites download, download times were measured for a sample of transit and non-transit home pages. The sample was comprised of 34 transit agencies, 13 airlines and intercity rail and bus providers, and 10 of the most-visited sites on the web. Tests were conducted using a 56k modem and Celeron 550 processor running Netscape 4.7—a typical set-up for transit website users. Testing was conducted in the evening, when a typical dial-up user would be on-line.

Although some transit home pages download more quickly than many of the most popular sites on the web, overall, transit websites appear to download somewhat more slowly than other sites chosen for comparison. As shown in Table 14, all of the comparison sites downloaded in less than 30 s; however, one-quarter of the transit sites took longer than 30 s. On the speedier end of the spectrum, 12 percent of the transit sites downloaded in less than 15 s compared with 26 percent of the comparison sites.

TABLE 14
HOME PAGE DOWNLOAD TIMES FOR SAMPLE OF TRANSIT, OTHER TRANSPORTATION, AND FREQUENTLY VISITED SITES

Time (in seconds)	Transit Agencies (%)	Other Transportation Sites (%)	Most-Visited Sites (%)
Under 5	0	0	0
5–9	0	15	10
10–14	12	15	10
15–19	29	38	40
20–29	32	31	40
30–39	12	0	0
40–49	12	0	0
50–59	0	0	0
60 or more	3	0	0
	100	100	100
Total sites tested	34	13	10
Percent loading in:			
Under 15 s	12	31	20
Under 30 s	74	100	100

Notes: Other transportation sites: America West Airlines, American Airlines, Amtrak, Continental Airlines, Delta Airlines, JetBlue Airlines, Northwest Airlines, Southwest Airlines, United Airlines, US Airways, and Greyhound, Peter Pan, and Trailways bus companies.

Most-visited sites: Amazon, AOL, CNET, Ebay, Excite@home, Google, Lycos, Microsoft, MNS, and Yahoo.

Tests conducted on the evening of December 21, 2001, using a 56k modem and Celeron 550 processor running Windows 98 and Netscape 4.7.

Some web managers feel that current download times are satisfactory. They report receiving positive feedback on the attractiveness of their sites and no complaints about download times. (However, visitors who tire of waiting and abandon a site are unlikely to e-mail their dissatisfaction.) Web managers may also feel that their sites cannot be compared fairly with large commercial sites that pay thousands of dollars a month for high-performance, exclusive servers. Transit agencies typically have much smaller budgets for basic server services. These technology differences can produce slower download times for similar file sizes.

Other web managers are taking steps to speed up their sites. Redesigns are in progress or were recently completed at several agencies that reduce the size of graphics and give more emphasis to text-based navigation elements. Among the fastest-loading transit sites in testing were the newly redesigned sites for the CTA and MARTA, each of which downloaded in 13 to 17 s. Also downloading in 17 s or less in testing were sites for the Washington Metro, Bi-State Development Agency in St. Louis, the Southwest Ohio Regional Transit Authority in the Cincinnati area, Red Rose Transit in Lancaster, Pennsylvania, and C-Tran in Vancouver, Washington. Portland's Tri-Met site was the fastest transit site tested, downloading in 10 s [see Appendix B for the uniform resource locators (URLs) of these sites].

CHAPTER SIX

FOUR INTERRELATED DESIGN ISSUES

The following four design issues are of concern to virtually all transit web managers and webmasters:

- Whether and how to use PDF files,
- Making sites accessible to people with disabilities,
- Effective presentation of bus and rail schedules, and
- Effective presentation of maps (route maps and particularly system maps).

These issues are discussed together because they are closely interrelated. For example, PDF files can be used to present schedules and maps, but they can also affect accessibility for disabled persons.

PDF FILES

PDF files are widely used on the Internet, particularly for larger documents or documents where it is important to maintain complex formatting. Graphic designers can better control font styles, font sizes, column formatting, and page layout in a PDF file than in a hypertext memory language (html) page. Graphic designers also control the location of page breaks in PDF files and can format for either portrait or landscape page orientation. Much higher resolutions can be used than is generally the case with graphics in html pages, thus rendering much finer detail for maps.

These substantial advantages have led many transit websites to use PDF files for schedules, maps, reports, and other documents. Seventy-eight percent of agencies surveyed use PDF files on their sites.

The PDF format is not an unalloyed blessing, however. The problem most often cited in the survey of transit agencies is that some users lack access to Adobe Acrobat Reader, which is needed to view and print PDF files. Forty percent of agencies using PDF files report that availability of Acrobat Reader is a problem. The problem arises for a variety of reasons. Some users' Internet connections are too slow to download the software. Others are using a computer at a school, library, or business that prohibits loading new software on the machine. Some computers lack the necessary disk space. Users may also not have the time or inclination to download the program or they may lack the technical capability or confidence to install the program once it is downloaded.

Another, sometimes unrecognized, problem with PDF files concerns the printing of oversize pages. Many maps and schedules available on transit websites are designed for paper sizes of 8½ × 14 in. or greater; however, the typical visitor can only print onto standard 8½ × 11-in. paper. Two options are available to print oversize documents, but neither option produces satisfactory results for printing maps and schedules. One option is to shrink the document size to fit the size of paper being used. This option often produces schedules and maps that are too small to read on the printed page. The other option is to print only the center part of oversize pages, lopping off headers and other essential text. Figures 9 and 10 show how a schedule meant to be printed on 24-in.-long paper prints out using each of these options. Neither printed product is useful for someone planning a trip.

A final problem with PDF files is that they have historically been inaccessible to blind and visually impaired persons, although that is changing, as discussed in the next section.

Because of these limitations, transit agencies tend to avoid exclusive reliance on PDF files. Most agencies present information in html format in addition to or instead of using PDF files, as detailed later in this chapter. In addition, some agencies have converted PDF files from 8½ × 14 in. page sizes to 8½ × 11 in. for printability. In the survey, approximately one-third of agencies that use PDF format for schedules and/or route maps use 8½ × 11 in.-page sizes.

ACCESSIBILITY FOR PEOPLE WITH DISABILITIES

The following five types of disabilities can affect Internet usage:

- Visual impairments, including blindness, low vision, and color blindness. These impairments can prevent users from seeing websites or distinguishing meaning derived from colors.
- Hearing impairments, affected by the use of sound, video, plug-ins, and multimedia programs.
- Mobility impairments, which can affect users' ability to control the mouse and keyboard.
- Cognitive impairments, which can make understanding websites, particularly complex websites, difficult or impossible.
- Seizure disorders, which can be induced by pages that flicker at certain rates ("Introduction to Web Accessibility" 2001).

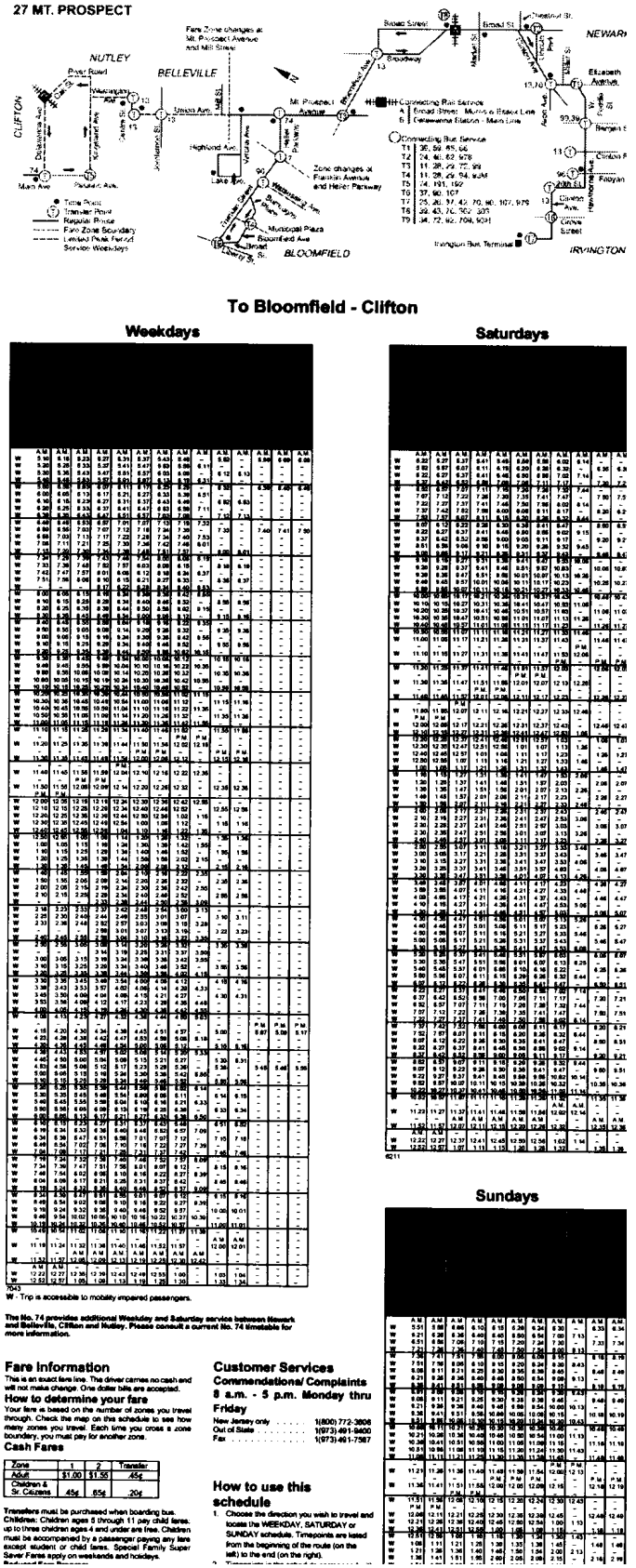

FIGURE 9 Schedule in PDF file with “fit to page” checked in dialog box.

W	9.40	9.45	9.55	9.59	10.04	10.10	10.16	10.22	10.35	–	–	–	–	–
W	9.50	9.55	10.05	10.09	10.14	10.20	10.26	10.32	–	10.35	10.36	–	–	–
W	10.00	10.05	10.15	10.19	10.24	10.30	10.36	10.42	10.55	–	–	–	–	–
W	10.10	10.15	10.25	10.29	10.34	10.40	10.46	10.52	–	10.55	10.56	–	–	–
W	10.20	10.25	10.35	10.39	10.44	10.50	10.56	11.02	11.15	–	–	–	–	–
W	10.30	10.35	10.45	10.49	10.54	11.00	11.06	11.12	–	11.15	11.16	–	–	–
W	10.40	10.45	10.55	10.59	11.04	11.10	11.16	11.22	11.35	–	–	–	–	–
W	10.50	10.55	11.05	11.09	11.14	11.20	11.26	11.32	–	11.35	11.36	–	–	–
W	11.00	11.05	11.15	11.19	11.24	11.30	11.36	11.42	11.55	–	–	–	–	–
W	11.10	11.15	11.25	11.29	11.34	11.40	11.46	11.52	–	11.55	11.56	–	–	–
	–	–	–	–	–	–	–	P.M.	P.M.	–	–	–	–	–
W	11.20	11.25	11.35	11.39	11.44	11.50	11.56	12.02	12.15	–	–	–	–	–
	–	–	–	–	–	P.M.	P.M.	–	–	P.M.	P.M.	–	–	–
W	11.30	11.35	11.45	11.49	11.54	12.00	12.06	12.12	–	12.15	12.16	–	–	–
	–	–	–	–	P.M.	–	–	–	–	–	–	–	–	–
W	11.40	11.45	11.55	11.59	12.04	12.10	12.16	12.22	12.35	–	–	–	–	–
	–	–	P.M.	P.M.	–	–	–	–	–	–	–	–	–	–
W	11.50	11.55	12.05	12.09	12.14	12.20	12.26	12.32	–	12.35	12.36	–	–	–
	P.M.	P.M.	–	–	–	–	–	–	–	–	–	–	–	–
W	12.00	12.05	12.15	12.19	12.24	12.30	12.36	12.42	12.55	–	–	–	–	–
W	12.10	12.15	12.25	12.29	12.34	12.40	12.46	12.52	–	12.55	12.56	–	–	–
W	12.20	12.25	12.35	12.39	12.44	12.50	12.56	1.02	1.15	–	–	–	–	–
W	12.30	12.35	12.45	12.49	12.54	1.00	1.06	1.12	–	1.15	1.16	–	–	–
W	12.40	12.45	12.55	12.59	1.04	1.10	1.16	1.22	1.35	–	–	–	–	–
W	12.50	12.55	1.05	1.09	1.14	1.20	1.26	1.32	–	1.35	1.36	–	–	–
W	1.00	1.05	1.15	1.19	1.24	1.30	1.36	1.42	1.55	–	–	–	–	–
W	1.10	1.15	1.25	1.29	1.34	1.40	1.46	1.52	–	1.55	1.56	–	–	–
W	1.20	1.25	1.35	1.39	1.44	1.50	1.56	2.02	2.15	–	–	–	–	–
W	1.30	1.35	1.45	1.49	1.54	2.00	2.06	2.12	–	2.15	2.16	–	–	–
W	1.40	1.45	1.55	1.59	2.04	2.10	2.16	2.22	2.35	–	–	–	–	–
W	1.50	1.55	2.05	2.09	2.14	2.20	2.26	2.32	–	2.35	2.36	–	–	–
W	2.00	2.05	2.15	2.19	2.24	2.30	2.36	2.42	2.55	–	–	–	–	–
W	2.10	2.15	2.25	2.29	2.34	2.40	2.46	2.52	–	2.55	2.56	–	–	–
W	–	–	–	2.33	2.38	2.44	2.50	2.56	3.09	–	–	–	–	–
W	2.18	2.23	2.33	2.37	2.42	2.48	2.54	3.00	3.13	–	–	–	–	–
W	2.25	2.30	2.40	2.44	2.49	2.55	3.01	3.07	–	3.10	3.11	–	–	–
W	2.33	2.38	2.48	2.52	2.57	3.03	3.09	3.15	3.28	–	–	–	–	–
W	–	–	–	2.56	3.01	3.07	3.13	3.19	–	3.22	3.23	–	–	–
W	2.40	2.45	2.55	2.59	3.04	3.10	3.16	3.22	3.35	–	–	–	–	–
W	2.50	2.55	3.05	3.09	3.14	3.20	3.26	3.32	–	3.35	3.36	–	–	–
W	–	–	–	3.14	3.19	3.25	3.31	3.37	3.50	–	–	–	–	–
W	3.00	3.05	3.15	3.19	3.24	3.30	3.36	3.42	3.55	–	–	–	–	–
W	3.10	3.15	3.25	3.29	3.34	3.40	3.46	3.52	–	3.55	3.56	–	–	–
W	3.20	3.25	3.35	3.39	3.44	3.50	3.56	4.02	4.15	–	–	–	–	–
W	3.30	3.35	3.45	3.49	3.54	4.00	4.06	4.12	–	4.15	4.16	–	–	–
W	3.38	3.43	3.53	3.57	4.02	4.08	4.14	4.20	4.33	–	–	–	–	–
W	3.45	3.50	4.00	4.04	4.09	4.15	4.21	4.27	–	4.30	4.31	–	–	–
W	3.53	3.58	4.08	4.12	4.17	4.23	4.29	4.35	4.48	–	–	–	–	–
W	4.00	4.05	4.15	4.19	4.24	4.30	4.36	4.42	4.55	–	–	–	–	–
W	4.08	4.13	4.23	4.27	4.32	4.38	4.44	4.50	5.03	–	–	–	–	–
	–	–	–	–	–	–	–	–	–	–	–	P.M.	P.M.	P.M.
W	4.15	4.20	4.30	4.34	4.39	4.45	4.51	4.57	–	5.00	–	5.07	5.08	5.17
W	4.23	4.28	4.38	4.42	4.47	4.53	4.59	5.05	5.18	–	–	–	–	–
W	4.30	4.35	4.45	4.49	4.54	5.00	5.06	5.12	–	5.15	5.16	–	–	–
W	4.38	4.43	4.53	4.57	5.02	5.08	5.14	5.20	5.33	–	–	–	–	–
W	4.45	4.50	5.00	5.04	5.09	5.15	5.21	5.27	–	5.30	5.31	–	–	–
W	4.53	4.58	5.08	5.12	5.17	5.23	5.29	5.35	–	5.38	–	5.45	5.46	5.55
W	5.00	5.05	5.15	5.19	5.24	5.30	5.36	5.42	5.55	–	–	–	–	–
W	5.10	5.15	5.25	5.29	5.34	5.40	5.46	5.52	–	5.55	5.56	–	–	–
W	5.20	5.25	5.35	5.39	5.44	5.50	5.56	6.02	6.14	–	–	–	–	–
W	5.30	5.35	5.45	5.49	5.54	6.00	6.06	6.11	–	6.14	6.15	–	–	–
W	5.40	5.45	5.55	5.59	6.04	6.10	6.16	6.21	6.33	–	–	–	–	–
W	5.50	5.55	6.05	6.09	6.13	6.19	6.25	6.30	–	6.33	6.34	–	–	–
W	6.00	6.05	6.13	6.17	6.21	6.27	6.33	6.38	6.50	–	–	–	–	–
W	6.10	6.15	6.23	6.27	6.31	6.37	6.43	6.48	–	6.51	6.52	–	–	–
W	6.19	6.24	6.32	6.36	6.40	6.46	6.52	6.57	7.09	–	–	–	–	–
W	6.34	6.39	6.47	6.51	6.55	7.01	7.07	7.12	–	7.15	7.16	–	–	–
W	6.49	6.54	7.02	7.06	7.10	7.16	7.22	7.27	7.39	–	–	–	–	–
W	7.04	7.09	7.17	7.21	7.25	7.31	7.37	7.42	–	7.45	7.46	–	–	–
W	7.19	7.24	7.32	7.36	7.40	7.46	7.52	7.57	8.09	–	–	–	–	–
W	7.34	7.39	7.47	7.51	7.55	8.01	8.07	8.12	–	8.15	8.16	–	–	–
W	7.49	7.54	8.02	8.06	8.10	8.16	8.22	8.27	8.39	–	–	–	–	–
W	8.04	8.09	8.17	8.21	8.25	8.31	8.37	8.42	–	8.45	8.46	–	–	–
W	8.19	8.24	8.32	8.36	8.40	8.46	8.52	8.57	9.09	–	–	–	–	–
W	8.34	8.39	8.47	8.51	8.55	9.01	9.07	9.12	–	9.15	9.16	–	–	–
W	8.49	8.54	9.02	9.06	9.10	9.16	9.22	9.27	9.39	–	–	–	–	–
W	9.19	9.24	9.32	9.36	9.40	9.46	9.52	9.57	–	10.00	10.01	–	–	–
W	9.49	9.54	10.02	10.06	10.10	10.16	10.22	10.27	10.39	–	–	–	–	–
W	10.19	10.24	10.32	10.36	10.40	10.46	10.52	10.57	–	11.00	11.01	–	–	–
W	10.49	10.54	11.02	11.06	11.10	11.16	11.22	11.27	11.39	–	–	–	–	–
	–	–	–	–	–	–	–	–	–	A.M.	A.M.	–	–	–
W	11.19	11.24	11.32	11.36	11.40	11.46	11.52	11.57	–	12.00	12.01	–	–	–
	–	–	A.M.	A.M.	A.M.	A.M.	A.M.	A.M.	A.M.	–	–	–	–	–
W	11.52	11.57	12.05	12.09	12.13	12.19	12.25	12.30	12.42	–	–	–	–	–
	A.M.	A.M.	–	–	–	–	–	–	–	–	–	–	–	–
W	12.22	12.27	12.35	12.39	12.43	12.49	12.55	1.00	–	1.03	1.04	–	–	–
W	12.52	12.57	1.05	1.09	1.13	1.19	1.25	1.30	–	1.33	1.34	–	–	–

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W - Trip is accessible to mobility impaired passengers.

The No. 74 provides additional Weekday and Saturday service between Newark and Belleville, Clifton and Nutley. Please consult a current No. 74 timetable for more information.

	–	–	–	–	–	–	–	P.M.	–	P.M.	P.M.			
W	11.20	11.25	11.37	11.41	11.46	11.51	11.57	12.03	–	12.06	12.07			
	–	–	–	–	–	P.M.	P.M.	–	–	–	–			
W	11.30	11.35	11.47	11.51	11.56	12.01	12.07	12.13	12.26	–	–			
	–	–	–	P.M.	P.M.	–	–	–	–	–	–			
W	11.40	11.45	11.57	12.01	12.06	12.11	12.17	12.23	–	12.26	12.27			
	–	–	P.M.	–	–	–	–	–	–	–	–			
W	11.50	11.55	12.07	12.11	12.16	12.21	12.27	12.33	12.46	–	–			
	P.M.	P.M.	–	–	–	–	–	–	–	–	–			
W	12.00	12.05	12.17	12.21	12.26	12.31	12.37	12.43	–	12.46	12.47			
W	12.10	12.15	12.27	12.31	12.36	12.41	12.47	12.53	1.06	–	–			
W	12.20	12.25	12.37	12.41	12.46	12.51	12.57	1.03	–	1.06	1.07			
W	12.30	12.35	12.47	12.51	12.56	1.01	1.07	1.13	1.26	–	–			
W	12.40	12.45	12.57	1.01	1.06	1.11	1.17	1.23	–	1.26	1.27			
W	12.50	12.55	1.07	1.11	1.16	1.21	1.27	1.33	1.46	–	–			
W	1.00	1.05	1.17	1.21	1.26	1.31	1.37	1.43	–	1.46	1.47			
W	1.10	1.15	1.27	1.31	1.36	1.41	1.47	1.53	2.06	–	–			
W	1.20	1.25	1.37	1.41	1.46	1.51	1.57	2.03	–	2.06	2.07			
W	1.30	1.35	1.47	1.51	1.56	2.01	2.07	2.13	2.26	–	–			
W	1.40	1.45	1.57	2.01	2.06	2.11	2.17	2.23	–	2.26	2.27			
W	1.50	1.55	2.07	2.11	2.16	2.21	2.27	2.33	2.46	–	–			
W	2.00	2.05	2.17	2.21	2.26	2.31	2.37	2.43	–	2.46	2.47			
W	2.10	2.15	2.27	2.31	2.36	2.41	2.47	2.53	3.06	–	–			
W	2.20	2.25	2.37	2.41	2.46	2.51	2.57	3.03	–	3.06	3.07			
W	2.30	2.35	2.47	2.51	2.56	3.01	3.07	3.13	3.26	–	–			
W	2.40	2.45	2.57	3.01	3.06	3.11	3.17	3.23	–	3.26	3.27			
W	2.50	2.55	3.07	3.11	3.16	3.21	3.27	3.33	3.46	–	–			
W	3.00	3.05	3.17	3.21	3.26	3.31	3.37	3.43	–	3.46	3.47			
W	3.10	3.15	3.27	3.31	3.36	3.41	3.47	3.53	4.06	–	–			
W	3.20	3.25	3.37	3.41	3.46	3.51	3.57	4.03	–	4.06	4.07			
W	3.30	3.35	3.47	3.51	3.56	4.01	4.07	4.13	4.26	–	–			
W	3.40	3.45	3.57	4.01	4.06	4.11	4.17	4.23	–	4.26	4.27			
W	3.50	3.55	4.07	4.11	4.16	4.21	4.27	4.33	4.46	–	–			
W	4.00	4.05	4.17	4.21	4.26	4.31	4.37	4.43	–	4.46	4.47			
W	4.10	4.15	4.27	4.31	4.36	4.41	4.47	4.53	5.06	–	–			
W	4.20	4.25	4.37	4.41	4.46	4.51	4.57	5.03	–	5.06	5.07			
W	4.30	4.35	4.47	4.51	4.56	5.01	5.07	5.13	5.26	–	–			
W	4.40	4.45	4.57	5.01	5.06	5.11	5.17	5.23	–	5.26	5.27			
W	4.50	4.55	5.07	5.11	5.16	5.21	5.27	5.33	5.46	–	–			
W	5.00	5.05	5.17	5.21	5.26	5.31	5.37	5.43	–	5.46	5.47			
W	5.10	5.15	5.27	5.31	5.36	5.41	5.47	5.53	6.06	–	–			
W	5.20	5.25	5.37	5.41	5.46	5.51	5.57	6.03	–	6.06	6.07			
W	5.30	5.35	5.47	5.51	5.56	6.01	6.07	6.13	6.25	–	–			
W	5.40	5.45	5.57	6.01	6.05	6.10	6.16	6.22	–	6.25	6.26			
W	5.50	5.55	6.07	6.11	6.15	6.20	6.26	6.32	6.44	–	–			
W	6.07	6.12	6.22	6.26	6.30	6.35	6.41	6.47	–	6.50	6.51			
W	6.22	6.27	6.37	6.41	6.45	6.50	6.56	7.02	7.14	–	–			
W	6.37	6.42	6.52	6.56	7.00	7.05	7.11	7.17	–	7.20	7.21			
W	6.52	6.57	7.07	7.11	7.15	7.20	7.26	7.32	7.44	–	–			
W	7.07	7.12	7.22	7.26	7.30	7.35	7.41	7.47	–	7.50	7.51			
W	7.22	7.27	7.37	7.41	7.45	7.50	7.56	8.02	8.14	–	–			
W	7.37	7.42	7.52	7.56	8.00	8.05	8.11	8.17	–	8.20	8.21			
W	7.52	7.57	8.07	8.11	8.15	8.20	8.26	8.32	8.44	–	–			
W	8.07	8.12	8.22	8.26	8.30	8.35	8.41	8.47	–	8.50	8.51			
W	8.22	8.27	8.37	8.41	8.45	8.50	8.56	9.02	9.14	–	–			
W	8.37	8.42	8.52	8.56	9.00	9.05	9.11	9.17	–	9.20	9.21			
W	8.52	8.57	9.07	9.11	9.15	9.20	9.26	9.32	9.44	–	–			
W	9.07	9.12	9.22	9.26	9.30	9.35	9.41	9.47	–	9.50	9.51			
W	9.22	9.27	9.37	9.41	9.45	9.50	9.56	10.02	10.14	–	–			
W	9.52	9.57	10.07	10.11	10.15	10.20	10.26	10.32	–	10.35	10.36			
W	10.22	10.27	10.37	10.41	10.45	10.50	10.56	11.02	11.14	–	–			
W	10.52	10.57	11.07	11.11	11.15	11.20	11.26	11.32	–	11.35	11.36			
	–	–	–	–	–	–	–	A.M.	A.M.	–	–			
W	11.22	11.27	11.37	11.41	11.45	11.50	11.56	12.02	12.14	–	–			
	–	–	A.M.	A.M.	A.M.	A.M.	A.M.	–	–	A.M.	A.M.			
W	11.52	11.57	12.07	12.11	12.15	12.20	12.26	12.32	–	12.35	12.36			
	A.M.	A.M.	–	–	–	–	–	–	–	–	–			
W	12.22	12.27	12.37	12.41	12.45	12.50	12.56	1.02	1.14	–	–			
W	12.52	12.57	1.07	1.11	1.15	1.20	1.26	1.32	–	1.35	1.36			

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Sundays

	IRVINGTON Bus Terminal	IRVINGTON Frelinghuysen Ave. & Taylor Pl.	NEWARK Frelinghuysen Ave. & Lyndhurst Ave.	NEWARK Lyndhurst Park	NEWARK Broad & Market Sts.	NEWARK Broad Street Station	NEWARK Bloomfield & Mt. Prospect Ave.	NEWARK Belmont Park & Mt. Prospect Ave.	BLOOMFIELD Broad St. at Bloomfield Ave.	NEWARK Verona Ave. & Mt. Prospect Ave.	NEWARK Mt. Prospect Ave. Lake Street Loop
	A.M.	A.M.	A.M.	A.M.	A.M.	A.M.	A.M.	A.M.	A.M.	A.M.	A.M.
W	5.51	5.56	6.06	6.10	6.15	6.20	6.24	6.30	–	6.33	6.34
W	6.21	6.26	6.36	6.40	6.45	6.50	6.54	7.00	7.13	–	–
W	6.51	6.56	7.06	7.10	7.15	7.20	7.24	7.30	–	7.33	7.34
W	7.21	7.26	7.36	7.40	7.45	7.50	7.54	8.00	8.13	–	–

FIGURE 10 Schedule in PDF file with “fit to page” unchecked in dialog box.

A number of simple steps can make websites accessible to people with disabilities including

- Providing a text equivalent for every nontext element, including graphics and scripting languages; for example, use of “ALT” (alternate text) tags for graphical elements. Text alternatives make web pages accessible to screen readers, which are software programs that convert text into synthesized speech for blind and visually impaired persons.
- Designing pages so that information conveyed with color is also available without color, from context or markup.
- Providing row and column headers for data tables through the use of “TH” (table heading) tags. This permits screen readers to read tables meaningfully to blind persons.
- When a timed response is required, alerting the user and giving the user sufficient time to indicate that more time is necessary.

TABLE 15
STEPS TAKEN TO BECOME ADA COMPLIANT

Compliance Steps	No.	Percent
"ALT" tags for graphics	21	66
Use both html and PDF files	13	41
Use html instead of PDF files	11	34
Avoid use of drop-down menus	11	34
Use client-side image maps with "ALT" tags	10	31
Provide functional text in pages using scripting	9	28
Separate text-only pages	5	16
Use alternative indicators for color	5	16
Provide text links for each active region of server-side image maps	5	16
Use "TH" tag in data table column and row headers	5	16
Other	4	13

Note: Number of respondents: 32.

- Not causing the screen to flicker with a frequency greater than 2 Hz and lower than 55 Hz, which can induce seizures. (This list is excerpted from "Section 508 Accessibility Checklist" 2001. See also "Section 508 Standards" 2001.)

Visual disabilities are a major focus of concern for transit website managers. Agencies are aware of the need to make their pages accessible. (See chapter 8 for discussion of federal accessibility requirements.)

Table 15 shows a variety of actions that agencies report having taken. Two-thirds include ALT tags for graphics. Roughly one-third have used html in addition to or instead of PDF files, avoided use of drop-down menus, used client-side image maps with ALT tags, and provided functional text in pages using scripting. Each of these steps enables a screen reader to comprehend web pages. Note that drop-down menus may be readable if formatted properly.

PDF files have been a particular concern. Until recently, software readers could not read PDF files. Adobe Acrobat 5.0, released in 2001, supports screen readers that use a standard programming interface. However, PDF files must be tagged using Acrobat 5.0, for screen readers to work ("Enhancing the Accessibility of the Web with Adobe Acrobat Software" 2001). This process is not automatic and must be carried out with diligence and care.

Most transit agencies surveyed in mid-2001 have used or plan to use this new software. Of agencies in the survey that use PDF files, 12 percent have designed PDF files to take advantage of the screen reader capabilities in Acrobat 5.0 and an additional 56 percent plan to update their files.

Transit web managers often emphasize the importance of working with the disabled community on these issues. Two-thirds of web managers surveyed have been in contact with people with disabilities or representatives of the disabled community. Agencies have worked with advocacy groups, resource centers, and disabled individuals to review the sites, determine steps that need to be taken, and check for customer satisfaction.

SCHEDULES

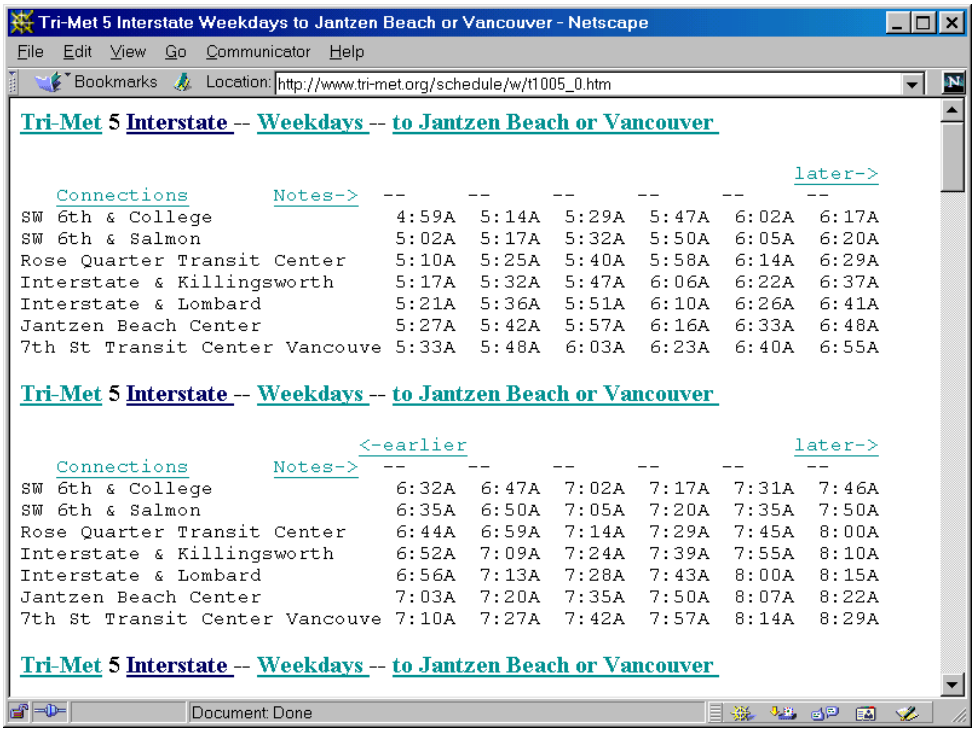
Transit agencies universally recognize the importance of providing customers with bus and train schedules. Websites promise to be an ideal medium to distribute schedule information—fast, up-to-date, and low-cost compared with printing and distributing paper schedules.

Web designers face two types of challenges in putting schedules onto the Internet. First, the underlying information is often not in a form suitable for directly uploading to a web page or PDF file. Only one-quarter of agencies surveyed update information automatically from a database and one-quarter use PDF files generated from files used to print their schedules.

Because of a lack of automation, schedule information must often be assembled and formatted manually. Nearly one-half of agencies surveyed put together schedule information manually. This process can involve an extensive amount of work for agency staff, particularly for agencies with scores of routes and separate schedules for weekdays, Saturdays, and Sundays. The scale of the task can make it difficult or impossible to keep up-to-date schedule information on the Internet.

The second challenge involves the volume of information in a given schedule. Schedules for bus and train routes with a large number of timepoints and many runs can be too large to fit on a computer screen. If the schedule is formatted as one large matrix, users will need to scroll vertically and perhaps horizontally, in the process losing key header information.

Different formatting options can help to overcome these challenges. The two basic formatting options are html (text) pages and PDF files. Three-fifths of survey respondents



Tri-Met 5 Interstate Weekdays to Jantzen Beach or Vancouver - Netscape

File Edit View Go Communicator Help

Bookmarks Location: http://www.tri-met.org/schedule/w/t1005_0.htm

Tri-Met 5 Interstate -- Weekdays -- to Jantzen Beach or Vancouver

Connections	Notes->	--	--	--	--	--	later-> --
SW 6th & College		4:59A	5:14A	5:29A	5:47A	6:02A	6:17A
SW 6th & Salmon		5:02A	5:17A	5:32A	5:50A	6:05A	6:20A
Rose Quarter Transit Center		5:10A	5:25A	5:40A	5:58A	6:14A	6:29A
Interstate & Killingsworth		5:17A	5:32A	5:47A	6:06A	6:22A	6:37A
Interstate & Lombard		5:21A	5:36A	5:51A	6:10A	6:26A	6:41A
Jantzen Beach Center		5:27A	5:42A	5:57A	6:16A	6:33A	6:48A
7th St Transit Center Vancouve		5:33A	5:48A	6:03A	6:23A	6:40A	6:55A

Tri-Met 5 Interstate -- Weekdays -- to Jantzen Beach or Vancouver

Connections	Notes->	<-earlier --	--	--	--	--	later-> --
SW 6th & College		6:32A	6:47A	7:02A	7:17A	7:31A	7:46A
SW 6th & Salmon		6:35A	6:50A	7:05A	7:20A	7:35A	7:50A
Rose Quarter Transit Center		6:44A	6:59A	7:14A	7:29A	7:45A	8:00A
Interstate & Killingsworth		6:52A	7:09A	7:24A	7:39A	7:55A	8:10A
Interstate & Lombard		6:56A	7:13A	7:28A	7:43A	8:00A	8:15A
Jantzen Beach Center		7:03A	7:20A	7:35A	7:50A	8:07A	8:22A
7th St Transit Center Vancouve		7:10A	7:27A	7:42A	7:57A	8:14A	8:29A

Tri-Met 5 Interstate -- Weekdays -- to Jantzen Beach or Vancouver

Document: Done

FIGURE 11 Tri-Met's (Portland, Oregon) schedules are displayed in html page, with timepoints along the left margin.

format schedule information on html pages; 23 percent use PDF files, and 16 percent offer both html and PDF formats.

Although they have the limitations discussed earlier, PDF files sometimes enable agencies to fit schedule matrixes on a printable page. PDF files are particularly attractive when the marketing or graphics department that generates published timetables can save the version used for printed schedules in a PDF format. This reduces the web staff's workload and ensures consistency between printed and Internet versions.

As noted, most agencies offer schedules on html pages. Html is more widely available to customers and more readily used. To prevent the schedule from overflowing the computer screen some agencies divide each schedule into several sections, each suitable for screen viewing and printing. Tri-Met in Portland, Oregon, and the Southeastern Pennsylvania Transportation Authority in Philadelphia (SEPTA) have taken this approach (Figures 11 and 12). Some agencies, such as the BART District, provide a screen-readable schedule on one html page and a separate version formatted for printing.

Whether in PDF or html format, accessibility of schedules for people with disabilities can be a significant issue. Screen readers read across the page, reading the first line followed by second line, etc. Where timepoints are in a header across the top, the html page may be accessible in theory but not in practice; by the time the reader reaches the desired line of times, the timepoints would be forgotten.

One solution to this problem is to turn the page so that timepoints are listed along the left column. The screen reader reads all bus arrival times at that timepoint; for example, "SW 6th & Broadway . . . 6:11A . . . 6:31A . . . 6:46A . . . 7:01A . . . 7:16A . . . 7:30A." This approach also permits longer, less cryptic descriptions of each timepoint.

Another solution is to use "TH" tags in html code or generate PDF files using Acrobat 5.0 tags. Proper coding enables screen readers to interpret headers comprehensively for the listener.

MAPS

As with schedules, maps offer the challenge of depicting a large volume of information in readable, printable formats. Approaches tend to differ for the two types of maps: route maps and system maps.

Route maps are by definition smaller than system maps and can usually be provided in conjunction with the schedule for that route, either on the same html page or on a separate page that is linked to the schedule. Route maps are often included as part of PDF files when such files are used to provide schedules. Whether using html or PDF formats,

SEPTA Transit Schedule: Route 3 - Netscape

File Edit View Go Communicator Help

Bookmarks Location: http://www.septa.org/schedule.cgi?route=3&day=1

STOPS	AM	AM	AM	AM	AM	AM	AM	AM	AM
Frankford Transportation Center	8.50	9.05	9.20	9.35	9.50	10.05	10.20	10.35	10.50
Kensington and Allegheny Avs	9.06	9.22	9.37	9.52	10.07	10.22	10.37	10.52	11.07
FRONT DAUPHIN	9.15	9.31	9.46	10.01	10.16	10.31	10.46	11.01	11.16
Broad St and Cecil B. Moore Blvd	9.27	9.43	9.58	10.13	10.28	10.43	10.58	11.13	11.28
20th & Cecil B. Moore Blvd	9.31	9.47	10.02	10.17	10.32	10.47	11.02	11.17	11.32
33rd St and Cecil B. Moore Blvd	9.41	9.57	10.12	10.27	10.42	10.57	11.12	11.27	11.42
	AM	AM	AM	AM	AM	AM	AM	AM	AM

Document: Done

FIGURE 12 SEPTA's (Philadelphia) schedules are displayed in html page, easily readable on screen or printed.

SF Muni: Maps - Netscape

File Edit View Go Communicator Help

Bookmarks Location: http://www.transitinfo.org/cgi-bin/muni/map/system

DOWN LOAD

Click on the map to zoom in

Document: Done

FIGURE 13 San Francisco's Muni provides zoomable maps, which can also be downloaded as PDF or GIF files.

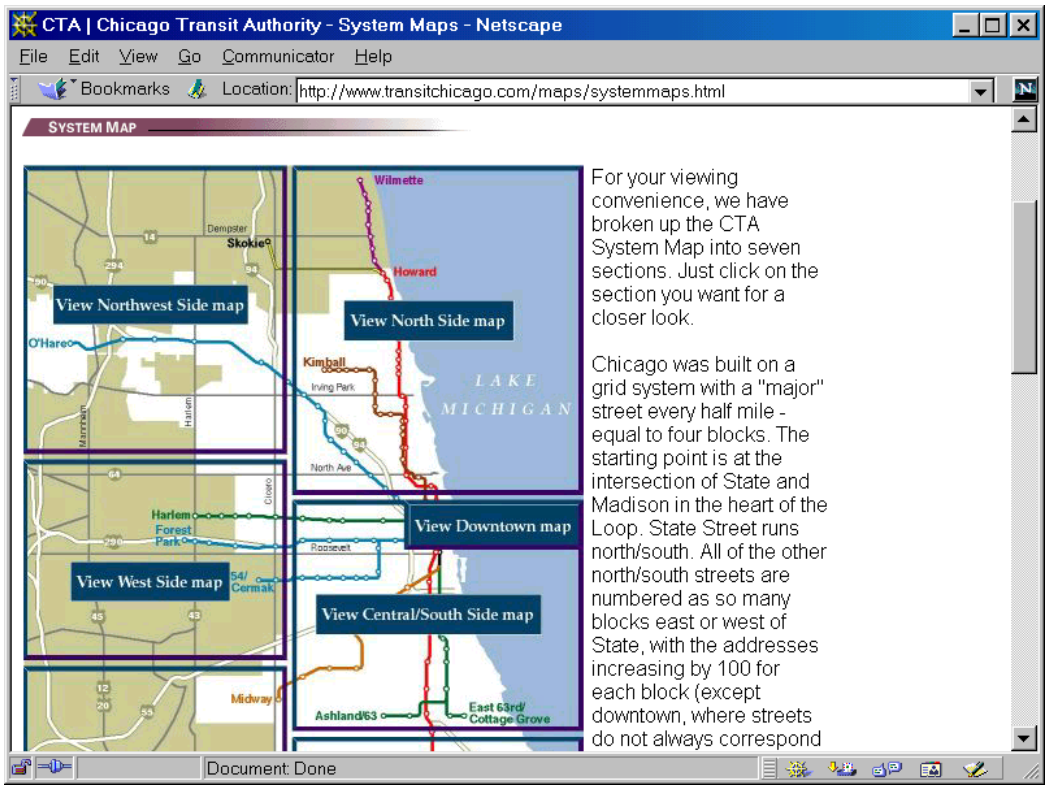


FIGURE 14 The Chicago Transit Authority breaks its system map into six sections, each readable on-screen or when printed.

text descriptions of routes can provide accessibility for people with disabilities.

Eighty-seven percent of transit agencies surveyed provide route maps on the Internet. This includes 41 percent that use html pages only, 28 percent that use PDF files only, and 19 percent that use both html and PDF (13 percent do not offer route maps). Formats used for system maps are similar: 34 percent use html only, 25 percent use PDF only, and 22 percent use both (13 percent do not offer a system map).

Unlike route maps, system maps are usually too large to print. For example, Houston Metro's system map is designed for printing at 34.2 in. × 23.7 in. and New York City Transit's Brooklyn bus map is approximately 21 in. × 21 in. Although neither can be printed, users can view sections of these maps on-screen using Acrobat Reader.

Many agencies provide zoomable maps in an attempt to preserve detail and ensure printability. With zoomable maps, users view the entire system on their screen and then click on the part of the map of interest to see an enlarged version of that section. The selected section can also be printed if desired. Users could also print out several enlarged sections and piece together a fairly large map with sufficient detail for trip planning.

San Francisco's Muni and the CTA provide zoomable maps (Figures 13 and 14). Muni also offers a downtown section in a PDF file.

The MARTA combines html and PDF files in an interesting way. An overview map showing major highways overlaid on a grid is provided on an html page. Users can click on a particular cell on the grid to view a very detailed PDF file showing major streets, bus and rail routes, bus stops, and rail stations. The map can be viewed on-screen or printed. Each PDF file fits on an 8½ × 11 in. page.

System maps are rarely if ever accessible to people with disabilities. The information on a system map cannot be converted to a text description. Transit agencies can instead provide a non-Internet alternative such as a Braille map available through the mail.

CHAPTER SEVEN

NEXT DIRECTIONS FOR TRANSIT WEBSITES

In addition to providing basic service information, transit websites are striking out in several relatively new directions. These include providing trip itinerary planners, which are currently offered at a number of sites and under development at others. Other new services include customized e-mail messages, e-commerce, and wireless capabilities. This chapter reviews the state of practice in each area based on the survey responses.

TRIP PLANNERS

Although maps and schedules are quite useful for trip planning and wayfinding purposes, customer feedback to web managers has shown that many customers want trip planners, routing, schedule, and fare information tailored to their specific trips on transit websites.

Trip planners are a big undertaking. Data collection and updating, software for route selection, user interface, and accessibility for people with disabilities pose a variety of challenges. Among agencies surveyed, 13 percent currently have a full trip planner on the website provided by the transit agency itself. Agencies with in-house trip planners include Tri-Met in Portland, Oregon; the Regional Transit District in Denver; the LACMTA; New Jersey Transit; and the SEPTA in Philadelphia.

The sites of an additional 19 percent of survey respondents link to a trip planner provided by another agency (typically a regional transit provider or regional planning agency). These regional agencies include the Regional Transportation Authority in Chicago (Figure 15); the San Diego Metropolitan Transit System; and the Metropolitan Transportation Commission in the San Francisco area.

One-half of the agencies surveyed are either working on a trip planner or in the planning stages. The remaining one in five agencies have no plans to add a trip planner.

The development process is shaped by a number of factors, including the size of the agency's operations, integration with transit services offered by other transit properties, and the level of sophistication of trip information systems already in use by customer assistance centers. Formulating a trip planner from scratch is a very extensive and expensive undertaking. Piggybacking on other efforts such as upgrades for customer service call center route information programs eases the task. One web manager commented that his agency's trip planner would be "a by-product of the CIS (Customer Information System) and Scheduling as Dispatch System that are currently being implemented. The cost to add the information to the web is minimal." Another manager commented that, "The cost will be limited to data extraction from the scheduling database into a format acceptable to the trip planning database—[these are basically] system interface costs."

Not surprisingly, given the many factors involved, the estimated cost of developing a trip planner varies widely. Among agencies that have developed or at the time of the survey were in the process of developing a trip planner, estimated costs ranged from $75,000 to $1.3 million. Mid-size agencies estimated costs of $75,000 to $150,000. Two large agencies with both rail and bus service covering a large area, estimated costs of $400,000 and $1.3 million. The ongoing costs of updating and tweaking the trip planners are in addition to these development costs.

REAL-TIME INFORMATION

Distribution of real-time information is one of the most promising areas for website development. Real-time information can help reduce customers' uncertainty about the reliability of travel times and thus make transit a more attractive transportation option.

A number of agencies have begun to present real-time information on their sites; for example

- New Jersey Transit posts travel advisories that include changes to schedules, construction notices, and service adjustments including elevator closures. (See http://www.njtransit.com/ta_advisorynotices.jsp)
- Tri-Met in Portland, Oregon, updates a list of detours throughout the day, as needed. (See http://www.tri-met.org/update/)

The ability to distribute updated information through the Internet proved especially useful as transit agencies responded to the September 11, 2001, attacks on the World Trade Center in New York and the Pentagon in northern Virginia. Washington Metro used its website as a primary source of customer information during an unprecedented situation when the Metro system operated orderly, back-to-back, rush hour service as Washington D.C. was evacuated. Throughout that and succeeding days, the website provided

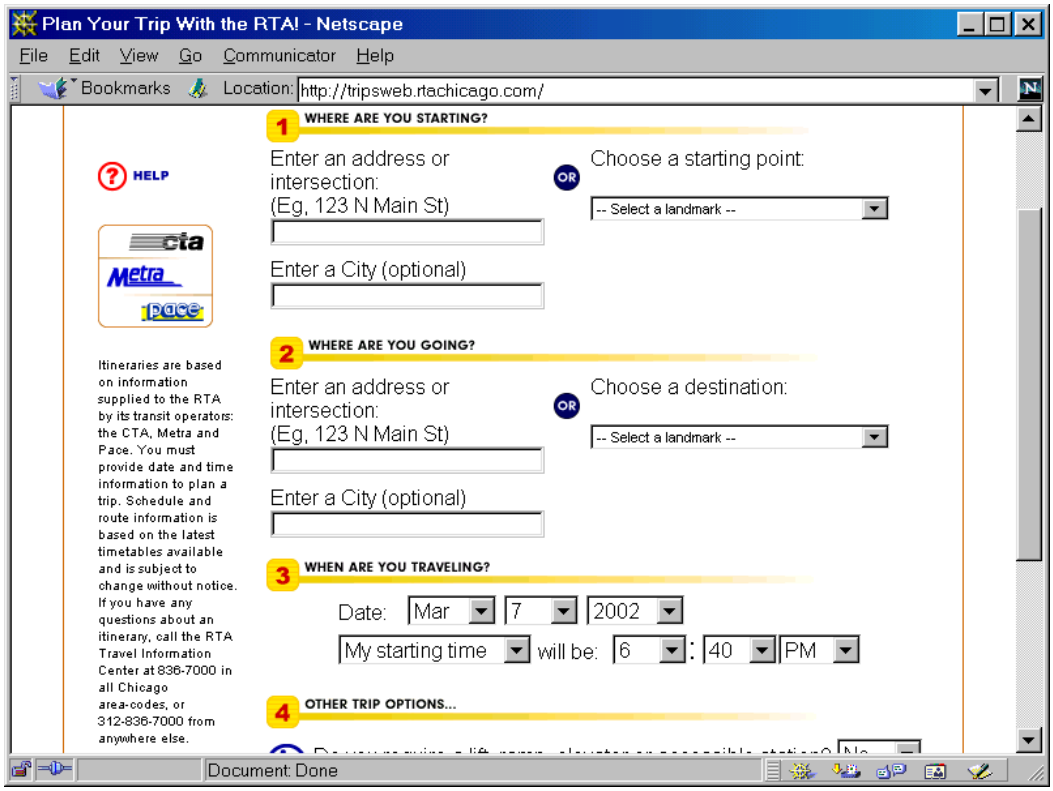


FIGURE 15 Trip planner for the Regional Transit Authority (Chicago area).

immediate information as Metro stations were closed and Metrobus service was rerouted. With around-the-clock staffing, Metro website staff continuously updated information about Metro service and the availability of emergency park-and-ride locations, which was provided to allow more people to use transit during a time when many major roadways were shut down.

In New York, the attacks necessitated repeated alterations to bus and subway service as lines and stations were closed and then gradually reopened. The Metropolitan Transportation Authority posted revised maps of the entire subway system and the affected downtown area as well as revised Manhattan bus maps.

CUSTOMER E-MAIL LISTS

Commercial websites are increasingly focused on building relationships with customers. Customer relationships are likened to "an ongoing conversation between the customer and the brand" (Cannon 2000). This ongoing conversation helps to move consumers through the sales process to become customers, and to turn customers into loyal, long-term buyers.

The goal of using websites to build customer relationships is beginning to percolate in the minds of transit web managers. One-third of web managers want to make their sites "more interactive" in the next redesign (see Table 8 in chapter 2).

One method of building customer relationships is to send customers regular e-mails tailored to their information needs. Currently, 38 percent of agencies surveyed maintain lists for regular e-mail mailings. Three of these agencies e-mail to specific audiences such as large employers, senior housing centers, and potential bidders. The remaining eight agencies e-mail customers a variety of information including

- Notice of planned service diversions, construction, etc. (seven of the eight agencies);
- Notice of permanent route changes and/or other service changes (six of the eight agencies);
- Updated schedules (four of the eight agencies); and
- Real-time information about service delays or problems (three of the eight agencies).

New Jersey Transit recently introduced a service that alerts customers of schedule updates, service advisories, construction notifications, parking information, promotions, and a customer newsletter. Alerts are sent to customers via e-mail, cell phone, or pager.

E-mails can be sent on a regular basis, such as biweekly or when schedules change. They can also be sent in

near real-time to communicate service disruption information. E-mails have also been used to enlist customer participation at public meetings. The CTA enlisted participants in a smart card pilot program by means of e-mail.

Most e-mail services began within the past 2 years. The number of customers who have signed up to receive e-mails ranges from 150 to 7,000, with a median of approximately 1,000. Several agencies report that their e-mail lists are growing rapidly.

E-COMMERCE

E-commerce is another promising development that might build customer relationships as well as save on operating costs in other areas. Three-quarters of agencies surveyed currently offer some type of store or sales capabilities on their sites. This includes 47 percent of agencies that sell tickets, passes, or farecards by mail; 15 percent that sell other items through the website; and 12 percent that sell both fare media and other types of items.

Sales of fare media range from a few hundred annually to several thousand. In dollar terms, one large agency takes in $28,000 monthly and another realizes $40,000 each month. Several agencies commented that their e-commerce efforts are in their infancy. Sales are growing rapidly at some agencies even though there has been little promotion because staff is still working out the kinks. E-commerce requires that agencies set up not only the "front-end" web site but also the "back-end" fulfillment to ensure timely delivery of orders. A possible future step is to eliminate fulfillment by delivering as well as selling fare media through the Internet. Development of smart cards as fare media holds the promise of downloading fare value automatically to customers at their homes. This would eliminate customers having to wait for the mails and would eliminate mailing costs for agencies. Possible smart card integration is an example of the importance of coordinating new agency programs with the agency's Internet efforts.

WIRELESS CAPABILITIES

The next step toward making information readily available is to enable customers to access information from websites wirelessly. Instead of needing to pre-plan a trip, customers could find out schedule and perhaps delay information on the fly, in real-time.

Five agencies reported that schedules are currently available in a form that can be downloaded to PDAs including the Utah Transit Authority, Salt Lake City; CTA; Santa Clara (Calif.) Valley Transportation Authority; and Tri-Met in Portland, Oregon. In addition, the Regional Transit District in Denver offers real-time information in a form downloadable to PDAs. The New Jersey Transit service mentioned earlier can send messages to cell phones and pagers. Staff at four other agencies surveyed expressed interest in adding wireless capabilities as they develop their sites.

CHAPTER EIGHT

ADMINISTRATION, PROMOTION, AND COST

This chapter covers topics related to administration and management. To whom are design and hosting responsibilities assigned? Are they performed in-house or outsourced? How is the Internet effort organized internally? What are the respective roles of marketing and information technology divisions? How are sites tested? How are sites marketed? What are the legal issues and requirements? How much does the website cost?

DESIGN AND HOSTING

Transit agencies may use agency staff, outside vendors, other public agencies, or some combination of these for website design, maintenance, and hosting. One-quarter of the agencies perform these functions internally and 31 percent use outside vendors exclusively. The remainder use a combination of in-house staff and outside vendors.

Design and Hosting: In-House Versus Outsourcing

The decision about whether to outsource the design function is usually based on criteria of effectiveness, expertise, cost, and availability of in-house staff. Agencies using in-house staff usually cite cost considerations and effectiveness. They feel that the agency staff's design capabilities and their familiarity with transit make in-house staff the more effective choice. Agencies that outsource design usually cite inadequate in-house staffing as well as expertise and effectiveness (Table 16). Smaller agencies in particular feel that the necessary expertise is best obtained by outsourcing.

Approximately two-thirds of agencies surveyed use outside companies to host their sites, whereas one-third host internally. Hosting arrangements tend to differ by agency size; larger agencies have the equipment and staffing to host the site internally.

Agencies using outside companies cite the need for expertise, lack of staff time, the need for 24/7 service, and security concerns as the main reasons for contracting out the hosting function. A few also feel that contracting out is less expensive. Agencies hosting their sites in-house cite most of the same factors, with cost given more emphasis (Table 17).

Agencies considering outsourcing of web responsibilities need to carefully review the experience and qualifications of potential vendors. Agency staffs who have been through this process cite a number of important areas for questioning potential vendors.

- Familiarity with transit;
- Financial stability;
- Ability to integrate with marketing and promotional programs;
- Frequency of backing up the server;
- Turnaround time if the site or server goes down;
- Provisions for site security;
- Load times for web pages;
- Browser compatibility, particularly with older browsers and the impact of using technologies such as Flash and Java scripts;
- Ability to make the site accessible to people with disabilities;
- Overall cost;
- Minimum charges for particular tasks;
- Ability of agency staff to update information (saving cost and time); and
- Ownership of intellectual property created during site development.

TABLE 16
REASONS CITED FOR DESIGNING IN-HOUSE AND WITH OUTSIDE VENDOR

Reasons	No. of Respondents			
	In-house	Outside vendor	In-house (%)	Outside vendor (%)
Less expensive	11	1	69	9
Expertise available in-house/outside only	9	7	56	64
More effective for good result	12	7	75	64
Time not available by in-house staff	0	8	0	73
Contracting for outsourcing difficult or time consuming	4	0	25	0
Number responding	16	11		

TABLE 17
PRIMARY REASONS FOR IN-HOUSE VERSUS OUTSOURCING HOSTING

Reasons	No. of Respondents			
	In-house	Out-sourced	In-house (%)	Out-sourced (%)
Less expensive	7	4	70	22
Expertise available in-house/outside only	6	12	60	67
Need 24/7 service	5	8	50	44
Security issues	6	8	60	44
Time not available by in-house staff	0	12	0	67
Contracting for outsourcing difficult or time consuming	1	0	10	0
Number responding	10	18		

TABLE 18
HOW OFTEN SITE IS UPDATED

Update Frequency	Size of Agency (no. of buses and rail cars)				
	0–99 (%)	100–499 (%)	500–999 (%)	1,000+ (%)	Total (%)
Daily including weekends/holidays	0	10	25	50	15
Daily, weekdays only	0	50	25	50	26
2–4 times a week	8	10	25	0	12
About once a week	17	10	13	0	12
Between once a week and once a month	33	10	13	0	18
Less than once a month	42	10	0	0	18
Grand total	100	100	100	100	100
Number responding	12	10	8	4	34

Other public agencies in the area can be a good source for recommendations. It is also advisable to look at the sites a potential vendor has designed.

Some agencies assign web design to their advertising agency, which facilitates coordination between the marketing program and website and ensures that the vendor knows the agency.

Updating Site Contents

Agency staffs are likely to update content internally, even where design and hosting functions are performed externally. In-house updating is considered faster, cheaper, and often easier, because the information is generated internally regardless of responsibilities for Internet functions. Approximately one-half the agencies that use outside vendors for design work update the information themselves. Most of the other half share updating responsibilities with the vendor that designs the site.

Frequency of updating runs the gamut from less than once a month to daily updates including weekends. Table 18 shows that larger agencies generally update their sites more frequently.

Usability Testing

The research found two agencies that have conducted formal usability testing with customers. GO Transit in Toronto, Canada, conducted usability tests with customers who had agreed to participate in market research activities. Each participant was presented with a scenario of data to retrieve and asked to describe aloud their thought process in locating the information. GO Transit staff found that "even with a small sample of 6 to 8 people, there was a high level of consistency in the findings." The usability testing produced several adjustments in the design of the agency's website (Wyatt and Luk 1999).

The LIRR conducted usability testing as part of the development of the Mail&Ride section of its site. Participants included six users and six nonusers of the LIRR Mail&Ride program. Recommendations were made to improve and enhance the user-friendliness and overall aesthetic appeal of the site (Global Strategy Group, Inc. 2001).

ORGANIZATIONAL AND SYSTEMS INTEGRATION ISSUES

Transit agencies face a number of issues when deciding how to organize their Internet efforts. These include setting divisional responsibilities and integrating the website with other business processes and information systems.

Organizational Assignments

The most basic issue concerns how to assign responsibility for different aspects of site design, hosting, and maintenance. As a rule, the technical aspects of hosting the site

are the responsibility of either outside vendors or the information technology (IT) or management information systems (MIS) division. Approximately one-half of the agencies surveyed also give the IT/MIS division responsibility for site design and content. Conversely, the marketing division has responsibility for design and content in the other one-half of agencies surveyed. In a few instances, marketing and IT/MIS staffs share design responsibilities.

The professional background of the agency manager responsible for website planning, management, and design reflects the split in responsibilities between marketing and IT/MIS divisions. One-third of the web managers surveyed have an IT/MIS background, whereas nearly one-half have a marketing background (Table 19). Other backgrounds include library and information science, communications, multimedia programming operations and management, and planning.

TABLE 19
WEB MANAGER'S PROFESSIONAL BACKGROUND

Primary Professional Background	No.	Percent
Marketing	14	44
IT/MIS	10	31
Web design (transit)	3	9
Web design (non-transit)	2	6
Customer service	2	6
Other	10	31

Notes: Number of respondents: 32; IT = information technology; MIS = management information systems.

Interdepartmental Communications and Systems Integration

Regardless of an agency's choice of organizational structure, the Internet effort requires good communication and cooperation between departments. Typically, a number of different departments ranging from schedules to human resources provide content for the website. Managing relationships with these various departments and obtaining timely, accurate information can be a major challenge for website managers. Marketing and IT/MIS departments must also coordinate closely with each other to ensure smooth running of the site and to achieve a consistent presentation of agency identity and information across electronic and print platforms. Written policies for all aspects of web management aid this coordination.

These internal relationships will become only more critical with greater integration of the Internet into agency business practices. There tends to be little such integration during the initial development of websites. Instead, website managers and technical staff deal with the web as an add-on to established routines, so that bus and rail schedules must be converted to PDF or html formats and IT hosts the site separately from the Intranet and other information systems and applications.

As agency websites become more established and more ambitious, this sort of after-market approach to handling information for the website becomes very inefficient and burdensome. Some information such as real-time service updates cannot be handled in this fashion except, possibly, in emergency situations. At this point, transit staff begin to recognize that the website must be fully integrated with business processes involving production of schedules, trip planning software development, handling of real-time service information, and the flow of employment information, procurement information, sales of fare media, etc. Systems integration and automation become recognized as critical to delivering timely, accurate information on the Internet.

The good news is that all of this is quite doable, particularly over time. The challenge, however, is that integrating the web into business processes means that the website is no longer an independent effort. Decisions about application software, hardware requirements, and staff priorities can create conflict. These conflicts need to be resolved for the website to rise to a new, higher level of capability.

Intranet Integration

One-third of survey respondents integrate their Internet and Intranet sites. This integration takes several forms.

- Staff revise Internet content on the agency Intranet; content is then uploaded to the website.
- The Intranet is used to automatically post press releases, job postings, and bid postings to the website.
- Staff are given access to the Internet through the Intranet, which links to the website.

PROMOTION AND MARKETING INTEGRATION

Website promotion tends to be integrated into other marketing and customer information activities. Most agencies put the website URL on all publications and press releases. Approximately one-half the agencies in the survey have used out-of-system advertising such as newspaper advertisements, used in-system advertising such as car cards, or put the URL on the exterior of buses and/or trains (Table 20).

Some agencies have advertised the site during special events or other promotions including promotional contests; publicity at county fairs, July 4 fireworks displays, and community events; distribution of free t-shirts; placing the URL at the footer of e-mail; and advertising on local websites.

Agencies may closely integrate marketing campaigns with new website designs. Washington Metro, for example,

TABLE 20
SITE PROMOTION

Promotion	No.	Percent
URL on all publications	28	88
Press releases	25	78
Out-of-system advertising (e.g., newspapers)	20	63
URL on exterior of buses and/or trains	18	56
In-system advertising (e.g., car cards)	17	53
Special events	11	34
Other	12	38

Note: Number of respondents: 32.

revamped the site's design, added features, and created a new URL (www.metroopensdoors.com) to highlight the theme of the agency's new advertising campaign. The new URL opens to a splash page that leads into www.wmata.com, which can also be accessed directly.

Another area related to marketing is the domain name. Transit agencies have steadily moved toward using easily recalled domain names, which are officially called uniform resource locators (URLs). The simplest approach is to use the agency's name; e.g., www.sfmuni.com for San Francisco Muni or www.dart. org for DART. A slightly different approach is to encourage ridership within the name; e.g., www.ridemetro.org (Houston Metro) or www.ridetherapid. org (Grand Rapids, Michigan). Some agencies have integrated their name into the marketing program; e.g., www.ridegold.com (Pittsburgh Port Authority Transit) or http://www.metroopensdoors. com (Washington Metro).

Use of a memorable name can be important for customers wishing to visit the site. An agency that used the form www.agencyname.city.state.us found that 76 percent of customers polled in a telephone survey said this name was not easy to remember, whereas the same percentage said that the form www.agencyname.com would be easy to remember.

ACCESSIBILITY REQUIREMENTS AND LEGAL NOTICES

Although all transit agencies participating in this study indicated a desire to provide accessibility of their website information to people with disabilities, there has been some uncertainty as to whether transit agencies are required to under federal law. Of note, therefore, is the opinion of the Civil Rights Division of the U.S. Department of Justice that "covered entities" under the Americans With Disabilities Act must either provide accessible web pages or "offer other alternative accessible formats" (U.S. Department of Justice 1996.)

Another set of legal issues concerns privacy policies, copyright of the site contents, trademarks, and general disclaimers. Privacy policies are essential for any site that collects information from users such as e-mail addresses, information for carpool matching, or through cookies used to track usage. Legal notices on Tri-Met's site illustrate a straightforward approach to this issue (see: http://www.trimet.org/copyright.htm).

COSTS

The cost of website design, hosting, and maintenance varies widely across transit agencies. Generally speaking, larger agencies spend more on their websites than smaller agencies, in part, because the websites of larger agencies tend to have more features. In addition, the task of design and updating is greater and consumes more resources for agencies with a larger number of bus and train routes. Larger agencies also tend to update their sites more often.

Table 21 shows the range of resources used by agencies of different sizes. Agencies are grouped by the number of full-time staff (or equivalent) devoted to the website. Staffing ranges from two or three full-time staff at very large agencies to a small fraction of a staff person's time at small agencies. The expense of vendors and consultants may add to the overall costs.

TABLE 21
SUMMARY OF COST AND ADMINISTRATION OF WEBSITES

Agency Size	No. of Buses	No. of Rail Cars	Website Administration	Staffing	Vendors/ Consultants	Updating	Visitor Sessions (monthly)
Very large	200–1,500	33–1,000	Primarily internal hosting, design, and updating, although some exceptions	2–3 full-time	$0–$300,000	Daily, may include weekends	50,000 and up
Large	100–1,000	25–50	Primarily internal hosting, design, and updating, although some exceptions	1 full-time	$0–$20,000	1–4 times a week	10,000–70,000
Medium	30–50	0	Hosted externally; design and updating externally, internally, or a mix	1 part-time	$0–$20,000	Once a week to once a month	No information available
Small	15–100	0	Hosted externally; design and updating externally, internally, or a mix	¼ part-time or less	$1,000–$5,000	Once a week to once a month	200–6,000

CHAPTER NINE

CONCLUSIONS AND FURTHER RESEARCH

The Internet offers a relatively inexpensive and widely accessible channel for transit agencies to distribute information to current and potential customers, employees, vendors, and other stakeholders. Transit agencies can keep schedule, map, fare, and other information up-to-date and instantly available, and also distribute real-time information that would not otherwise be available to transit users. Information on the Internet is available both during business hours and during non-business hours when offices and telephone information centers are closed, thus allowing customers to visit sites and retrieve information at times of their own convenience. The Internet also provides better accessibility for people with disabilities than printed publications.

These capabilities can provide manifold benefits to transit agencies. By making bus and rail services easier to use, transit agencies can spur an increase in ridership. With a majority of Americans having Internet access, transit sites can reach varied audiences—from tech-savvy travelers who might not otherwise consider using buses or trains to low-income customers. Websites can also help polish the community image of transit agencies and demonstrate that transit is up-to-date.

Transit websites have grown and matured into extensive and sophisticated tools for trip planning and many other uses. There is much to learn from this experience that can aid transit agency staff in planning and designing their websites.

This section distills study findings and the insights of website managers who have recounted their "lessons learned" and biggest surprises in website development. The bulleted lists that follow highlight and summarize the key considerations for transit sites given the type of information transit sites offer, their audiences, and the current state of the practice.

General Planning and Expectations

- *Be prepared for high customer expectations for the information on the site*—Site visitors are planning to use the information to make trips; they want accurate, up-to-date, and complete information.
- *Focus on ease of use*—Visitors want to find basic service information easily and quickly. Creating a fast, navigable site requires much work and maintaining it is even more work. Internet users are rarely patient, however, so making popular information easily accessible is just as important as having the information on the site in the first place. Put a premium on ease of use.
- *Be prepared for feedback*—The Internet is a two-way medium. Think carefully about where you want visitors to send you comments on the website, complaints about service, and requests for information. Design links to e-mail addresses accordingly and prevent your general manager from being inundated with complaints.
- *Proceed at a pace that you can handle*—Do not put so much information on the Internet that you cannot keep it updated. Do not invite feedback that you cannot handle properly.
- *Address accessibility issues and do so early in the design process*—People with disabilities are an important and often vocal constituent of transit agencies. Many agencies have worked successfully to meet their needs. Sites can be designed to be accessible without a great deal of additional work, provided that accessibility needs are taken into account up front.
- *Plan for systems integration and automation*—Business processes involving production of schedules, development of trip planning software, handling of real-time service information, the flow of employment and procurement information, sales of fare media, etc., need to be designed to meet the needs of webmasters as well as other departments within the agency. Information processing should be automated as much as possible. Information should be converted into formats suitable for uploading onto websites. These steps are critical to providing accurate, comprehensive, and timely information.

Priorities for Site Content

- *First priority: maps, schedules, and fare information*—These are the most basic and most frequently used pages of any transit website. Make sure that maps, schedules, and fare information are complete, accurate, and up-to-date, and that they can be viewed on screen and also printed onto standard 8½ by 11-in. paper.
- *Also, provide at least basic information on other popular topics*—These topics could include "about the agency," "how to ride," employment and procurement information, and agency news including plans for major service expansions. Such topics are

more important to website visitors than any other topics aside from maps, schedules, and fares.

- *The next big thing: (1) trip planners*—Visitors want transit sites to help them plan their trips. Ideally, develop a trip itinerary planner. Trip planners provide customers with routing and schedule information tailored to their specific needs. Trip planners are a major and costly undertaking, however, and can be beyond the resources of many mid-size and smaller agencies. As a second-best solution, provide place directories that list key destinations and the transit routes that serve them.
- *The next big thing: (2) real-time service information*—Service reliability is just as important to customers as the speed and comfort of their trips. Real-time service information helps customers avoid the frustration and inconvenience of delays. Also, consider merging real-time information with *e-mail notifications* targeted to users who travel on routes experiencing delays.
- *Other new features*—Several other potential features show promise, including customer e-mail alerts, e-commerce, wireless downloads, and mobile services, although they are still in their infancy.

Audience Needs

- *Design for the different audiences that will visit your site*—Provide customers who know what schedule or map they want with a quick and easy path to this information. Provide others with guidance through system maps, place directories, etc. Plan specifically for the needs of customer segments such as visitors, students, disabled persons, and people planning to move to your community. Provide easily located links to the type of information these groups want. Visitors, for example, are likely to want travel information for coming from the airport, for reaching hotels, and for attending special events. Links to these specific topics are easier to navigate than a list of route maps. Similarly, disabled persons need specific information about accessible buses and trains, paratransit services, etc. New residents may want to search for neighborhoods or housing developments close to transit services.

Marketing and Promotion

- *Use an easy-to-recall domain name*—Ridemetro.com is easier to remember than rta.city.state.us.
- *Make your domain name ubiquitous*—Put the URL on all maps, schedules, brochures, letterhead, and other documents and on your buses, rail cars, and paratransit vans.
- *Spur usage through advertising*—Advertise specific features of the site such as availability of updated schedules, trip planners, employment listings, public information, etc. Customers are looking for information; tell them what they can find on your website.
- *Target particular audiences*—Effective promotion can also involve targeting the needs of particular audiences such as occasional riders, visitors, and new residents. What are their specific information needs? How can they find information quickly and easily on the site?

Design Parameters

- *Design for client-side technology*—Transit websites should be designed for users with a 56k modem, 800 × 600 screen resolution, and 4.x browser. The sites should also work with 28k modems and 3.x browsers, which lack Java scripting and style sheets.
- *Design for accessibility for people with disabilities*—Pages should be accessible to screen readers or separate text-only pages should be provided.

Home Page Design

- *Make the home page an effective gateway to the site*—Links for schedules, maps, and fare information should be prominently displayed across the top of the page or along the right or left margins. Schedules, maps, and fare information should be accessible either directly from the home page or within one to three clicks of the home page. Other links should include sufficient specificity to clearly indicate the contents accessible through the link. Use of menus that pop up when the mouse is rolled over the link can be helpful in this regard.
- *Design for ease of use*—Carefully consider the cost of snazzy "looks" in download times. More graphics means slower downloads. Remember that visitors are at the site primarily to find specific information. Your site will reflect positively on your agency and its services if it combines easy navigation, quick responsiveness, and a good appearance.

Design of Inside Pages

- *Use consistent links*—Each inside page should use the same navigation links as the home page.
- *Make information available on html pages*—If possible, offer schedule and other information on html pages instead of or in addition to PDF files. However the information is offered, it should print legibly on standard 8½ × 11-in. paper. When used, PDF files should be tagged for screen readers.
- *Provide maps effectively*—Provide route maps for each route, either with the schedule or on a separate

page. Provide system maps on html pages either in a zoomable format or in sections that can be viewed on screen and printed. If PDF files are used for maps, provide PDF files that can be printed on standard 8½ × 11-in. paper.

- *Avoid pages that require extensive scrolling*—If scrolling is necessary, place links at the top of the page that skip down to each section. The top of the page "above the fold" should show information relevant to the purpose of the page. For example, a page about schedules should be clearly defined as such without any scrolling.

Testing the Site and Monitoring Usage

- *Test your site with real-life customers*—Even a minimal amount of testing can be valuable; much insight can be gained from a three- or four-person convenience sample (i.e., whoever is around and willing). Numerous design books provide the basic "how to" needed to conduct usability testing. You will find yourself thinking about your site's information and its usability and navigability more intelligently and concretely after you test the site.
- *Analyze usage patterns*—Which parts of the site are receiving the most page views? How easily are those pages reached on the site? Are you allocating your time and resources appropriately given the interests and priorities of visitors?
- *Use of cookies*—Consider using cookies to monitor usage more accurately. If you use cookies, be sure to include a privacy policy on your site.

Transit agencies' decisions on web development have been based primarily on the agency staff's marketing and information technology experience, experience with the website, and informal user feedback. This approach has proven to be expeditious and fruitful, yet it leaves important questions unanswered. Fully using the Internet's potential will require additional research, particularly for successful development of complex areas such as e-commerce.

Specific areas for additional research are:

- *Usability testing among representative cross sections of current and potential transit riders*—This research should focus on the design of common features of websites, such as schedules, maps, fares, ticket sales, trip planner (if available), "how to ride" pages, events, service diversions, employment, etc. Such research would demonstrate which types of design are most effective and easiest to use and would be of interest to virtually every transit agency with a website. The research could also explore the impact of down load times on site usability and the potential of websites to help increase ridership among customers and attract new riders. This research should be conducted with both disabled and able-bodied persons. Respondents could view the website(s) of local transit agencies as well as of out-of-town sites for cities that they might visit.
- *New features and capabilities such as e-commerce, interactive services (e.g., e-mails), trip planners, mobile services, and provision of real-time information*—These areas are important individually and for the ways they may be combined—for example, delivering real-time information through e-mails to personal computer's or mobile devices. Research could show how best to proceed in these complex and challenging areas. Research on trip planners might include "second best" options for agencies that will not implement trip planners in the foreseeable future. An example of such an option is the use of "place directories," which are listings of landmarks such as shopping centers, government buildings, hotels, etc., and the closest bus/rail service. Volpe National Transportation Systems Center usability research found that place directories can be useful to and usable by customers.
- *Promotion and advertising*—What types of advertising and promotion are most effective in attracting web visitors? What is most effective with infrequent riders and non-riders and what can enhance the agency's image in the community?
- *Site administration and automation*—To a large degree, the Internet is currently an afterthought in the flow of information in transit agencies. Marketing or information technology departments adapt information for the web from a variety of original sources, often at considerable work and expense. Websites should and will become better integrated into agency information processes. As integration and automation increase, transit agencies will confront serious tensions over what software applications and information processes to use. The issues are numerous. What are the technologies for integrating the web into agency operations? What are the transitional requirements and long-term tradeoffs? What are the most effective methods for organizing such functions? These issues will grow in importance as websites become increasingly ambitious and effective. Research could help guide top transit agency management through this transformative process.

Finally, new research and the ongoing experiences of transit website managers, designers, and webmasters should be shared across agency staffs. Mechanisms such as list-serves and conference programs can help agency staff learn from the experiences at other agencies.

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APPENDIX A

Survey Questionnaire

Transit Cooperative Research Program
Project J-7, Topic SB-8

EFFECTIVE USE OF TRANSIT WEB SITES
Study Questionnaire

Who should complete the survey:
Agency manager who is responsible for web site planning, management and design.

Due Date: June 14, 2001

Project purpose: To document transit agency experience and report on the effective use of the Internet from a variety of perspectives. The final report will be of practical use to transit agencies of all sizes in conceptualizing, planning, creating, evaluating and expanding their web sites.

The report will synthesize information from a literature review, this survey, and telephone interviews with web site managers and executive staff.

Purpose of this survey: To obtain basic information on your agency's web site and contact information for follow-up telephone interviews.

Return to:

Bruce Schaller
Schaller Consulting
94 Windsor Place
Brooklyn, NY 11215
Voice: (718) 768-3487
Fax: (718) 768-5985
Email: schaller@schallerconsult.com

EFFECTIVE USE OF TRANSIT WEB SITES

Study Questionnaire

I. CONTACT INFORMATION

A. Respondent information:

Name: _____ Title: _____

Address: _____

Phone: _____ Email: _____

B. Were you involved in initial web site development? __Yes ___No.
If no, would the person(s) involved in the start-up be available for a telephone interview? __Yes __No.
If person is available, please provide his/her name and contact information.

Name: _____ Title: _____

Phone: _____ Email: _____

C. Who is the senior-level manager that oversees the web site (generally, this will be GM or V.P.-level manager)?

Name: _____ Title: _____

Phone: _____ Email: _____

II. DESIGN AND ADMINISTRATION

1. Year web site began: _____

2. Is the site hosted: ___ In-house ___ By outside company __Other: _____

3. Is the site designed by: ___ In-house staff ___ Outside company __Other: _____

4. Who updates information: ___ In-house staff ___ Outside company __Other: _____

5. What resources are currently used on the web site:

Full-time equivalent staff: _____

Consultants: $_____ annually

Hosting/technical support: $_____ annually

6. How often is the site updated?

___Daily, including weekends/holidays
___Daily, weekdays only
___2-4 times a week
___About once a week
___Between once a week and once a month
___Less than once a month

7. Which of the following technologies are employed? (check all that apply)

___Interactive forms
___Downloadable forms
___Java scripts
___PDF files

8. Is site content or design coordinated with advertising campaigns? ___Yes ___No

9. Is the web site integrated with the agency intranet in some fashion? ___Yes ___No
If yes, describe:

10. Is the content coordinated with other transportation providers? ___Yes ___No
If yes, describe:

III. CONTENT AND USAGE

1. How many visitors are there per month? _____

2. How many page views are there per month? _____

3. Are detailed usage statistics available for the site? ___Yes ___No

4. What information or services are currently on the site? (check all that apply)

___Fares
___System maps
___Route maps
___Schedules
___Accessibility information
___Interactive trip planning
___Real-time information
___Service disruption information
___Elevator maintenance information
___Park and Ride
___ADA (paratransit) services
___Special event information
___Planning studies
___Budget/ridership/annual reports
___Agency history
___Board meeting agendas
___Board minutes
___Public involvement information (other than Board material)
___Purchase tickets/passes/farecards by mail
___Store/sales (other than tickets/passes/farecard sales)

___Press releases, other press information
___Procurement information
___Employment
___What's new
___Links to other transit sites in metro area
___Links to other transportation sites
___Links to non-transit, non-transportation sites

5. What areas of the site receive the most visitors? (e.g., maps, schedule, trip-planning, service disruptions, procurement, employment, public involvement, etc.)

IV. GOALS AND EVALUATION

1. Are there written goals or objectives for the web site? ___Yes ___No
   If yes, describe or provide a copy:

2. Are there written policies for the site? (e.g., content, links) ___Yes ___No
   If yes, describe or provide a copy:

3. How do you obtain feedback and evaluate the quality of the site? (check all that apply)
   ___Staff testing
   ___Customer usability testing
   ___Analysis of visitor volumes, click-through patterns, etc.
   ___Analysis of searches
   ___Market research (e.g., phone surveys, focus groups)
   ___Emailed comments from customers
   ___On-line surveys
   ___Other: _____

4. How do you evaluate the effectiveness of the site? (check all that apply)
   ___Number of visitors
   ___Cost savings in other areas (e.g., printing, telephone customer assistance)
   ___Analysis of ridership impacts
   ___Public image
   ___E-commerce sales
   ___Other: _____
   ___None

Return by June 14, 2000 to:
Bruce Schaller, Schaller Consulting, 94 Windsor Place, Brooklyn, NY 11215
Voice: (718) 768-3487 Fax: (718) 768-5985 Email: schaller@schallerconsult.com

You may also download this form from www.schallerconsult.com/transitwebsite and then email the survey to: schaller@schallerconsult.com

THANK YOU FOR YOUR COOPERATION!

Follow-Up Questionnaire
Effective Use of Transit Web Sites

Transit Cooperative Research Program
Project J-7, Topic SB-8

Purpose: Obtain information on critical aspects of transit web sites as identified in initial survey and telephone interviews with staff at a number of responding agencies.

Questions are almost entirely multiple-choice and should take you 15-20 minutes to complete. Responses will be aggregated in the report and will enable you to see how your efforts and experiences compare with other transit agencies. *You should be able to complete this survey based on your experience and existing knowledge.* Any additional comments that you feel would aid understanding of the topic are most appreciated.

Deadline: Tuesday, September 11, 2001

Return this survey by e-mail or U.S. Mail.

Return to: Bruce Schaller
Schaller Consulting
94 Windsor Place
Brooklyn, NY 11215
Email: schaller@schallerconsult.com
Voice: (718) 768-3487

For further information about this project, and useful links, visit www.schallerconsult.com/transitwebsite

Completed by: _____ Agency: _____

Title: _____ Email: _____

Phone: _____

A. AUDIENCE AND BENEFITS

1. How do you define your web site's audience for the purpose of developing the content, structure, look and feel of the site? Who is the primary audience (most important for design decisions) and who are other audiences (important but less impact on design)?

	Primary Audience	Other Audiences	Don't design site specifically for this group
Customers	___	___	___
Prospective customers	___	___	___
Out of town visitors	___	___	___
Stakeholders	___	___	___
Press	___	___	___
Potential employees	___	___	___
Employers (e.g., for trip planning, tax-free fare program)	___	___	___
Other: _____	___	___	___

2. For the customer audience, do you develop content, structure, look and feel of the site specifically for any of the following groups separately from customers generally?
(Check all that apply)

___ Regular customers
___ Occasional customers
___ Elderly customers
___ Disabled customers
___ Other: _____

3. How important are each of the following as benefits to your agency from the web site?

	Very Important	Somewhat Important	Not Important
Making schedules and/or maps easily available	___	___	___
Improving agency's image in the community	___	___	___
Providing information for public involvement	___	___	___
Increasing ridership among existing customers	___	___	___
Attracting new customers	___	___	___

B. DESIGN GOALS AND CONSIDERATIONS

1. On the whole, which statement best describes your approach to web site design?

___ We aim to create a simple, functional design that lets visitors quickly access desired information

– OR –

___ We aim to create a very attractive ("wow") design that will help develop a better image for the agency in the community, while also providing desired information.

2. Which generation of browser do you design for?
___ 3.0 and above
___ 4.0 and above
___ 5.0 and above

3. Which connection speed do you design for?
   ___ 14.4k and faster
   ___ 28.8k and faster
   ___ 56k and faster

4. What resolution do you design for?
   ___ 640 × 480 and above
   ___ 800 × 600 and above
   ___ 1024 × 768 and above

5. With what browsers do you test your site?
   (Check all that apply)
   ___ Microsoft Internet Explorer
   ___ Netscape Navigator
   ___ AOL's browser
   ___ Lynx
   ___ Opera
   ___ Other: _____

6. When was the last time you redesigned the site—that is, substantially changed the look and/or navigability of the site?
   ___ Within last 6 months
   ___ 6-12 months ago
   ___ Over a year ago
   ___ Have not done redesign of site

7. What were the main goals of the last redesign?
   (Check all that apply)
   ___ Update the look of the site/make it more attractive
   ___ Improve navigability
   ___ Reorganize content to a more logical structure from users' perspective
   ___ Make most popular pages more directly accessible (fewer clicks) from home page
   ___ Add new features (specify) _____
   ___ Make the site more interactive
   ___ Other: _____
   ___ Not involved with last redesign/don't know

8. Is the next redesign…
   ___ Currently underway
   ___ Not started but planned to start within next 6 months
   ___ Probably start redesign 6-12 months from now
   ___ Redesign is at least a year away

9. What are your priorities for further development of the web site?
   (Check all that apply)
   ___ Priorities not developed yet
   ___ Update the look of the site/make it more attractive
   ___ Improve navigability
   ___ Reorganize content to a more logical structure from users' perspective
   ___ Automate process of generating/posting updates
   ___ Make the most popular pages more directly accessible (fewer clicks) from home page
   ___ Make the site more interactive
   ___ Add trip itinerary planner
   ___ Add information targeted to visitors
   ___ Add/expand ecommerce
   ___ Add/expand wireless capabilities
   ___ Add/expand service that emails customers with service or other information
   ___ Add/expand employment/jobs information

___ Add/expand procurement information
___ Add/expand Board information, planning reports, other public involvement information
___ Make site customizable by user
___ Eliminate frames
___ Other: _____

10. Some transit agency staff have commented that they worry that pictures and schedules on the web site communicate a higher quality of service than customers may actually experience. Is this a concern at your agency? Please comment.

_____

_____

C. SPECIFIC SITE FEATURES

1. Is a trip itinerary planner …
   ___ Currently available on site
      ___ Provided by your agency
      ___ Provided by another agency
   ___ Working on adding trip planner
   ___ Planned but work not yet begun
   ___ No plans to add

2. If you are working on or planning to add a trip itinerary planner, when do you expect it will be added to the site?

_____

3. What was the cost, or is the expected cost, of developing a trip itinerary planner?
   Please estimate the cost including staff time and consultant or other expenditures.
   a. Cost: $_____
   b. What does cost figure cover (systems development, hardware, etc.)?

_____

_____

4. Do you maintain customer email lists for regular email mailings?
   ___ Yes
   ___ No

5. If you maintain customer email lists …
   a. What year did the service start? _____
   b. How many customers are currently on the list? _____
   c. What information do you email customers?
      (Check all that apply)
      ___ Updated schedules
      ___ Notice that updated schedules are available on site
      ___ Notice of routing changes and/or other service changes
      ___ Notice of planned service diversions, construction, etc.
      ___ Real-time information about service delays or problems
      ___ Other: _____

6. Is your web site …
   ___ English only
   ___ English only; outside translation service offered
   ___ English and Spanish
   ___ Other languages: _____

7. Have you had requests that site be in languages other than English?
   ___ Yes
   ___ No

8. Describe any current or planned capability for downloads to PDAs or other wireless capabilities.

   _____

   _____

9. Describe any partnerships with private sector companies (e.g., to provide content, for ecommerce, etc.)

   _____

   _____

D. MAP, SCHEDULE, PDF AND ADA ISSUES

1. Is a system map …
   (Check all that apply)
   ___ Not on web site. Why? _____
   ___ Available as Adobe Acrobat (pdf) file
   ___ Available in html page
      ___ Can click to show enlarged section of map

2. Are route maps …
   (Check all that apply)
   ___ Not on web site. Why? _____
   ___ Available as PDF files. What size are pages? _____
   ___ Available in html pages

3. Are schedules on site …
   (Check all that apply)
   ___ Not on web site. Why? _____
   ___ Available as PDF files. What size are pages? _____
   ___ Available in html pages

4. Are schedules on site …
   ___ Updated automatically using database
   ___ PDF files based on printed schedule
   ___ Put together manually
   ___ Other: _____

5. Potentially, transit web sites may generate cost savings from reduced printing of maps and schedules, reduced calls to customer service/call center, reduced mailing costs, etc. Do you think in your agency there have been …
   ___ No or insignificant cost savings
   ___ Cost savings but can not/have not quantified
   ___ Cost savings that have been quantified *(please attach any available information)*
   ___ Do not know whether there have been any cost savings

6. What is your experience with Adobe Acrobat (pdf) files?
   ___ Don't use PDF files on site
   ___ Use PDF files and have no user complaints or concerns
   ___ Use PDF files and users have raised issues …
   (Check all that apply)
   ___ Some customers do not have Acrobat Reader, cannot download the Reader, do not want to download or do not know how
   ___ Problem printing entirety of pages larger than 8½ × 11
   ___ Accessibility for blind/visually impaired
   ___ Other issues: _____

7. If you use PDF files, are they designed to take advantage of screen reader capabilities in the new Adobe Acrobat 5.0?
   ___ Yes
   ___ Not currently
   ___ Not currently; plan to update

8. What steps have you taken to make the site ADA compliant?
   (Check all that apply)
   ___ ALT tags for graphics
   ___ Separate text-only pages
   ___ Use html instead of PDF files
   ___ Use both html and PDF files
   ___ Avoid use of drop-down menus
   ___ Use alternative indicators for color
   ___ Provide text links for each active region of server-side image maps
   ___ Use client-side image maps with ALT tags
   ___ Use <th> tag in data table column and row headers
   ___ Provide functional text in pages utilizing scripting
   ___ Other: _____

9. Have you been in contact with people with disabilities or representatives of the disabled community concerning ADA issues?
   ___ Yes. Describe:_____
   ___ No

E. USAGE AND PROMOTION

1. Approximately how much has site usage changed in the past 12 months?
   ____%

2. What events/situations have created the greatest peaks in usage?

   _____

   _____

3. How do you promote the site?
   (Check all that apply)
   ___ URL on all publications
   ___ URL on exterior of buses and/or trains
   ___ In-system advertising (e.g., car cards)
   ___ Out of system advertising (e.g., newspapers)
   ___ Press releases
   ___ Special events: Describe: _____
   ___ Other: _____

F. NON-SERVICE INFORMATION

1. What employment information/capabilities are on your site?
   (Check all that apply)
   ___ None
   ___ Job listings
   ___ Job descriptions
   ___ Employment application (print out and mail/fax)
   ___ On-line filing of employment application

2. Have a significant number of job applicants used the site for information, applications, etc.?
   ___ Yes
   ___ No

3. Have the number of job applicants increased due to the web site?
   ___ Clearly has increased
   ___ Probably has increased
   ___ Probably not increased
   ___ Clearly not increased
   ___ Don't know

4. What procurement information/capabilities are on your site?
   (Check all that apply)
   ___ None
   ___ Procurement opportunities
   ___ Full text of bid specifications
   ___ Full text of requests for proposals
   ___ Submit bids via Internet
   ___ Other: _____

5. Are potential vendors required to register to obtain bid/RFP information?
   ___ Yes
   ___ No

6. Is a fee charged to potential vendors for bid/RFP information?
   ___ Yes: How much? _____
   ___ No

G. STAFFING, ORGANIZATION AND COST

1. Is your primary professional background…
   ___ Information technology/MIS
   ___ Web design (non-transit)
   ___ Web design (transit)
   ___ Customer service
   ___ Marketing
   ___ Other: _____

2. Is web design done by
   ___ Outside vendor
   ___ IT/MIS department
   ___ Marketing
   ___ Other: _____

3. What are main reason(s) for design to be done in-house or outsourced (whichever is the case)?
   (Check all that apply)
   ___ Cheaper
   ___ Expertise available in-house/outside only
   ___ More effective for good result
   ___ Time not available by in-house staff
   ___ Contracting for outsourcing difficult or time-consuming
   ___ Other: _____

4. Is web hosting provided by
   ___ IT/MIS department
   ___ Other transportation agency
   ___ Other non-transportation agency
   ___ Private outside company
   ___ Other: _____

5. What are main reason(s) for hosting to be done in-house or outsourced (whichever is the case)?
   (Check all that apply)
   ___ Cheaper
   ___ Expertise available in-house/outside only
   ___ Need 24/7 service
   ___ Security issues
   ___ Time not available by in-house staff
   ___ Contracting for outsourcing difficult or time-consuming
   ___ Other: _____

6. What is the approximate current annual cost of the web site, including staff time and vendor contracts? $_____

7. Which of the following are the primary factors influencing your agency's funding of the web site?
   (Check all that apply)
   ___ Agency sees as necessary for "up-to-date" image
   ___ Agency believes web site saves money in other areas
   ___ Agency believes web site helps meet hiring needs
   ___ Agency believes web site helps meet procurement needs
   ___ Usage statistics have been adequate to show value of site
   ___ Good press has helped show value of site
   ___ Senior executive staff see web site as priority; haven't needed to work to convince them of benefits
   ___ Other justifications used for funding *(detail below:)*

H. SUPPORTING INFORMATION

If available, please send by email or regular mail:

- Detailed usage report for recent time period (or link)
- Any surveys, focus group reports or other research showing characteristics of visitors, reaction to web site, whether ride more as result, etc.
- Data on impact of web site on job applications, call center volumes, printing or mailing costs, procurement or other operational impacts
- Data on sales of fare media
- Data on other ecommerce sales

Send to:

Bruce Schaller
Schaller Consulting
94 Windsor Place
Brooklyn, NY 11215
Voice: (718) 768-3487
Email: schaller@schallerconsult.com

THANK YOU FOR YOUR TIME AND EFFORT ON THIS SURVEY. I WILL NOTIFY YOU WHEN THIS REPORT IS PUBLISHED (NEXT SPRING)

APPENDIX B

Survey Respondents

The following agencies provided information for this project.

State	City/Agency	Web Site URL
CA	Los Angeles–LACMTA	http://www.mta.net
CA	Oakland–AC Transit	http://www.actransit.org
CA	Orange County–OCTA	http://www.octa.net
CA	Riverside–RTA	http://www.rrta.com
CA	San Diego Transit	http://www.sdcommute.com/service/buspage.htm
CA	San Francisco–BART	http://www.bart.gov
CA	San Francisco–Muni	http://www.sfmuni.com
CA	San Jose–Santa Clara VTA	http://www.vta.org
CA	Santa Cruz–METRO	http://www.scmtd.com
CA	Santa Rosa–City Bus	http://ci.santa-rosa.ca.us/tp
CO	Colorado Springs Transit	http://www.colorado-springs.com/transpt/transit.htm
CO	Denver–RTD	http://www.rtd-denver.com
CT	Norwalk–Wheels	http://www.norwalktransit.com
DC	Washington–WMATA	http://wmata.com
FL	Miami–MDTA	http://www.co.miami-dade.fl.us/mdta
FL	Orlando–LYNX	http://www.golynx.com
FL	Tallahassee–TALTRAN	http://www.talgov.com/citytlh/taltran
GA	Atlanta–MARTA	http://www.itsmarta.com
IL	Chicago–CTA	http://transitchicago.com
IL	Chicago–Pace	http://www.pacebus.com
MI	Grand Rapids–GRATA	http://www.ridetherapid.org
MO	Kansas City–KCATA	http://www.kcata.org
MO	St. Louis–Bi-State	http://www.bi-state.org
NC	Raleigh–CAT	http://www.raleigh-nc.org/transit
NY	New York–MTA	http://www.mta.info
OH	Cincinnati–SORTA	http://www.sorta.com
OH	Cleveland–RTA	http://www.riderta.com
OH	Toledo–TARTA	http://tarta.com
OR	Portland–Tri-Met	http://www.tri-met.org
PA	Allentown–LANTA	http://www.lantabus.com
PA	Altoona–AMTRAN	http://www.amtran.org
PA	Lancaster–RRTA	http://www.redrosetransit.com
PA	Philadelphia–SEPTA	http://www.septa.org
PA	Pittsburgh–PAT	http://www.ridegold.com
PA	Scranton–Colts	http://www.coltsbus.com
PA	York–YCTA	http://www.rabbittransit.org
SC	Charleston–CARTA	http://ridecarta.com
TN	Nashville–MTA	http://www.nashvillemta.org
TX	Corpus Christi–The B	http://www.ccrta.org
TX	Dallas–DART	http://www.dart.org
TX	Houston–Metro	http://www.ridemetro.org
UT	Salt Lake City-UTA	http://www.rideuta.com
WA	Everett–Community Transit	http://www.commtrans.org
WA	Seattle–SoundTransit	http://www.soundtransit.org
WA	Vancouver–C-Tran	http://www.c-tran.com
WI	Kenosha–KTC	http://www.kenosha.org/departments/transportation
WI	Milwaukee–County	http://www.ridemcts.com

Note: URLs for all transit agencies in the United States can be found on the American Public Transportation Association's website at http://www.apta.com/sites/transus/.

APPENDIX C

Measuring Customer Use of Transit Websites

Chapters 3 and 4 report on results from the two basic methods of measuring web usage:

- Audience measurement—measures web usage among a representative sample of users, typically through telephone surveys, although intercept and on-line surveys are sometimes used.
- Server log analysis—measures traffic on the website's Internet server. The log analysis shows the number of hits, page downloads, visitor sessions, unique visitors, length of visits, and other relevant data.

The size and characteristics of the web audience are best understood with data from both sources, each of which has significant (and in part offsetting) strengths and limitations. This appendix discusses technical issues with each methodology.

AUDIENCE MEASUREMENT

Audience measurement is generally based on survey data such as telephone interviews. Survey data offer the advantage of counting people instead of counting computers or Internet connections, producing a more accurate picture of usage levels. Surveys also include both those with and without Internet access, thus showing web usage in the context of all transit users. However, survey data are limited by three important factors.

- Only a few transit agencies conduct surveys of this type and they may not be representative of the industry.
- The surveys have gathered only basic information about Internet access usage.
- Nonresidents are not included in the surveys.

Chapter 3 reports on results from eight transit agencies that provided survey data for this study.

SERVER LOG ANALYSIS

Server logs provide four types of statistics.

- Hits—actions on a website, such as when a visitor views a page or downloads a file. Viewing one page on a website can generate numerous hits because each text and graphical file on the page is counted as an individual hit.
- Page views—a hit on an html (text) page only. A visitor who opens the home page, then clicks on "schedules" and then clicks on "weekday bus schedules," generates three page views. This same visitor may have generated a dozen or more hits. The average user views 36 pages per on-line session ("July 2001 Internet Usage Stats" 2001).
- Visitor sessions—a session of activity for one visitor of a website. A visitor session is generally thought of as one person visiting a site uninterruptedly for some period of time that could be less than a minute or an hour or more. Users log on for an average of one session per day, spending 32 min on-line per session ("July 2001 Internet Usage Stats" 2001).
- Unique visitors—the same as visitor sessions except that visitors returning to the site are counted only the first time.

Although these statistics are straightforward in concept, in actual measurement they are subject to important caveats stemming from how server logs identify visitors. Server logs track users through the Internet Protocol (IP) address. An IP address is assigned to each computer connection linking to the Internet. Server logs count a visitor based on traffic coming from a particular IP address.

This measurement technique can lead to both overcounts and undercounts of hits, page views, visitor sessions, and unique visitors. Counts of usage based on IP addresses lead to *overcounts* in one or more of these usage indicators in the following situations:

- Dial-up users are generally assigned a new IP address each time they connect to their Internet service provider. The same person returning to a site is thus counted as a unique visitor, leading to an overcount of unique visitors.
- Visitors may be double-counted or triple-counted if they return to a page past a predetermined amount of time. For example, some server log analysis packages terminate the "session" after 30 min. A visitor who leaves the site for 35 min and then returns may be counted as two visitor sessions. If the IP address changes in this period, the visitor will also be counted as two unique visitors.
- Some networks including AOL change the visitor's IP address during a session. The IP address may change rapidly, even while a page is being downloaded. The number of visitors and unique visitors are thus overcounted. (Conversely, the length of visits is underreported.)

Server logs produce *undercounts* of usage in other situations.

- Different people may use the same computer. This can occur within a household, and certainly occurs at libraries, schools, Internet cafes, and other places where computers are shared. In this case, server logs undercount the number of unique visitors.
- Many networks cache (store) popular or recently accessed pages and graphical files on their own server. Caching speeds up download times for the user and reduces Internet traffic. The originating server only sees one download of a given file, however, when multiple users may view the file. The number of hits, page views, and possibly visitor sessions are thus undercounted. A study of server logs for 30 major sites estimated that server logs miss as much as 20 to 40 percent of a site's usage due to caching (Ivins and Reed 1999).
- Several users connected through the same IP address (e.g., on a network) may be counted as one visitor, or as one visitor session, producing undercounts in these areas.
- Given these limitations, server log statistics can reasonably be used to chart overall patterns and trends, but cannot be used as precise yardsticks of visitor activity.
- Chapter 3 reports overall visitor sessions for 29 transit agencies. Chapter 4 reports on detailed usage data from 14 agencies.

Although other agencies provided server log data, Dallas Area Rapid Transit (DART) supplied usage data from a tracking service that uses "cookies" and Java script to track visitation. Cookies are small files placed on the user's computer by the tracking service that enable the tracking service to tabulate activity coming from an individual computer. These data are believed to be more accurate than server logs because they track the individual user. They also track page views whether the page is downloaded from the transit agency's server or the server of the user's Internet service provider. Results from server logs are compared with DART's usage data in the chapter 4 analysis as something of a check on the server log results. Notably, DART's results tend toward the midpoint of the server log results, suggesting that the various issues with server log tracking at least to some extent cancel each other out.

APPENDIX D

On-Line Resources for Website Managers

GENERAL

American Public Transportation Association's list of U.S. local and state transportation websites: http://www.apta.com/sites/transus

CyberAtlas' data on current Internet usage, connection speeds, and other valuable information (see especially the "Stats Toolbox" link): http://cyberatlas.internet.com

Effective Use of Transit Websites (papers based on this report; links to 29 Good Practices in Transit Web Site Design): http://www.schallerconsult.com/transitwebsite

Federal Transit Administration links to transit and transportation sites: http://www.fta.dot.gov/other

Jakob Nielsen's Current Issues in Web Usability: http://www.useit.com/alertbox

National Cancer Institute Web Design and Usability Guidelines: http://usability.gov

Volpe Center's transit agencies website search: http://transitweb.volpe.dot.gov

[See also publications available on-line in References section.]

ACCESSIBILITY FOR PEOPLE WITH DISABILITIES

Section 508 Rule, as published in the *Federal Register*, covering accessibility requirements for federal agencies: http://www.access-board.gov/sec508/508standards.htm#PART 1194

Introductory materials and Section 508 checklist on web accessibility issues: http://www.webaim.org

CAST's "Bobby" tool checks website accessibility: http://www.cast.org/bobby

APPENDIX E

Sample RFPs for Website Design and Hosting

Kansas City Area Transportation Authority
PROCUREMENT DEPARTMENT
1350 East 17th Street
Kansas City, Missouri 64108

REQUEST FOR PROPOSALS
#00-7011-45

FOR A CONSULTANT TO PROVIDE WEB SITE
& ELECTRONIC KIOSK TECHNICAL/DESIGN ASSISTANCE

Date: June 19, 2000

SECTION II
SCOPE OF SERVICES

A. OVERVIEW

The Kansas City Area Transportation Authority (KCATA) is the regional transit agency and the largest of three transit service providers in the metropolitan area.

The KCATA is seeking the services of a qualified consultant to assist and advise in the technical maintenance and ongoing design of the ATA's web site at www.kcata.org, and electronic information kiosks at Union Station.

1. Technical. The consultant is expected to provide on-call technical support (within 12 hours) in response to technical problems that arise with the web site, kiosks, staging server, and relational issues involving both the web site and the kiosks.

2. Design. The consultant is expected to provide advice, assistance and limited training (on-site and off-site) on design and content enhancements to the site. All design and development work will facilitate future opportunities for expansion [i.e., additional kiosk locations, integration of the Kansas City SCOUT Intelligent Transportation System (ITS), ATA's real-time GPS-based transit vehicle locator system and implementation of interactive "trip planning" software].

The KCATA is anticipating entering into a six-month cost reimbursement contract based on the hourly rates provided by the consultant. The consultant should expect to provide approximately 125–150 man-hours over the term of this contract. The final contract amount, as well as the total hours, will be negotiated with the consultant.

B. BACKGROUND

1. Technical. The primary objective of the site and the Union Station kiosks is to provide information about ATA's programs and services. Several sections of the web site are database supported: bus schedules and maps; procurement opportunities; and employment vacancies.

   The ATA has an ISDN line installed with 2-64K active channels. The web site is currently hosted by an external Internet service provider, and has 50 mb of server space available.

   Applied Innovations, Inc., developed the web site using FrontPage 2000, and deployed it in November 1999. The site is currently hosted by Primary Networks. Using NetShift software, Applied Innovations also developed and deployed two electronic, touch-screen information kiosks at Union Station in March 2000. These kiosks provide links to the ATA web site, as well as other Union Station occupants.

   Adobe PDF technology has been primarily utilized to leverage the existing ATA graphics process for creating the bus schedules and maps. With regard to enhancing access to the bus schedules and maps for the visually impaired, several options have been explored, both internally and with representatives of the Low Vision Library. Long-term solutions may include interfacing with route scheduling software currently being installed. Consultant will assist ATA with the installation of WebTrends software, as well as train staff on how to use the software.

   Successful proposer will provide a staging server accessible to ATA staff via the web in order to test changes prior to uploading to live server.

2. Design. Applied Innovations has continued to provide consulting services on both the web site and the kiosks, as well as familiarize the ATA staff with reporting and analysis software and methodology.

While not presently staffed with a fulltime position (web master) dedicated to the project, the ATA does have the expertise and technical capability capacity to produce editorial and visual content for the web site, and only limited experience in uploading content.

Bus schedules and maps have been the main interest of visitors to the site since its deployment. Ensuring the currency and accuracy of that information has been the primary focus of staff work on the site. Consequently, other areas that require editorial and design attention have gone lacking. Seven of every 10 e-mail messages generated from the web site have been about bus schedules and maps; remaining messages deal with customer service issues.

A Union Station-entry page is in the concept stage, with some preliminary design work performed by ATA staff and the current consultant. The completion and implementation of this task, in conjunction with Union Station staff, and another similar "special pages," may represent the first design and training tasks to be performed under the terms of this contract.

C. QUALIFICATIONS OF CONSULTING FIRM

1. Familiar with the local Kansas City area and experienced in web site design and development.

2. Possess both Internet marketing and web site design and maintenance experience.

3. Have working knowledge of the technology involved with electronic information kiosks and the employment of "touch screen" methodology.

4. Familiar with the needs of a large business and have previous experience in developing and maintaining sites for companies and government agencies comparable in size to the ATA. ATA is the area's largest transit (bus) service provider serving nearly 51,000 customers each day, employing nearly 800 persons and having an annual budget of over $30 million.

5. Knowledge and experience with the passenger transportation industry is a plus.

6. The consultant is expected to:

   - Advise and assist ATA staff on future web site opportunities, such as on-line forms.

   - Review various technology concepts and options suitable to ATA; e.g., should the ATA expand its network of electronic information kiosks; if so, where?

   - The site was constructed to facilitate future expansion. The consultant is expected to provide recommendations and assistance in developing expansion opportunities in concert with the existing kiosk environment.

D. METHODOLOGY

1. Meetings and brainstorming sessions with ATA staff and the consultant to discuss "where the site's at now" and short-term and long-term strategies for "where we want the site to go." The meetings can be scheduled as soon as practical after contract is awarded.

2. From those meetings, consultant will develop a "road map" of tactics and a timeline to achieve short-term and long-term objectives. Tactics should reflect the site's current "look and feel" and navigation scheme. This phase should take 8–10 weeks.

3. The remaining term of the contract will be devoted to developing timelines for individual projects, providing technical assistance/consultation, as required, in uploading changes/updates to the site, and implementing a web site and kiosk reporting and analysis plan.

E. POSSIBLE DELIVERABLES

1. Strategies with outline/flow chart of possible changes/updates to the ATA web site. These strategies should also address how to enhance the site's access for visually impaired visitors.

2. User-friendly documentation to assist training staff in using FrontPage software to maintain/update site components.

3. Plan for maintaining and utilizing data from web site and kiosk(s).

4. Recommendation and assistance in developing service that will assist ATA staff to analyze and monitor web site activity, while also alerting ATA staff to operational problems.

5. Conduct monthly meeting with ATA staff to review updated reports and analysis on site activity, provide direction and training on interpreting reports, and clarify meaning and action items resulting from the review.

SECTION IV
FORMAT OF PROPOSALS

A. INTRODUCTION

The intent of this RFP is to encourage submittals that clearly communicate the consultant's qualifications for this project. Submittals should provide information in a concise and well-organized manner. All submittals should follow the format outlined below. This format will assist the Evaluation Committee in evaluating qualifications. Failure to include such information in accordance with the requirements set herein may result in the proposal being judged non-responsive.

B. PACKAGING AND DELIVERY OF PROPOSAL

Interested firms are asked to submit one (1) "Original" and eight (8) copies of their proposal to:

Denise Bradshaw, Contract Administrator
Procurement Department
Kansas City Area Transportation Authority
1350 East 17th Street
Kansas City, MO 64108

The envelope should be labeled with the name and address of the firms and the words "RFP #00-7011-45" and "Website/Kiosk Consultant" plainly written across the face of the envelope.

The Procurement Department must receive the proposal no later than 4:30 p.m. Monday, July 10, 2000. Submittals not received by this time, submitted to another location, or submitted in a different formation may not be accepted.

C. PROPOSAL CONTENTS

1. Cover Letter

A cover letter from the consultant introducing their firm and any and all subcontracting firm(s) should be included. The cover letter should identify the category of work on which they are proposing and include the name and phone number of the contact person for each firm.

2. Summary

The consultant should summarize its understanding of Section II, "Scope of Services," to allow for the Evaluation Committee to determine the consultant's level of understanding of the services required by KCATA.

3. Profile of the Firm or Team

This section should set forth a general description of the consultant, including the following information:

- Name of firm or team
- Location of the firm and all team members
- Location of offices
- Date the firm(s) was (were) established
- A brief description of the firm's/team's history

a. Prior Experience of Firm and Personnel. Describe the consultant's and team's reputation and capability to successfully implement this type of contract and work. Give a brief description of the consultant's team members' experience on similar contract or projects. State whether the firm or team is local, regional or national, and how long the firm has been in existence under current ownership or management, as well as how long the firm has provided the kind of service that is requested in this RFP. When citing projects worked on, briefly describe specific responsibilities. Indicate if firm(s) served as lead consultant or as subconsultant, including specific area of responsibilities, etc.

b. References. Include URL addresses of web sites on which your firm has worked, and the extent of your work on those sites.

4. Contract Management

Describe the organization structure of the firm or team including a clear and concise description of how the contract will be managed in the following areas:

a. Overall Management. Describe the organizational structure of the firm or team as it may relate to this contract. Identify the team leader or person(s) responsible for managing and supervising this contract.

b. Key Personnel. In an outline format, identify all key personnel for the firm or team and provide a resume identifying their title. Describe their experience and availability.

D. COST PROPOSAL

Proposers shall complete the enclosed **Cost Proposal Form**, indicating the hourly rate for each portion of the work. This hourly rate shall include furnishing all personnel and related materials required to execute the contract, except as may be provided otherwise in the contract documents.

Proposers shall complete and submit the Cost Proposal Form (Attachment C).

The Cost Proposal shall be submitted in a separate, sealed envelope and clearly marked with the firm's name, address, and the words "Cost Proposal" on the outside cover.

E. REQUIRED FORMS

In addition to their proposal, proposers are required to submit the following attached forms with their proposal.

- Cost Proposal (Attachment C)
- Vendor Registration Form (Attachment D)

SECTION V
SELECTION PROCESS

A. SUBMITTAL DEADLINE

Only those proposals received by the submittal deadline will be evaluated by the KCATA's Evaluation Committee.

B. RESPONSIVENESS CRITERIA

Contract negotiations will be initiated with the firm that, in the opinion of the KCATA, best meets the needs of KCATA for this procurement. Respondents must meet all of the following to be considered:

1. Submittal meets KCATA deadline.

2. Organization of proposal. Proposals submitted as required in the Format of Proposals, Section IV.

3. Completeness of proposal. All required forms, questionnaires, and information are complete, signed and dated.

Proposers may be asked to submit additional information if needed.

C. EVALUATION CRITERIA

Proposals and presentations from all firms determined to be responsive by compliance with all requirements in Paragraph B above will be evaluated on the following criteria. KCATA will consider the past (10) years as the period of time for evaluation under factors 1 and 3 below.

	Selection Criteria	Weight
1.	Experience and qualifications of assigned project manager.	40%
2.	Cost.	25%
3.	Quality of work done, including familiarity with applicable software, such as NetShift and FrontPage 2000.	20%
4.	References (i.e., customer satisfaction, adherence to time schedules, etc.).	15%

Proposers should consider these factors when preparing their proposals and must provide a specific response to each of the above factors.

D. PROPOSER INTERVIEWS AND PRESENTATIONS

Proposers that have been determined to be responsive may be scheduled for a presentation and interview with the Evaluation Committee prior to final selection. In this case, selected proposers will be informed as to the exact date and time of the interview. This presentation shall be at the Proposer's own expense and should last no longer than 20 minutes, with another 30 minutes allotted for questions and answers.

The KCATA reserves the right to forego the interview process and determine highest-ranked firm based solely on the proposals submitted which meet the described Evaluation Criteria.

E. PROPOSER SELECTION

Based on the evaluation process described above, the Evaluation Committee will select the best-qualified firm. The award of a contract under this RFP will be based on competitive, negotiated procurement procedures, and proposals submitted will be subject to negotiation. If the KCATA fails to reach an agreement with the best-qualified firm, it will then enter into negotiations with the subsequent firms/teams.

Bi-State Development Agency
Transportation System Web-site
Request for Proposals

Section 1. Introduction

The Bi-State Development Agency is the regional public transportation provider for the St. Louis metropolitan area. The Agency carries 55 million customers per year on its MetroBus, MetroLink and Call-A-Ride paratransit services.

The Bi-State Development Agency intends to contract with a qualified proposer to provide professional services to redesign, develop and implement the Agency's web-site. In 1995, the Agency recognized the need to have a web presence and contracted with a local ISP to build our web-site. Over the years only minor improvements have been made to the site.

Accessibility for persons with disabilities was not considered. While cool graphics, brilliant colors and fancy fonts work for sighted individuals, these can all be major barriers for persons with visual disabilities. This is clearly unacceptable and must be corrected with the web-site redesign.

At this time, the Agency plans to use a "tier one" ISP for hosting services; however, the Agency operates both an OS/390 IBM mainframe computer, and a Windows NT-based wide area network that may be considered for in-house hosting in the future. The Agency uses the Oracle and Microsoft SQLServer database platforms.

The following sections describe the scope of services that we expect, explain the format that we require for your response, and explain our evaluation process. Please contact the Agency's Contracts and Procurement Department at 314 982-1490 with questions.

Section 2. Professional Scope of Services

The successful proposer shall design, develop and implement a web-site to the specifications in this section. General design elements will include accessibility, usability, appeal, functionality and ease of incorporating future features. Although the Agency has some specific requirements, we are also interested in your ideas for content, and more specifically your approach in designing the style of the web-site. We encourage the proposer to consider and propose alternative solutions and recommendations.

2.1 General Functionality

1. The site should be developed using the most current standard of technology in web-site development. Proposals must identify the software tools that will be used to develop the web-site, languages used to develop applications, and the database product proposed.
2. The site should be developed to present formats viewable and downloadable to the public in general as well as in an ADA accessible format to enable viewing and downloads using currently available assistive technology tools.
3. The site should be developed to minimize loading times for analog dial-up customers.
4. The site must be designed to function effectively with common versions of the Microsoft Windows 95, 98, 2000, ME, NT, XP operating systems, MacOS and Linux.
5. The web-site must be compatible with current versions of commonly used Internet browsers, including Microsoft Internet Explorer, Netscape, AOL, Lynx and Opera, as well as older browser versions commonly available.
6. The site must be designed for 24 hour a day, 7 day a week operation, except for scheduled maintenance downtime.
7. The site must include e-commerce capabilities to enable secure online credit card purchase, verification, fulfillment and acceptance.

2.2 Current Content

The Agency's current web-site (www.bi-state.org) contains the following components:

1. Board of Commissioners
    a. Names
    b. Message from the Chairperson
2. Agency Information
    a. Agency Facts and Figures
    b. Agency History
    c. Agency Mission
    d. Who We Are
3. Prices and Outlets
    a. Fare Prices
    b. How to Buy Tickets
    c. Where to Buy Passes
    d. MetroRide Store
4. Transportation Services
    a. Safety and Security
    b. Paratransit
        i. Call-A-Ride
        ii. Transit Management Association
        iii. Region Maps
    c. MetroLink
        i. Route Maps
        ii. Schedules
    d. MetroBus
        i. Route Maps
        ii. Schedules
    e. Special Service
        i. Route Maps
        ii. Schedules
5. Business Opportunities
    a. How to do Business with Bi-State
        i. Procurement and Contract Administration Policy
6. Disadvantaged Business Enterprises
    a. DBE Directory
    b. DBE Newsletter
7. Arts in Transit
8. Customer Service
9. Transit Accessibility
10. Human Resources
    a. Job Opportunities
11. MetroLink Expansion (links to existing URLs)
    a. St. Clair County
    b. Cross County
12. Annual Report
13. Fact Sheet
14. Press Releases
15. Speakers' Bureau
16. Business Enterprises
    a. St. Louis Downtown Airport
    b. St. Louis Gateway Arch
    c. Gateway Arch Riverboats
17. Traveler Information
18. Web Links
19. Newsworthy Notes (What's New)

2.3 Features and Additional Content Desired

1. A "Message from the Executive Director."
2. Choice of a "printer friendly" format for pages.
3. Immediate email acknowledgement of incoming email messages back to the sender.
4. An "Upcoming Features" page to preview cool new features; for example, a web-enabled "Trip Planner."
5. An Agency email address associated with each feature to submit questions.
6. All documents, including maps and tables, should be in Portable Document Format (PDF) for ease of viewing, printing and downloading, and in alternate ADA acceptable download formats.
7. Include links for customers to download any browser supplement products, such as Acrobat Reader, that are necessary to view information on the site.
8. Secure maintenance features that enable Agency departments to update content quickly and easily. For example, volatile information might be placed in tables accessible through the web-site and an appropriate password, so that the departments responsible for the content can update the information directly.
9. A searchable "DBE Directory."
10. On-line application for DBE Certification.
11. A "Temporary Service Change" function that contains up-to-the-minute changes in our basic service.
12. An alphabetical site map.
13. Department-specific email links and a generic "Give us your comments" feature.
14. Cross-referenced information will be hyperlinked from page to page within the web-site. For example; there will be a Transit Fare page that contains all transit fares, and the Call-A-Ride page will have a link to the Call-A-Ride Fares portion of Transit Fares.
15. A secure function to sell selected fare media on-line via credit card transactions.
16. A "FAQ" section.
17. Agency Board of Commissioners profiles, meeting schedule, agendas and minutes.
18. The site will contain an Agency disclaimer statement that will be provided by our legal representative.
19. A searchable library of Agency documents (Board Policies, Press Releases, Management Procedures, etc.).
20. An on-line customer "Please Contact Me About" feature that will allow customers to enter mailing or contact information and select from a menu of Agency services for follow-up by Agency staff.
21. At selected locations throughout the web-site, when customers ask for information, we will collect name and address information through an on-line form, and store the information in a database. This feature should include a "remove me" feature to remove them from future mailings.
22. The proposer, as part of implementation, will ensure that all of the Agency's domain names are properly installed and registered.
23. The proposer will develop procedures for periodic downloading of information on the web-site that is stored in database tables.
24. When possible, the proposer will use existing content from other Agency web-sites, for example, the hotel and restaurant list at www.gatewayarch.com.
25. The proposer will integrate the two existing MetroLink construction web-sites for Cross County and St. Clair County—www.crosscounty.org and www.metro2001.org.
26. The site should contain a secured area directory of downloadable Agency images for access by authorized personnel.

2.4 ADA Compliance

No specific accessibility standards apply to the Agency's web-site; however, we are committed to the same level of excellent service to our customers with visual, hearing, motor or cognitive disabilities that we do to the general public. The proposer will utilize the W3C Web Content Accessibility Guidelines when designing and developing the Agency's web-site. We will link to sites like Microsoft that have information about how to make IE5 more accessible. We will also suggest links to web-sites that provide accessible desktop software for reading web-sites. We expect the proposer to offer other suggestions that will accomplish this goal.

2.5 Implementation

1. The proposer will be responsible for coordinating the implementation of the web-site with Agency personnel and the web hosting site selected by the Agency.

2. The proposer will provide for a joint beta testing period, and a subsequent acceptance testing period during which the Agency may evaluate the web-site on Agency property to ensure that the web-site functions as anticipated and in accordance with specifications.

2.6 Knowledge Transfer

1. The proposer will provide "as-built" documentation for the web-site.
2. The proposer will provide source code for the web-site and any applications developed in conjunction with the web-site.
3. The proposer will train Agency employees to use and maintain the software necessary to maintain the web-site. This training will occur at the Agency's Headquarters building.

2.7 Ownership and Intellectual Property Issues

1. All screens, graphics, domain names, content and the look-and-feel of the site developed shall be owned solely by the Agency, together with all underlying software, object code digital programming and source code.
2. The proposer does not retain rights to use any materials or software it gains from its creation of the web-site.
3. All intellectual property developed in connection with the web-site will be owned solely by the Agency.
4. In developing the web-site, the proposer will not infringe or violate the copyright and other intellectual property rights of third parties.
5. If the proposer is bundling or using any prior intellectual property that it owns and of which it wishes to keep ownership, the Agency will receive a perpetual, irrevocable, world wide, royalty free transferable license to the same.
6. The proposer is responsible for securing various rights, licenses, clearances, and other permissions related to works, graphics or other copyrighted materials to be used or otherwise incorporated in the web-site.
7. All applicable copyright notices will be displayed on the web-site.
8. The proposer will not, during the web-site development or thereafter, use the Agency's logos except with the Agency's express written approval.
9. The proposer will not use its service affiliation with the Agency for its own promotional purposes without prior written consent.

2.8 Miscellaneous

1. The proposer shall keep all confidential or proprietary information that it learns about the Agency or its customers strictly confidential, and not use such information other than in connection with the development of the web-site.
2. The successful proposer will meet with the Agency's project team, at a minimum, every two weeks for the length of the project.
3. The successful proposer will provide an electronic mechanism for conveying and verifying information in a timely fashion.

2.9 Future Considerations

Design elements must consider features planned for the future. Explain, in detail, how you will accomplish this. Future functionality includes:

1. An in-house business-to-business application to consign transit passes to our existing pass vendors.
2. An on-line trip planner for our customers.
3. A flexible on-line survey tool.
4. A search engine.
5. Weather alerts and service delay information.
6. Automatic email notification to customers when something is changing on a route that they use.
7. A virtual Bi-State transportation system tour.
8. Advertising on-line.
9. Expanded e-commerce functionality to include the MetroRide Store sales.
10. An on-line paratransit reservation and cancellation process for our customers.
11. Information in other languages.

Section 3. Proposal Response Format

For ease of evaluation and comparison, proposals must respond to the following format. Paragraph layout and identification should permit easy reading and referencing. Multiple sections, paragraphs and subparagraphs should be numbered corresponding to this document or otherwise identified to assure proper understanding of subordinate topics, relationships, and qualifying statements or phrases. The technical proposal must be submitted in a separate sealed package from the cost proposals. Partial proposals will be rejected. A joint proposal in which one firm is the primary contractor coordinating the efforts of multiple sub-contractors is acceptable.

3.1 Introduction:

Include a brief statement of those matters that your firm wants to highlight. If you include additional items not requested, the introduction must identify the items and where they occur. The introduction should be limited to two pages.

3.2 Creative and Technical Information:

The information included in this section of your response should relate directly to the professional scope of services. Proposals must be explained in detail, explaining the approach and alternatives considered. This section should correspond to Section 2, Professional Scope of Services, of this document.

3.3 Experience and Professional Competence:

Describe, in detail, your firm's qualifications to provide these services including the ability to bring additional resources to the project should they become necessary. Identify all sub-proposers, their relationship to your organization and responsibilities on the project. Provide resumes of the professional and management staff that will be assigned to the Bi-State account. Provide references that will be used to evaluate your ability to provide this service.

3.4 Project Work Plan:

Provide a detailed work plan defining anticipated phases of the project and a detailed description of the process for each phase. Include a detailed schedule of events for implementation. Specifically outline the creative and technical roles for both the proposer and the Agency.

3.5 Contract Pricing and Payments:

3.5.1 Fixed Price. The Agency will enter into a fixed-price contract with the successful proposer for the agreed-upon scope of services. This will include all design, development and implementation activities for the new Agency web-site. The Agency will retain 20% of the total contract amount and will remit this amount 30 days after acceptance. Acceptance will occur, barring any problems, 30 days after the go-live date. The 80% component of the contract will be paid in equal monthly payments based upon the total number of months to complete the project as proposed.

3.5.2 Project Change Requests. For any activities falling outside of the agreed-upon scope of work the proposer will provide a single blended hourly rate for professional services. If individuals with varying skill levels and hourly rates are to work on the project, it is not acceptable to propose multiple hourly rates. These hourly rates must be combined into a single blended rate. Prior to any work, the change must be documented and approved by both the proposer and Agency Project Managers. These services will be billed by the hours of service provided, and the proposer will invoice the Agency monthly for these services.

3.5.3 Optional Pricing. Based upon your knowledge and experience, provide optional pricing for services after the project is implemented:

1. Tier One Web Hosting Services. Provide a monthly rate for an annual contract. Outline the value-added services that will be provided.
2. Ongoing Technical Support Services. Provide a blended hourly rate and estimated number of hours per month.
3. Ongoing Web Promotion Services. Provide a blended hourly rate and outline the services that will be provided. Also provide the estimated number of hours per month.
4. Ongoing Web Content Management Services. Provide a blended hourly rate and outline the services that will be provided. Also provide the estimated number of hours per month.

3.5.4 Warranty. The proposer will warrant all work for a period of 180 days following acceptance of the web-site. The proposer warrants that the software for the web-site is free of any viruses. During this time the proposer will fix any bugs, failed links or any other error in the web-site at no cost to the Agency. All web-site corrections will be made within two hours of notification. The proposer must identify a contact to whom all corrections should be directed.

The portion of your proposal that contains pricing must be submitted in a separate sealed envelope from the technical proposal package.

3.6 Disadvantaged Business Enterprise Participation:

Identify, in detail, your plans for utilizing DBE firms in this project. Indicate the name of the firms, the principal contacts, and specifically identify the portion of the work for which they will be responsible. Include the firms' experience and qualifications. Indicate the total DBE percentage commitment in hours and dollars.

Section 4. Proposal Evaluation Criteria

Proposals will be rated according to the following criteria, in descending sequence of importance:

4.1 Professional Services:

Detail information about professional scope of services as outlined in Section 2.

4.2 Qualifications:

4.2.1 Information concerning the qualifications of the firm in providing the proposed services to other firms of comparable size to the Agency.

4.2.2 Experience and qualifications of the professional and management team that will be assigned to the account. Include detailed resumes of all individuals who will be assigned to the account.

4.2.3 References from both general and public entities similar to the Agency.

4.2.4 Implementation Work Plan.

4.3 Cost.

4.4 Disadvantaged Business Enterprise Participation.

Section 5. Proposal Evaluation Methodology

5.1 A committee consisting of members of the Agency's Marketing, Communications, Customer Service and Information Technology departments will conduct proposal evaluations. Committee evaluation will be a process of awarding points based on the firm's response to the Agency's requirements.

The creative/technical package will be evaluated first. All qualified proposers will proceed to the next phase in which cost proposals and DBE participation will be assessed. Points will be assigned to the cost proposal and DBE participation based upon a standard formula that rewards competition.

5.2 Interviews and demonstrations may be requested by the evaluation committee to clarify or confirm proposals.

5.3 The contract award will be based upon the proposal that receives the highest evaluation score using the stated evaluation criteria that constitutes the best professional services proposal and price. In addition, the Agency will consider other factors that will ultimately lead to the Best Business Decision.

5.4 The Agency reserves the right to cancel the procurement if the Agency determines that the proposals received are not in its best interest.

THE TRANSPORTATION RESEARCH BOARD is a unit of the National Research Council, a private, nonprofit institution that provides independent advice on scientific and technical issues under a congressional charter. The Research Council is the principal operating arm of the National Academy of Sciences and the National Academy of Engineering.

The mission of the Transportation Research Board is to promote innovation and progress in transportation by stimulating and conducting research, facilitating the dissemination of information, and encouraging the implementation of research findings. The Board's varied activities annually draw on approximately 4,000 engineers, scientists, and other transportation researchers and practitioners from the public and private sectors and academia, all of whom contribute their expertise in the public interest. The program is supported by state transportation departments, federal agencies including the component administrations of the U.S. Department of Transportation, and other organizations and individuals interested in the development of transportation.

The National Academy of Sciences is a nonprofit, self-perpetuating society of distinguished scholars engaged in scientific and engineering research, dedicated to the furtherance of science and technology and to their use for the general welfare. Upon the authority of the charter granted to it by the Congress in 1863, the Academy has a mandate that requires it to advise the federal government on scientific and technical matters. Dr. Bruce Alberts is president of the National Academy of Sciences.

The National Academy of Engineering was established in 1964, under the charter of the National Academy of Sciences, as a parallel organization of outstanding engineers. It is autonomous in its administration and in the selection of its members, sharing with the National Academy of Sciences the responsibility for advising the federal government. The National Academy of Engineering also sponsors engineering programs aimed at meeting national needs, encouraging education and research, and recognizes the superior achievements of engineers. Dr. William A.Wulf is president of the National Academy of Engineering.

The Institute of Medicine was established in 1970 by the National Academy of Sciences to secure the services of eminent members of appropriate professions in the examination of policy matters pertaining to the health of the public. The Institute acts under the responsibility given to the National Academy of Sciences, by its congressional charter to be an adviser to the federal government and, upon its own initiative, to identify issues of medical care, research, and education. Dr. Kenneth I. Shine is president of the Institute of Medicine.

The National Research Council was organized by the National Academy of Sciences in 1916 to associate the broad community of science and technology with the Academy's purposes of furthering knowledge and advising the federal government. Functioning in accordance with general policies determined by the Academy, the Council has become the principal operating agency of both the National Academy of Sciences and the National Academy of Engineering in providing services to the government, the public, and the scientific and engineering communities. The Council is administered jointly by both Academies and the Institute of Medicine. Dr. Bruce Alberts and Dr. William A. Wulf are chairman and vice chairman, respectively, of the National Research Council.