511 Service in USA and in San Francisco Bay Area

Service Model, Benefits and Beneficiaries

Petri Mononen

Author(s)
Mononen, Petri

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Abstract

This report looks into the background of the deployment of 511 transport information services in the US. The content of the 511 transport information service in San Francisco Bay Area (SFBA) and the service network model applied with the SFBA 511 service in particular are described in this report.

In the US, the three digit number 511 has been selected as a common brand for traffic and travelling related information. The US federal government provides several types of support and incentives for the states in order to facilitate the early stages in the deployment of 511 services. These means include e.g. assistance funding and various deployment and marketing support toolboxes. Currently 28 states have the service available either through the phone or the Internet or both.

The SFBA 511-service covers different modes and is available both on the Internet and as a phone service. The service includes information on traffic, transit, bicycling and ridesharing. The service was one of the forerunners in the 511 implementation in the US, it is quite well known in the area and is well appreciated by its users. About 90% of existing users are very or somewhat satisfied with the services. Today the service generates around 500 000 phone calls and over 2 000 000 web-sessions per month.

The SFBA 511 is facilitated by a partnership of public agencies led by the Metropolitan Transportation Commission, the California Highway Patrol, and the California Department of Transportation. The SFBA 511 services are based on public sector funding. The annual operational budget is about $6.2 million. The public partners include the aforementioned agencies, congestion management agencies and emergency response services. The private partners include a system manager contractor, companies supplementing public agency data collection efforts, local media and various information service providers.

This report concludes that it is sensible that the secondary beneficiaries, i.e. the public actors pay the majority or all of the costs regarding the deployment, operation and maintenance of travel information services. This conclusion is backed by evidence on the fact that in general travellers are not willing to pay very much for travel information services like the 511.

Preface

This research report looks into the service model, benefits and beneficiaries of 511 Service in the USA and in particular the 511 service in the San Francisco Bay Area, California. This study is a part of a wide-scope research effort seeking methods and approaches to analyse different types of information services (EVASERVE, www.evaserve.fi). Funding for this particular part of the research came from FINNFUND (Finnish Fund for Industrial Cooperation Ltd.) and VTT Technical Research Centre of Finland.

The reporting was performed by VTT researcher Petri Mononen.

The quality assurance for this report was done by Pekka Leviäkangas from VTT.

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The text and conclusions throughout represent the views of an independent researcher only, and not those of any organization mentioned in this report.

VTT Technical Research Centre of Finland, Espoo, February 2008

Petri Mononen

Contents

1. Introduction

1.1 Background

It has been found in several earlier studies that drivers and travellers do not always get the information they need and want for their daily commuting or longer trips. Even if on-time traffic information is currently available, for instance on the Internet, not everyone is able to find it when needed. Searching for information that is not needed very often, such as routes and road-side services for longer trips can be onerous.

Currently, the information is spread into many sources or addresses, even on the Internet. Service providers are mainly providing information based on their own information gathering. Some are giving links to other traffic and travel related pages – although those are usually also addressed to service providers, not to specific information content. Users are not always aware of who is the provider of the particular information they are searching. Therefore it might be difficult for them to find the relevant information, especially when the information is needed in haste.

Users, drivers and travellers, may need information not only on one mode but also on weather, other modes, delays, incidents, large scale events – just to mention some examples. In addition, users also like to find other traffic related information through the same portal as real time traffic information. Some examples of this kind of information include information on new in-vehicle or roadside technology and its effects, traffic safety, new traffic rules and new traffic signs. [1]

One way to help users in their search for traffic information is to collect the existing traffic and travelling related information into one portal – for instance on the same Internet-page. In the US, the three digit number 511 has been selected as a common brand for traffic and travel related information. There are similar plans for gathering together different pieces of traffic information in the EU countries. [1]

1.2 The scope and method of the study

Scope

The scope of this study has been focused into describing the 511 transport information service from the following three angles:

i) The background and path to deployment of 511 transport information services in the US,

ii) The content of the 511 transport information service in the San Francisco Bay Area (SFBA), California and

iii) The service network model of the SFBA 511 service.

Method

This study has been carried out as a desktop work based on prior research, review of literature and published material and other information sources on 511 services in the US and in SFBA. This study is best described as a review study, as the amount of in-depth analysis and resulting findings or conclusions has been left intentionally minimal.

2. Description of the 511 service in USA

2.1 Background and history [2, 3]

The public and private sectors across the USA have invested millions of dollars in Intelligent Transportation Systems (ITS) as a means of enhancing mobility, improving safety, and speeding freight to its destination.

A great deal of information is collected via ITS. Providing access to traffic information via one nationwide, three-digit telephone number is a means to make the most of that investment. That is, to get that information to the driver and shipper by the most common means of communication, the telephone. One easy-to-remember number, regardless of the traveller's location, gives travellers' choices – choice of time, choice of mode of transportation, choice of route – which save lives, time and money.

On July 21, 2000, the Federal Communications Commission (FCC) granted the petition of the U.S. Department of Transportation (DOT), filed in March, 1999, for nationwide assignment of the abbreviated dialling code "511" for access to traveller information services. The FCC concluded that a governmental entity may request 511 from both wireline and wireless service providers to use it for intelligent transportation systems (ITS) or other transportation information, but left with federal, state, and local transportation agencies the discretion to determine the deployment schedule and the type of transportation information to be provided.

In its order assigning the 511 code, the FCC observed that callers should have access to information that transcends municipal boundaries and is easily retrievable in a single call, but recognized that "governmental entities, working in conjunction with regional government transportation agencies, will need time to determine uniform standards for how travel information services should be provided to the public."

DOT's ITS Joint Program office is sponsoring an effort to document the progress of 511 services for the benefit of the entire transportation community.

Mindful of both the opportunity and challenge 511 presents, the American Association of State Highway and Transportation Officials (AASHTO), in conjunction with many other organizations including the American Public Transportation Association (APTA) and the Intelligent Transportation Society of America (ITS America), with support from the U.S. Department of Transportation, has established a 511 Deployment Coalition.

The National 511 Traveller Information Service is under the guidance of this Coalition. The goal of the 511 Deployment Coalition is "the timely establishment of a national 511

traveller information service that is sustainable and provides value to users." The intent is to implement 511 nationally using a bottom up approach facilitated by information sharing and a cooperative dialogue through the national associations represented on the Policy Committee, the governing body of the program. The mission of the Policy Committee is to provide guidance on how to achieve this goal. A Working Group of practitioners has been formed to support the Policy Committee.

2.1.1 National support for 511 deployment

Although there is currently no one source of established funding for 511, there are still many options that can be used. Deployers across the US have used a wide assortment of funding, ranging from ITS earmarks, Congestion Mitigation and Air Quality (CMAQ), Surface Transportation Program (STP) funds and state or local funds. In addition, there may be some funding for 511 in the next transportation act reauthorization, which is pending before Congress as of publication of this document.

The US federal government provides several types of support and incentives for the states in order to facilitate the early stages in the deployment of 511 services. These means include e.g. assistance funding and various deployment & marketing support toolboxes.

Assistance funding through "511 Planning Assistance Program" [4]

In order to assist locations in the planning necessary to convert existing telephone access numbers and facilitate implementing the 511 telephone service, the DOT developed a program to provide Federal funding assistance. As an initial implementation of this assistance, the FHWA published a notice in August 2000, requesting participation in a program to help defray the costs associated with converting existing traveller information telephone numbers to 511. Based upon early applications and initial work by states such as Kentucky, Virginia, and Arizona, it became clear that some sort of assistance to areas to develop 511 traveller information systems would be more beneficial toward deployment of 511 services nationwide than just converting existing telephone numbers. Therefore, this 511 support assistance program replaced the earlier conversion program, and offered funding to State transportation departments to develop plans for 511 services. If 511 deployment plans existed, the funds could be used to defray the costs of conversion to 511 or the development of 511 services.

The development of 511 services could include development of basic traveller information services should none exist or are inadequate for delivery by 511. A critical element of developing 511 deployment plans is determining the available traveller

information services and the "gaps" that may exist when considering state-wide deployment.[1]

Deployment support tools and toolboxes

For any actor advancing regional uptake of 511 services, the 511 Deployment Coalition offers various tools that will help in planning 511 deployment, launch and promotion. The single most important of these is the "Implementation and Operational Guidelines for 511 Services" -documentation which is periodically updated by the 511 Deployment Coalition. Other tools include:

> Logos & other brand related guidelines and material (see Figure 1)
> Market research reports
> Marketing plans
> Deployer marketing materials
> Marketing tools
> Outreach presentations
> Media relations materials.

Figure 1. Universal logo for the 511 services in USA.

2.2 Current deployment of 511 in the US [2]

During the past decade, many states in the US have adopted 511 as a common brand for traffic and travelling information. Currently, 28 states have the service available either

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[1] The maximum amount of Federal funding provided under this program for any State was limited to $100,000.

through the phone or the Internet or both. Implementation of the service has been quite fast, and the first systems have already been there for five years and are consequently quite mature. The goal of implementation was to cover 75% of the population by the end of the year 2007. Naturally, the weather and traffic conditions in different states differ quite remarkably and hence the needs for the 511-service also vary.
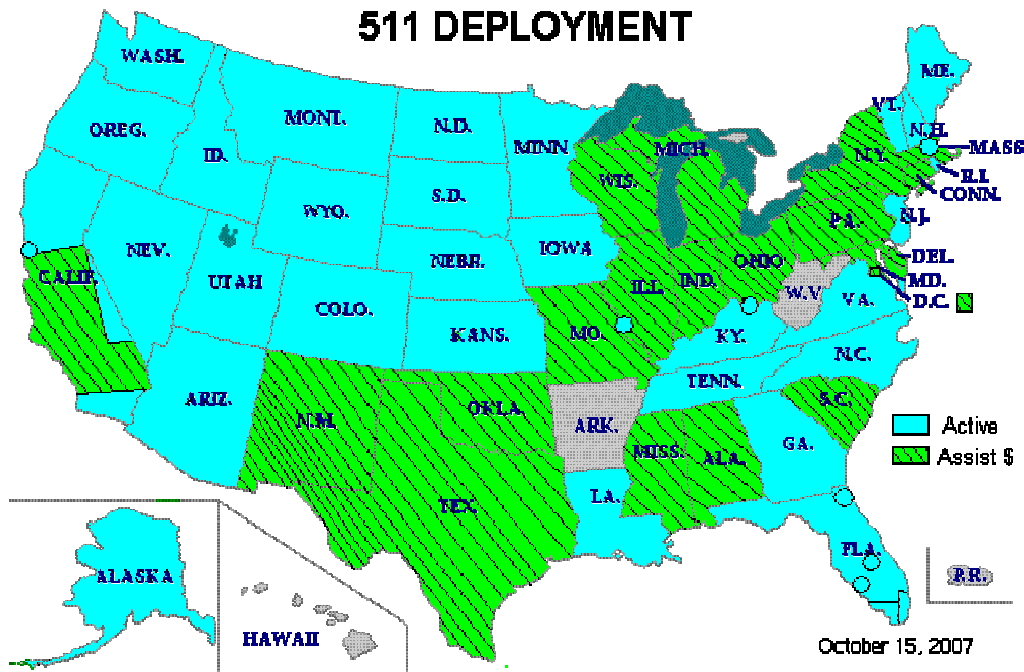
Figure 2. Deployment of 511 in the U.S.[2] [2]

The solid blue-green areas on the map depict states with active 511 services. States in slanted line/green area have applied to the FHWA for 511 planning assistance grants.

These are the active locations where 511 traveller information services are available:

> Alaska 511
> Arizona 511
> ARTIMIS - Northern Kentucky / Cincinnati
> Colorado 511
> Eastern Sierras, California
> Florida 511
> Idaho 511
> Iowa 511

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2 This 511 Deployment map (Figure 2) and the information that follows have been extracted from the Federal Highway Administration's (FHWA) 511 Deployment Website.

- Jacksonville 511
- Kansas 511
- Kentucky 511
- Louisiana
- Maine 511
- Minnesota 511
- Montana 511
- Nebraska 511
- Nevada 511
- New Hampshire 511
- North Carolina 511
- North Dakota 511
- Oregon 511
- Orlando / I-4, Florida
- Rhode Island 511
- Sacramento / Northern California Region 511
- San Diego 511
- South Dakota 511
- South Florida Smart SunGuide
- Southwest Florida 511
- St. Louis Gateway Guide 511
- Tampa Bay area 511
- TravInfo - San Francisco Bay area
- Tennessee 511
- Utah CommuterLink
- Vermont 511
- Virginia 511 Travel Information / I-81
- Washington State 511
- Wyoming 511.

Adopters

The following regions were the "Adopters", i.e. among the first to investigate implementing 511 traveller information services

- Arizona
- Greater Detroit
- Kentucky
- Minnesota
- San Francisco Bay Area
- Shenandoah Valley, Virginia
- Utah.

States that received assistance funding

These are the locations that have received funding under the 511 Planning Assistance Program:

Alabama, Alaska, Arizona, California, Colorado, Connecticut, Delaware, District of Columbia, Florida, Idaho, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana, Maine, Maryland, Massachusetts, Michigan, Minnesota, Mississippi, Missouri, Montana, Nebraska, Nevada, New Hampshire, New Jersey, New Mexico, New York, North Carolina, North Dakota, Ohio, Oklahoma, Oregon, Pennsylvania, Rhode Island, South Carolina, South Dakota, Tennessee, Texas, Utah, Vermont, Virginia, Washington State and Wisconsin.

More information about launches that have already taken place or are planned is provided in the Deployment Coalition Website (http://www.deploy511.org), in the "Timeline of 511, Services In Operation" section in particular. The timeline also includes contact information for the public information officers and technical project managers for each deployment. [5]

All in all it can be concluded that the deployment of 511 services or the preparations for deployment of 511 services have been very active across the US. Only three states so far remain inactive in this sense and have not started to build any 511 services.

3. San Francisco Bay Area 511 Service

One good example of a 511-system that covers different modes and is available both on the Internet and as a phone service, is the San Francisco Bay Area 511-service. The service includes information on traffic, transit (public transportation), bicycling and ridesharing. The service was one of the forerunners in 511 implementation in the US, is quite well known in the area and, based on the studies, also well appreciated and considered to be useful.

Today the service generates around 500 000 phone calls and over 2 000 000 web-sessions per month. (Weekly averages for the whole year 2007 were 105 000 calls and 480 000 web-sessions.) The 10 millionth call was received less than three and a half years from opening the 511 phone service and the 20 millionth call was received around the first days on 2008. [6, 7]

3.1 The San Francisco Bay Area

The San Francisco Bay Area is one of the densest and most heavily populated metropolitan areas in the USA, with over 6 million residents in an area of 7,000 square miles. The Area includes some 18,000 miles of local streets and roads, 1,400 miles of highways, six public ports, and five commercial airports. Its nine counties and some 100 cities are served by eight primary public transit systems as well as numerous other local transit operators, altogether carrying an average weekday ridership of about 1.5 million passengers. The combined annual operating budgets of the public transit agencies exceeds $1 billion. There are also numerous specialized services for elderly or disabled travellers. [8]

Rapid growth of the economy and population in the Bay Area, especially during the latter half of the 1990s, has imposed increasing stress on the area's transportation system. In 1998, a "meltdown" of San Francisco's Municipal Railway, under the pressure of aging equipment, increased ridership, and controversial work rules, produced nation-wide headlines and made public transportation an issue of the greatest concern in local opinion polls. [8]

The people of the Bay Area have a history of involvement in transportation issues, with effects often at odds with conventional planning goals. In 1960, public opposition to construction of a freeway through San Francisco's Golden Gate Park created a major controversy and had the effect of permanently barring the creation of any high-speed thoroughfare between San Mateo and Marin Counties. Projects for replacing and reconstructing freeways and bridges damaged or weakened by the 1989 Loma Prieta

earthquake have been controversial and slow to complete. Air traffic delays cause great distress, but construction of new airport runways are delayed by environmental concerns. [8]

As indicated, coordination and cooperation have not always been the hallmark of transportation planning in the Bay Area. Plans of the state transportation department, Caltrans, to address regional highway needs, continue to run into opposition from anti-freeway groups. Proposals to extend BART (Bay Area Rapid Transport) into Santa Clara County and to other points remain controversial. The Peninsula Corridor Joint Powers Board operates a commuter rail line, CalTrain, between San Francisco and San Jose, which is seen as both a complement and a rival to BART. In this context of overlapping systems and competing demands, the Bay Area has been fortunate to have one transportation agency of regional scope, MTC, that has been able to exercise a coordinating role among the region's many special interests and local authorities. [8]

3.2 The main actor MTC

MTC was created by the Legislature of the State of California in 1970 to serve as the transportation planning, coordinating, and financing agency for the nine-county San Francisco Bay Area. The 19-member governing panel of MTC is responsible for setting agency policies. Fourteen members are appointed directly by local elected officials, two members represent other regional agencies, and three non-voting members represent federal and state transportation agencies and the federal Department of Housing and Urban Development. [9]

MTC functions as both a regional transportation planning agency under state law and, for federal purposes, as the region's metropolitan planning organization (MPO). In the latter role, MTC is responsible for the Regional Transportation Plan, a comprehensive blueprint for development of mass transit, highways, airports, seaports, railroads, and bicycle and pedestrian facilities. MTC also screens local agency requests for state and federal grants for transportation projects to determine their compatibility with the regional plan. [9]

Over the years, MTC has come to play an increasingly important role in financing Bay Area transportation improvements. The federal Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA) increased the powers of MPOs like MTC to determine the mix of transportation projects best suited to their regions' needs. MTC also administers federal funds for combating congestion and air pollution as well as state moneys for transportation projects, including the revenues generated by the Bay Area's seven state-owned toll bridges. [9]

Development and deployment of the 511 service are the result of a partnership between MTC; the California Highway Patrol (CHP); the California Department of Transportation (Caltrans); dozens of public transit and paratransit operators; and two entities that MTC contracts with: a consortium of engineering, telecommunications, design and marketing firms led by PB Farradyne Inc. (nowadays known as Telvent Farradyne after Telvent GIT S.A., the Global RealTime IT Company purchased PB Farradyne) and PBQD (transportation consultants Parsons Brinckerhoff Quade and Douglas), which operates the Bay Area's regional rideshare program, and provides information on carpooling, vanpooling and bicycling options to the 511 system. [8] A precursor for 511 was one of MTC's operational projects, the Bay Area Advanced Traveller Information System, which was known as TravInfo. [9]

MTC has also expanded its involvement, in recent years, in operational projects aimed to promote efficient monitoring and operation of the regional transportation network. These projects include a pioneering computer-based Pavement Management System, developed by MTC staff, that is helping cities and counties to maintain local streets and roads. In partnership with the CHP and Caltrans, MTC oversees installation and operation of call boxes along the Bay Area freeways and administers a roving tow truck service that facilitates clearing incidents from congested roadways. [8]

3.3 Current SFBA 511 system

3.3.1 Overview [6]

511 is a free phone and Web service that consolidates Bay Area transportation information into a one-stop resource. 511 provides up-to-the-minute information on traffic conditions, incidents and driving times, schedule, route and fare information for the Bay Area's public transportation services, instant carpool and vanpool referrals, bicycling information and more. It is available 24 hours a day, 7 days a week.

511 is managed by a partnership of public agencies led by the Metropolitan Transportation Commission, the California Highway Patrol, and the California Department of Transportation. The bulk of the investment is made by the public sector, with some dissemination assistance provided by the private sector. Information is free of charge to end-users.

The information the public gets through 511 is only as good (and as up-to-date) as the data MTC's partners deliver. So the 511 partnership relies on the CHP and Caltrans to constantly update vital information about traffic conditions, accidents, road closures, delays and other incidents affecting motorists on Bay Area freeways, expressways and

other major thoroughfares. The 511 partnership similarly calls on the region's transit and paratransit operators to provide timely and accurate information about their routes, schedules, fares and to alert callers and Web users of any service changes or interruptions.

511 phone service is available in the entire nine county Bay Area, on nearly all landline and cellular phones. The nine counties in question are Alameda, Napa, Santa Clara, Contra Costa, San Francisco, Solano, Marin, San Mateo and Sonoma.

The 511 Program has evolved to keep pace with the changing needs of mobility consumers, advances in technology, and the availability of travel data. MTC has delivered traveller information since the mid-1990s, when it launched a multi-modal telephone service and a separate regional transit information website. 511 is now a consolidated, comprehensive, multi-media, multi-modal traveller information service. While Bay Area 511 information is available via phone and web, there are slight differences in how the information is presented due to limitations of the media. Because of web capabilities, the 511.org website is able to offer broader information and more detailed and interactive information to users than what could reasonably be provided via the 511 phone service. Bay Area 511 unifies several traveller information programs. Transit, Traffic, Rideshare and Bicycle information previously existed as separate information resources, but have been merged under the 511 suite of services to provide a one-stop resource. Of these, traffic and transit represent the largest percentage of usage; as such, recommendations within the plan focus primarily on strategies that support enhanced or expanded functions for these two modes. Furthermore, the rideshare program recently completed its own strategic plan. The current level of effort to provide bike information will remain unchanged.

511 Accessibility: MTC staff met with its Elderly and Disabled Advisory Committee for guidance and review of the phone and web service. Both were enhanced with specific recommendations from this committee. Phone users who are hearing impaired can call 711, the national three-digit number for access to the Telecommunication Relay Services (TRS), to access 511. Speech-impaired callers can similarly use 711 or can use the back-up, touch-tone system that 511 offers.

3.3.2 Traffic data collection [6]

The traffic functions on 511 has required a major investment in data collection. MTC collects and consolidates regional traffic data from various sources to make congestion information, driving times, incident information, segment speeds and information about planned closures available through the phone and web. With incomplete freeway data

available from Caltrans, MTC made key investments in additional data collection mechanisms using FasTrak transponders as well as integration of freeway data from private sources (SpeedInfo).

The traveller information centre (TIC), operated by an MTC contractor, is the control centre for data aggregation. Both manual and automated data come into the TIC where it is consolidated and processed for 511. Real-time traffic data is then disseminated to the public via phone and web as well as to information service providers – including broadcast media – to be used as part of their traffic information dissemination services.

3.3.3 Transit data collection

Transit data to support 511 must be coordinated with the many individual transit operators in the Bay Area. The Regional Transit Database (RTD) is the clearinghouse for data from the region's transit services. Coordinating with different transit agencies presents challenges, as each agency has different expectations, scheduling systems, forms and types of data. Ultimately, a greater investment has been required to support the ongoing collection of transit schedule, fare, and route data to support trip planning than MTC had initially anticipated. Currently, real-time transit information is available on a pilot basis for San Francisco municipal light rail and streetcars via the phone; it has also been made available on the web through a link to nextmuni.com. MTC has conducted an evaluation of possible approaches for a region wide deployment of real-time transit information. The deployment of the real-time transit information is currently underway. [9]

3.3.4 511 telephone content and features [6]

Public Transportation

At the Public Transportation section 511 provides the following:

Transit Agency Information: Transfers to agency operators, routes, schedules, fares, service announcements, lost-and-found and customer service for more than 40 transit providers.

Commuter Incentives: Toll-free transfers to an operator who provides information about programs that offer financial incentives for commute alternatives, including the commuter tax benefit program and free services for commuters. A message service is available for after-hours questions.

Airports: Toll-free transfers to an operator who provides information about public transportation, ground transportation, and shuttle services for San Francisco, Oakland, San Jose and Sacramento airports.

Paratransit Agency information: Information for approximately 20 paratransit agencies serving persons with disabilities or the elderly, including shuttle services, public transportation, and customer service.

511 provides toll-free transfers to Bay Area transit agencies so the user does not have to remember agency phone numbers. Through the partnership with the transit agencies, 511 can provide the user with information on routes, schedules, fares, bikes on transit, accessibility and service updates. When the user calls 511, he/she can ask for the name of a transit agency. If the user is not sure what agency he/she should choose, he/she can say, "I don't know" at the Transit Agencies Menu to hear a list of choices. Once the user has made a selection, 511 will either play a recorded message for select options (fares, passes, etc.) or transfer the call to a live transit agency operator.

Traffic

Enhanced software supports an array of features on the 511 phone system that enable MTC to provide traffic information. The features include:

Traffic Conditions: 511's Traffic Conditions provides current incidents and average speeds when traffic is moving less than 40 miles per hour. It also provides road closure information from CHP, Caltrans, and other transportation agencies.

511 Driving Times: 511 Driving Times provides actual driving times for specific routes based on real-time traffic information.

Airports: Provides information about traffic conditions, ground transportation and parking rates for San Francisco, Oakland, San Jose, and Sacramento airports. Oakland International Airport also provides, when available, parking-status information.

FasTrak: Transfers toll-free to an operator who has information on the FasTrak Electronic Toll Collection program. The FasTrak program is a way for drivers to pay Bay Area bridges tolls via an electronic transponder. FasTrak users are able to drive non-stop through toll plazas in dedicated FasTrak lanes, and the tolls are automatically deducted from their prepaid accounts.

Carpooling and vanpooling

When asked for any of the following: "carpooling, vanpooling or rideshare", 511 will connect the user with an operator who can explain how to join a carpool or vanpool, and provides information on rideshare incentives, tax benefits, commuter checks, park-and-ride lots, and rules about diamond/HOV lanes (express lanes on freeways). A message service is available for after-hours questions.

Bicycling

When a user asks for "bicycling", 511 connects to an operator with answers to bicycling questions, including how to get bike maps, tips for taking a bike on transit and across Bay Area bridges, and how to get in touch with local bicycling organizations. A message service is available for after-hours questions.

3.3.5 Content and features through www.511.org

The SFBA 511 service offers through the Internet (at www.511.org) the following:

Transit

This on-line version of the transit information service features the TakeTransit Trip Planner. This automated Web-based tool assists in planning Bay Area transit trips. By typing in the starting and ending points, the Trip Planner will return the most efficient routes, including walking maps to and from transit. The 511 Popular Destinations on Transit feature offers information on how to travel to Bay Area sites using transit. Other features include transit schedules and route maps, fare information and paratransit information for the elderly and disabled. [6]

Traffic

511 Traffic provides information via the Internet about travel on Bay Area freeways and expressways. The traffic page includes 511 Driving Times, Bay Area traffic maps, and FasTrak information. The traffic maps are interactive and help the user to calculate driving times for their routes. The map also shows traffic alerts, incidents, levels of congestion, special events and construction information. Additionally the traffic page at 511.org provides Popular 511 Driving Times information, showing the driving times of the most popular commuter routes in the Bay Area. [6]
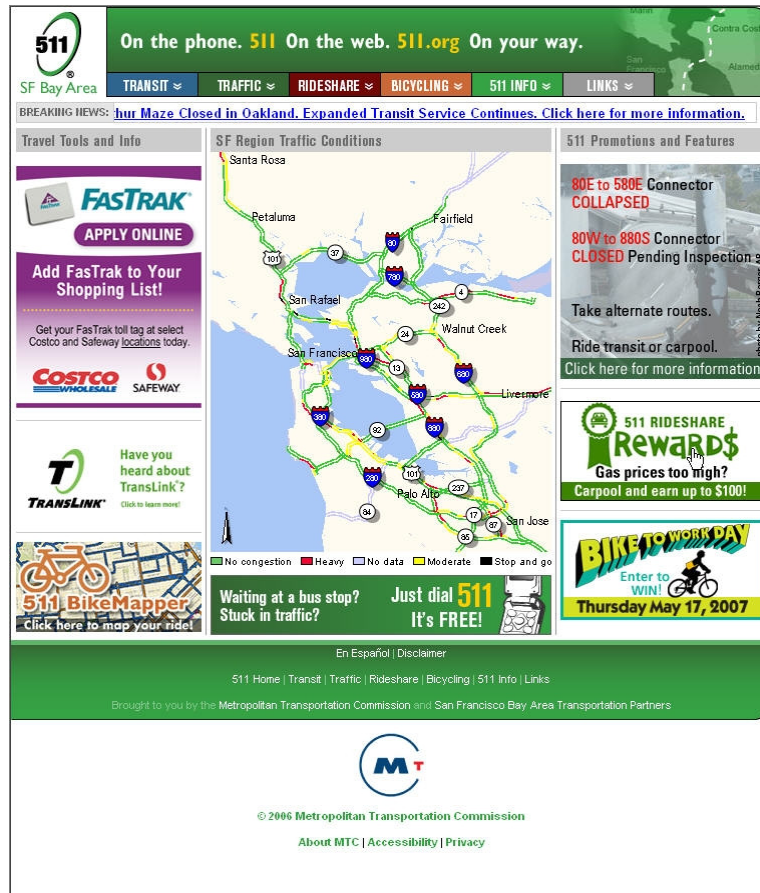
Figure 3. Main page of San Francisco Bay Area 511-service on the Internet. [6]

Rideshare

511's reasonably new Rideshare Page enables to find information about alternatives to driving alone. The 511 Online Ridematching service helps in finding members for a carpool or vanpool. The service is free, and can provide instant information on starting a carpool and vanpool. The site also provides the locations of Carpool (HOV) Lanes and park-and-ride lots as well as information on incentives for car-poolers and vanpoolers. [6]

Bicycling

511's Bicycling Page (www.bicycling.511.org) serves as a resource for bicycling commuters and recreational cyclists. The site provides useful information, including safety tips, bike maps, tips for taking bikes on transit and across Bay Area bridges, information on local bicycling organizations, and announcements that affect the Bay Area's bicycling community. [6]

Predict-a-Trip

An important traffic information feature is "Predict-a-Trip" which allows users to access historical travel time info and compare it to current conditions. [9]

Figure 3 illustrates the opening page of San Francisco Bay Area 511 Internet service.

3.3.6 Usage and trends

The San Francisco Bay Area 511 service is the most comprehensive and well-used 511 traveller information system in the USA. At the moment the service generates around 500 000 phone calls and over 2 000 000 web-sessions per month. The 10 millionth call was received less than three and a half years from opening the 511 phone service and the 20 millionth call was received around the first days on 2008. [6, 7]

Figure 4 below illustrates the accumulation of calls from December 2002 to March 2006 [1] and figure 5 the web usage during 2007. Survey [10] data reveals that:

- Traffic and transit information requests had made up 97 percent of all requests via 511 phone and web. (Rideshare requests had made up 2.5% and bicycling requests 0.5%.)

- Traffic information had remained the dominant information type requested by phone.

- Transit information had been the most requested on the web.

- The 511 phone system had experienced average annual call volume growth of 60%. The greatest growth rate for 511 phone services around the country were those that had been in service for more than two years.

- The 511 website had experienced average annual growth in user sessions of 38%.

- The 511 phone system was reaching each "millionth call" milestone in fewer months. Whereas the first million calls took nine months to achieve, now the system logs a million calls every two to three months.
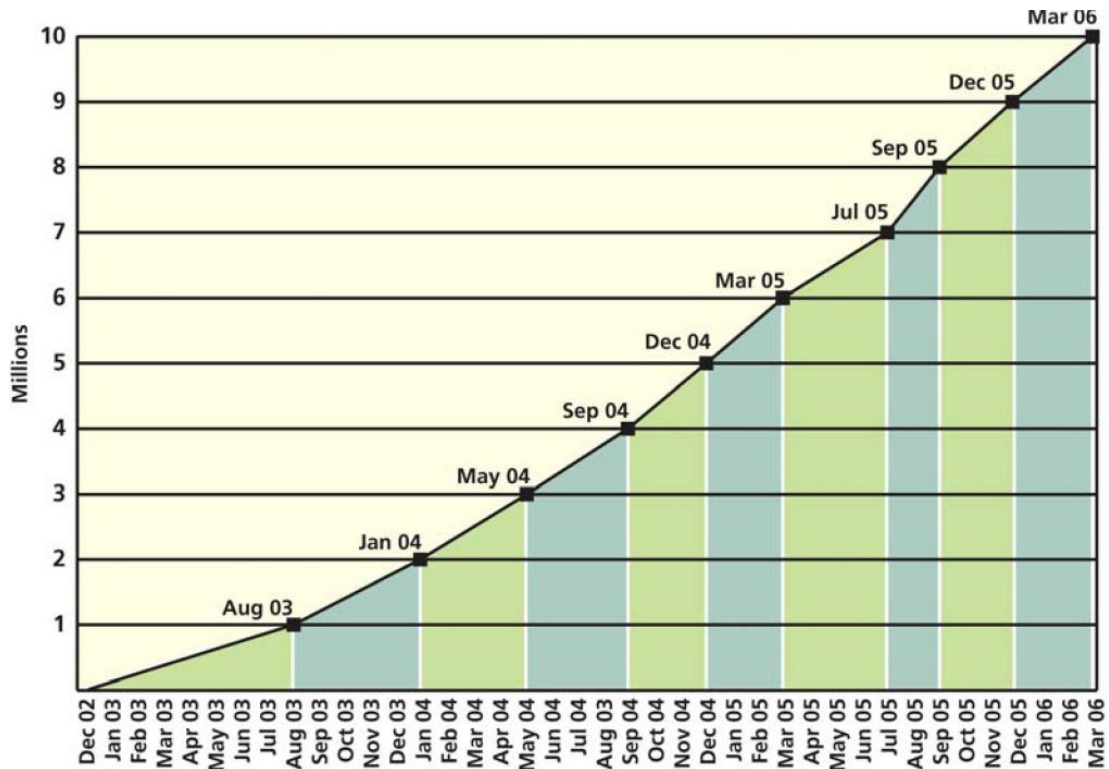
Figure 4. Millions of calls to SFBA 511. [10]

3.3.7 Future of SFBA 511

In August 2007, the U.S. Department of Transportation (US DOT) designated the San Francisco Bay Area as an Urban Partner, securing $158.7 million of federal funds to implement innovative congestion relief programs in the region, the second most congested in the country. The Urban Partnership Program is part of a larger US DOT initiative to reduce congestion across the nation. The program is intended to encourage cities to develop an integrated response to congestion through deployment of the Department's 4T's of congestion management: tolling, transit, technology, and telecommuting. Among other things, the grant will fund expansion of MTC's 511 real-time traveller information systems. [8]

Emergency response has become a much bigger issue for MTC during recent times. MTC is investing significant resources in increased capacity for phone and web, and have invested in many other emergency tools. [9]

MTC has conducted an evaluation of possible approaches for a region wide deployment of real-time transit information. The deployment of the real-time transit information is at the moment underway. [9]

The 511 traffic program has wrapped up its design-build phase and transitioned to a system maintenance and operations phase.
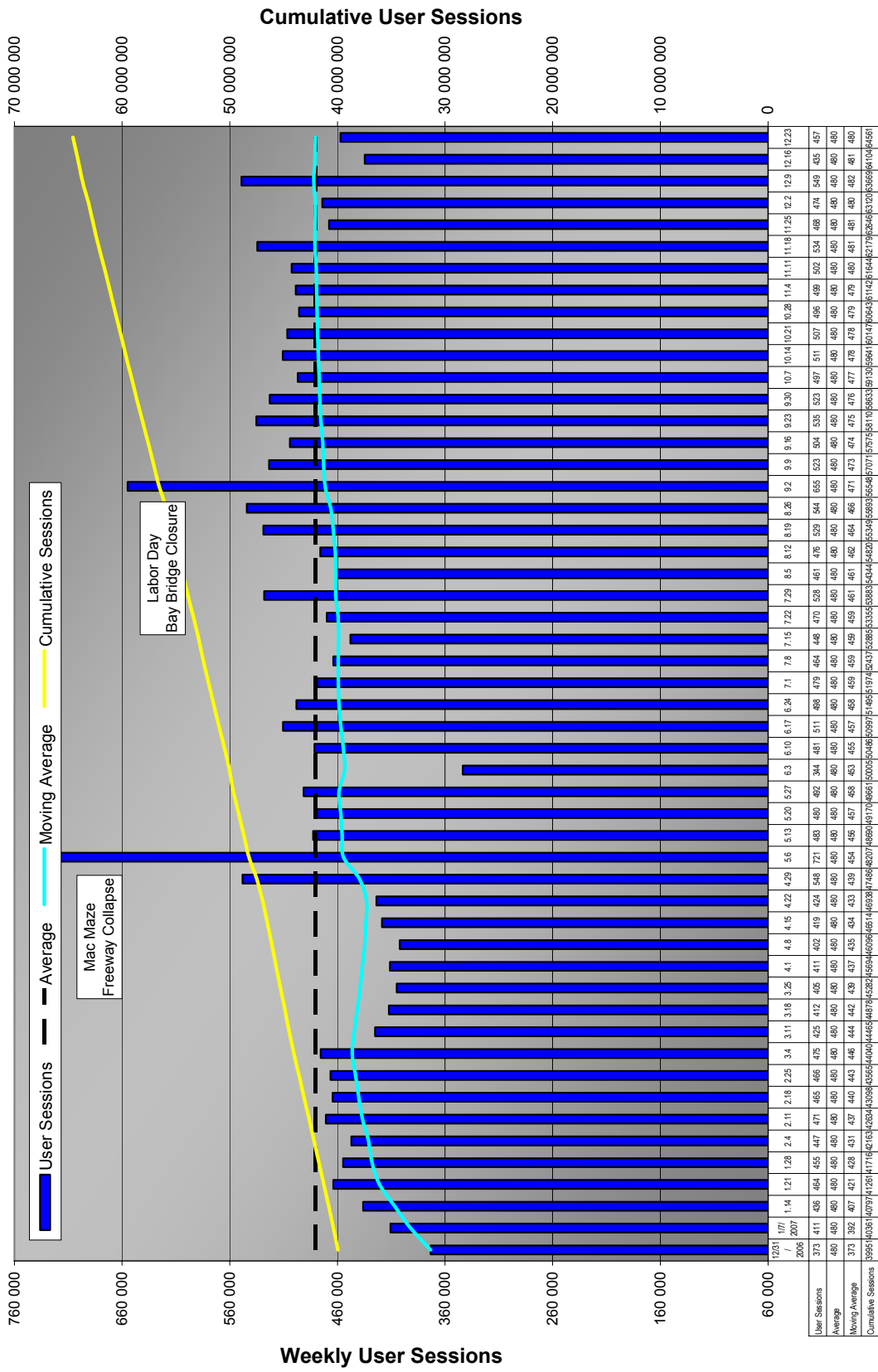
Figure 5. Web use during 2007. [7]

4. Business and Service Models

4.1 The business models considered before implementation phase

The following descriptions of business models specify those approaches that were considered feasible for 511 implementation during the early stages of national 511 deployment. These were prepared by the 511 Business Models and Cost Sub-committee prepared this document of the 511 Deployment Coalition to educate other members of the 511 Working Group and the members of the 511 Policy Group on issues salient for migrating a planned or existing traveller information service to utilize the 511 dialling code. [11]

The recommendations therein were meant for national scale to be used in multiple states or regions but at the same time it was noted that Business Models and Solution Scenarios presented there were for *example purposes only*.[3] Each implementing entity were advised to view these solutions as guides, and perform their own studies to determine which, if any, solutions might be applicable.

The goal was to investigate plausible business models and their applicability to 511. It was agreed that attempts would be made to bring public and private enterprise together to work cooperatively on 511 solutions. It was also agreed that a basic 511 service should be available to the end user at no more than the cost of a local call, and that an extended 511 service could be available typically through the private sector, at an additional cost to the consumer. These underlying principles were incorporated to explore the business models, cost considerations, to enable partnerships and finally to make recommendations. [11]

4.1.1 The preferred business model

The group anticipated that the **Public Sector Funded Model** was the most likely approach for a basic service implementation.[4] Description of the Public Sector Funded Model:

> "Constituents such as Government agencies elect to pay for most or all of the service provided to the end user. This would reduce the hurdle rate for other cost recovery methods (like selling advertising) and provide a valuable

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[3] Solutions that may work in one state or metropolitan area might not be viable in another for a multitude of reasons.

[4] The Public Sector Funded was also the business model applied for implementing and operating the 511 service in San Francisco Bay Area.

service to the end user. This model places the financial responsibility on the public sector and assumes that the call costs no more than a local call to the user. Delivery of services to the end users is more likely to be public oriented and, as with all models, the cost of telecommunications or other delivery methods will vary widely."

Traditional public-private partnerships for traveller information have typically consisted of public agencies collecting roadway conditions data, disseminating it through public infrastructure, and providing it at no charge to the private sector. The private sector, in turn, disseminates the data through a variety of privately developed systems. In theory, if private sector companies or public agencies could generate revenue by providing traveller information, public agencies could offset traveller information program costs through some type of revenue sharing agreement. [10]

4.1.2 Other business models considered [11]

This chapter briefly lists the other business models considered before selecting the Public Sector Funded Model.

Subscription Model

Description: The subscription model suggests that the end-user of the service should subscribe or become subscribed to the 511 services for a fixed monthly or yearly fee. For this fee, the subscriber should have access to the service on an unlimited or bulk basis. This service can either be offered on an opt-in or an opt-out basis. In the opt-in scenario, the service provider can market the services in order to entice the end-user to sign up for it. An opt-out scenario is one where a caller is automatically subscribed to a service by completing the call unless they take some action to cancel the subscription. (Magazine publishers and credit card companies often use this method to lure new customers. A customer agrees to a "sample" of the service, but must take direct action informing the provider that you wish to cancel the subscription before being charged for it.)

The group concluded that this model conflicted with the 511 Policy Committee decision of making a 511 call "no more than the cost of a local call to the user."

Pay-Per-Call Model

Description: The pay-per-call model, charges the end user for the service on a call-by-call basis. This allows the Service Provider to charge for the specific cost of the call and then bill the end user through their existing phone service.

The group concluded that this model also conflicted with the 511 Policy Committee decision of making a 511 call "no more than the cost of a local call to the user."

Advertising and Sponsorship Model

Description: Under this model, advertisers and sponsors would have the ability to place ads throughout the service, covering the costs of the service itself. Services that have the potential to drive sufficient call volume will be able to command a higher price for ad placements. As an example on the Internet, information based services such as Yahoo's website generate 90% of their revenue from selling advertisements onto their service.

Loss-Leader or Franchise Model

Description: Under this model, the 511 information service provider (ISP) would underwrite all or a portion of delivering the service in exchange for the opportunity to market and up-sell the caller additional services and/or the opportunity for other special privileges associated with a franchise agreement. This model was used by SmartRoute Systems in Detroit wherein SmartRoutes agreed to deploy and operate an Automatic Traffic Information System (ATIS) and traffic management system in exchange for the exclusive right to market public sector data. It was also used by Trafficstation to secure an agreement in the New York tri-state area wherein Trafficstation was to build and operate an Internet web site whose operation would be sustained through advertising and subscriptions to enhanced services.

Hybrid Business Models

Also, more innovative models were considered which were set up in a hybrid fashion. It was noted that public sector support would very likely be needed for the basic level of 511 service. Unless a change would be made to the Policy Committee decision on the price being no more than the cost of a local call to the user, funding would be required to sustain day-to-day basic operations until such time as private revenue can grow and perhaps be used to defray the public sector funding.

The following are examples of hybrid models, which were considered to be applicable in certain areas to help offset costs to implement a 511 service. In any of these and other examples, telecommunications carriers may have an unspecified role in the process. If the telecommunications carrier sees a light at the end of the tunnel (such as billing or consuming more wireless minutes, offering advertising, or up-selling to a premium service), then they may offer to fund a portion of the service. This has been successful mostly in markets where the carriers could see the benefit of "partnering" with a government agency.

- Public sector funded basic 511 services + sponsorship or advertising.
- Public sector funded basic 511 + per-use premium services (Up-Selling).
- Public sector funded basic 511+ subscription for personalized services.
- Public sector funded basic 511 for wireless customers as a service differentiator.

4.2 Costs of ramping up a 511 service

The summary table below (Table 1) reflects the development of a cost estimate for the data collection and data processing components of a 511 traveller information system in the US. The cost for the data collection and data processing is presented as a range with the low end representing the cost for a generic medium metropolitan area and the high end representing a generic large metropolitan area. The cost estimate is based on a zero baseline. That is, no existing underlying infrastructure has been assumed to be in place.

Table 1. Estimated costs of a 511 traveller information system in the US [11].

Deployment Stage	Medium Metropolitan Area		Large Metropolitan Area	
	Capital Investment	Operations & Maintenance (Annual)	Capital Investment	Operations & Maintenance (Annual)
Stage 1 – Data Gathering	$16,500,000	$970,000	$40,500,000	$2,400,000
Stage 2 – Data Fusion/Processing	$465,000	$15,000	$485,000	$24,000
Stage 3 – Telephone Dissemination	$100,000 ~ $650,000	$30,000 ~ $100,000	$100,000 ~ $650,000	$30,000 ~ $100,000
Stage 4 – 511 Implementation	$20,000 ~ Unknown	Unknown	$20,000 ~ Unknown	Unknown
Stage 5 – 511 Marketing	Unknown	Unknown	Unknown	Unknown
Total	$17,085,000 - $17,615,000+	$1,015,000 - $1,085,000+	$41,105,000 - $41,635,000+	$2,454,000 - $2,524,000+

Judging from the recommendations given in the MTC 511 Strategic Plan [10], the operating costs for an up-and-running 511 service in a large metropolitan area (e.g. San Francisco Bay Area) are somewhat higher. In reality, the plan recommends an operational budget of $6.2 million, annually for the next 10 years.

4.3 The responsibilities for MTC and partners [10]

This chapter studies the roles and responsibilities of MTC and partners, according to the MTC 511 Strategic Plan [10].

4.3.1 Private partnerships for traveller information and 511

Public agencies who provide traveller information services have long hoped that establishing relationships with private sector companies might help defray the costs of providing traveller information. Outreach to private partners in the Bay Area was therefore an important part of the strategic planning process. The changing landscape of private sector involvement in delivering traveller information programs, emerging technologies, and emerging business models could have a significant impact on future directions and strategies in the SF Bay Area.

Current private sector partners

MTC currently partners with several private sector entities to provide 511 services on a day-to-day basis. Private partners include:

1. A system manager contractor (PB Farradyne) to design, build, operate and maintain a traveller information service as well as other contractors to provide various elements of the 511 system.

2. Private companies who supplement public agency data collection efforts to provide wider real-time coverage of key corridors in the region.

3. Local media who broadcast traffic, incident and construction information provided by 511 over radio and TV.

4. Information service providers (ISPs) that make 511's regional traffic and travel conditions data available through multiple technologies, such as Internet, telematics and wireless communications.

Private Sector Input and Perspective

Based on feedback from current partners and key industry players, it can be determined that private partners are not interested in taking on a large responsibility for a function that public agencies are currently providing. In fact, most partners are supportive of MTC and public agencies continuing to collect data, serving as a 'one-stop' source for regional data, and continuing to promote the public sector 511 program because that outreach has tremendous benefits to promoting awareness of traveller information

overall (and indirectly helps to promote some of the private initiatives). In general, feedback from the private sector, including the media, data collection, data dissemination and other information service providers indicate:

1. The private sector is still looking for good business models. Subscription models are emerging as a trend in the traveller information marketplace; however, there is not yet a proven market for subscription traveller information services. Even private sector participants acknowledged the fact that consumers, in general, have not been willing to pay for traffic content. The private sector is not able to stand on its own (from a revenue standpoint).

2. The private sector has demonstrated that a sustained business model based on web advertising is possible. One company specifically recommended MTC to seek proposals from the private sector for provision of the traffic portion of the 511 service, which would be subsidized by sponsorship and advertising.

3. Private sector firms see a sustaining role for MTC (and other public agencies, especially CHP) as a data provider as well as a continued role for dissemination by public agencies (phone, web, highway advisory radio, changeable message signs). Continued promotion of 511 indirectly helps the private sector by increasing public awareness of traveller information.

4. Most private partners are not in favour of MTC making radical changes to current program operations and are not in favour of paying a fee to MTC for data that they are currently getting for free.

5. The private sector is not ready to underwrite data collection efforts. The 511 program is doing a good job of providing regional information – they see MTC as a good partner and place a high value on the service, the data, and the 'one-stop shop' MTC provides on behalf of the Bay Area.

6. Suggestions for improving data collection (expanding to include other corridors), as well as providing the traffic data in 'raw' format rather than in a 'processed' format. Focus for the near-term for the public sector should be on enhancing the data.

7. There is little agreement among various media companies on the value of 511 data. Some find the 511 data feed extremely useful. Others state they do not find it accurate. All media companies rely on multiple sources of data collection, including the primary source of the CHP incident information. They all ask that the interface/reliability of the CHP incident information be improved.

8. Most of the media representatives view 511 as an inevitable presence – a Federal Communications Commission "mandate" that could not be altered. Some are mildly concerned about having 511 compete in their markets,

especially with driving times and the more personalized services. The issue of competition between their service and 511 would be more pointed if the data feed were offered exclusively to only one media company, and it is not clear whether media companies would be willing to pay for exclusive access.

4.3.2 Public partnerships for traveller information and 511

Public sector agencies' roles and responsibilities were assessed in delivering the 511 program as part of the strategic plan process. Relationships between transit agencies, state agencies (Caltrans and CHP), and county agencies (congestion management agencies *CMA* and smart corridors) and the 511 Program were assessed.

A fundamental question raised with partner agency staff was "Should MTC continue to take the lead on the 511 program, or are there other agencies who are better positioned to lead the program and/or take on a more significant role in program delivery?" Interviewees were unanimous in their response that MTC should continue heading up the 511 program. The remaining strategic question was therefore "What are the appropriate roles for partner agencies in delivering 511?" These roles are important to consider and understand because the level of resources that a main coordinator like MTC must dedicate to providing 511 varies depending on the level of program commitment and support given by other agencies.

Transit operators

Transit operator reliance on and enthusiasm for SFBA 511 varies. Some agencies take advantage of and support the 511 program. Other agencies are less supportive. In general, operators have concerns about:

1. Data quality regarding accuracy of schedule and route information on the website.

2. Consistency between their websites and the 511 website, and transit agencies' lack control over how the information is presented on 511.

3. Promotion of 511. For information about individual transit systems, operators believe that encouraging riders to call/visit 511 pushes them to a less direct route to the information they seek. 511 can be viewed as a barrier that the caller must "get through" in order to get to transit agency specific information.

4. Riders already familiar with getting information from their local transit provider might find 511 phone system design cumbersome, encounter speech recognition issues, and be transferred incorrectly. Similarly, riders may have more initial familiarity with transit operator sites.

5. As a comprehensive source of information, 511 provides details about all agencies' services and other modes. This raises the potential that 511 information may cause riders to try alternatives to one system's transit services, with the net result that they would lose riders.

Rather than 511 being a barrier that customers must get through, 511 is intended to be an easy-to-remember call-to-action for regional transit information that eliminates barriers to using transit agency services. The 511 transit website is extremely popular. Accessing information is simpler than it would be if callers had to search for the appropriate transit agency telephone number or website. The common look and feel that 511 provides for all transit services lowers the barriers for callers and web visitors to learn about other transit agencies. Focus group research conducted with users of 511 and for the Regional Transit Connectivity Study found that transit riders value 511 and transit.511.org for conveniently centralizing a great deal of otherwise dispersed information.

Caltrans and CHP

Caltrans is one of the key partners in the 511 system. MTC relies on Caltrans to provide 1) access to the state right of way to install and maintain electronic toll tag readers, 2) access to the Caltrans loop detector information and CCTV cameras, 3) access to the Traffic Management Centre and to information about planned construction, and 4) driving times information on changeable message signs throughout the region. In addition, MTC encourages Caltrans to support the 511 program by referencing 511 in public information messages about anticipated traffic disruptions and real-time traffic updates. Caltrans staff provides on-going support for the 511 program and are beginning to treat 511 as one of their system management tools (e.g. driving times on CMS, Bay Bridge Construction information, etc.) There are, however, unresolved state-wide issues regarding traveller information and data feeds to information service providers (ISPs).

Like Caltrans, CHP is a key partner in the 511 system. MTC relies on CHP to support the 511 program primarily by providing timely information about traffic incidents. MTC encourages CHP to support the 511 program by referencing and promoting it.

Congestion Management Agencies

In the past, CMAs have expressed reservations about the level of funding for the 511 program, given competing high priority needs. In more recent discussions with CMAs, it appears that customer use of, and satisfaction with, 511 traveller information services has tempered these concerns. The CMAs suggested that the project success and value to the travelling public would increase further with:

- Improved coordination on local websites,

- Further investment in the TakeTransit Trip Planner, and

- A more defined role for 511 as a tool for communicating to the public in emergencies.

They also expressed support for 511 to more aggressively pursue revenue generating opportunities with the private sector.

511 and Emergency Response

Emergency response is one of several areas proposed in the MTC Agency Strategic Plan as an area for greater involvement by MTC. This issue is also currently of great national concern in the US. [10]

Emergency response has become a much bigger issue for MTC during recent times. MTC is investing significant resources in increased capacity for phone and web, and have invested in many other emergency tools. Its ability to provide information in emergencies has greatly increased partner agency respect for 511. [9]

4.4 Funding sources and operational costs of SFBA 511

Funding

The traffic, transit and real-time transit elements of the 511 program are funded with a mix of federal and local funding instruments, which are the following:

Federal funding instruments

- Surface Transportation Program STP
- Congestion Mitigation and Air Quality CMAQ

Local funding instruments

- Service Authority for Freeways and Expressways SAFE
- State Transit Assistance STA. [10]

The 511 BikeMapper is partially funded by the Bay Area Air Quality Management District. [6]

Operational costs

The operation of the SFBA 511 program costs around $6.2 million annually. A summary of MTC's combined traffic and transit budgets (does not include bicycle and rideshare) for different functional areas, including data collection, operations and maintenance, performance monitoring and other key functions, is depicted in Figure 6 below. [10]
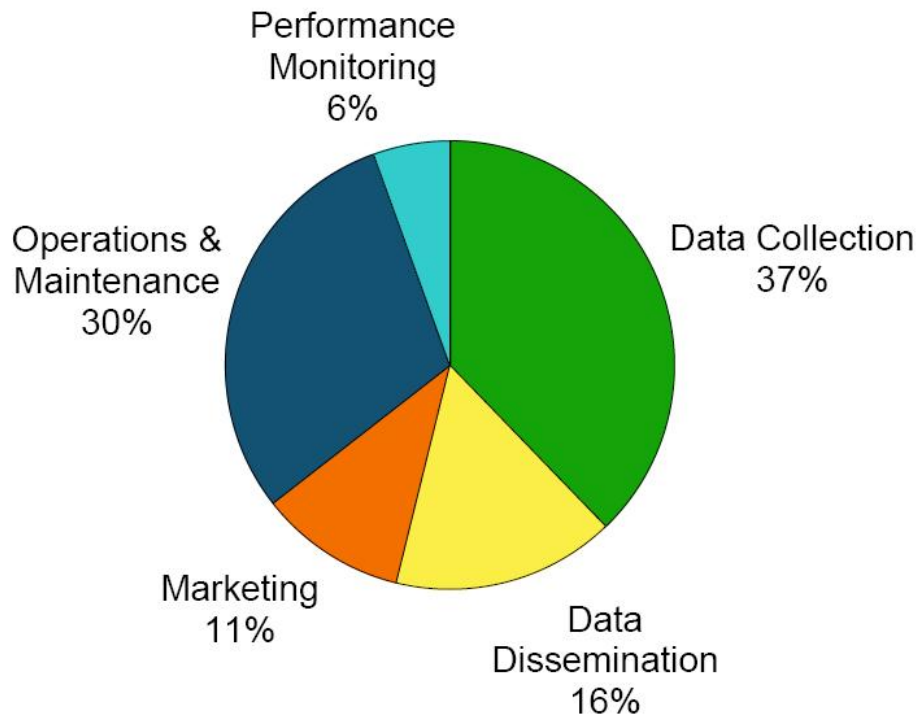
Figure 6. Traffic and Transit Budget by Function [10].

4.5 Information flows and money flows

The SFBA 511 service is a DBOM (Design, Build, Operate, Maintain) 6 year contract between PB Farradyne and MTC that started September 2000. The contract had two provisional 2 year extensions to it and is currently running on its first extension. The following picture (Figure 7) illustrates the service network and tables 2 and 3 list the various money and information flows in Figure 7.

SFBA 511 Service Network

Figure 7. The information and money flows – SFBA 511 Service Network. (Modified based on a draft version in [12].

Table 2. Principal data and information flows in SFBA 511.

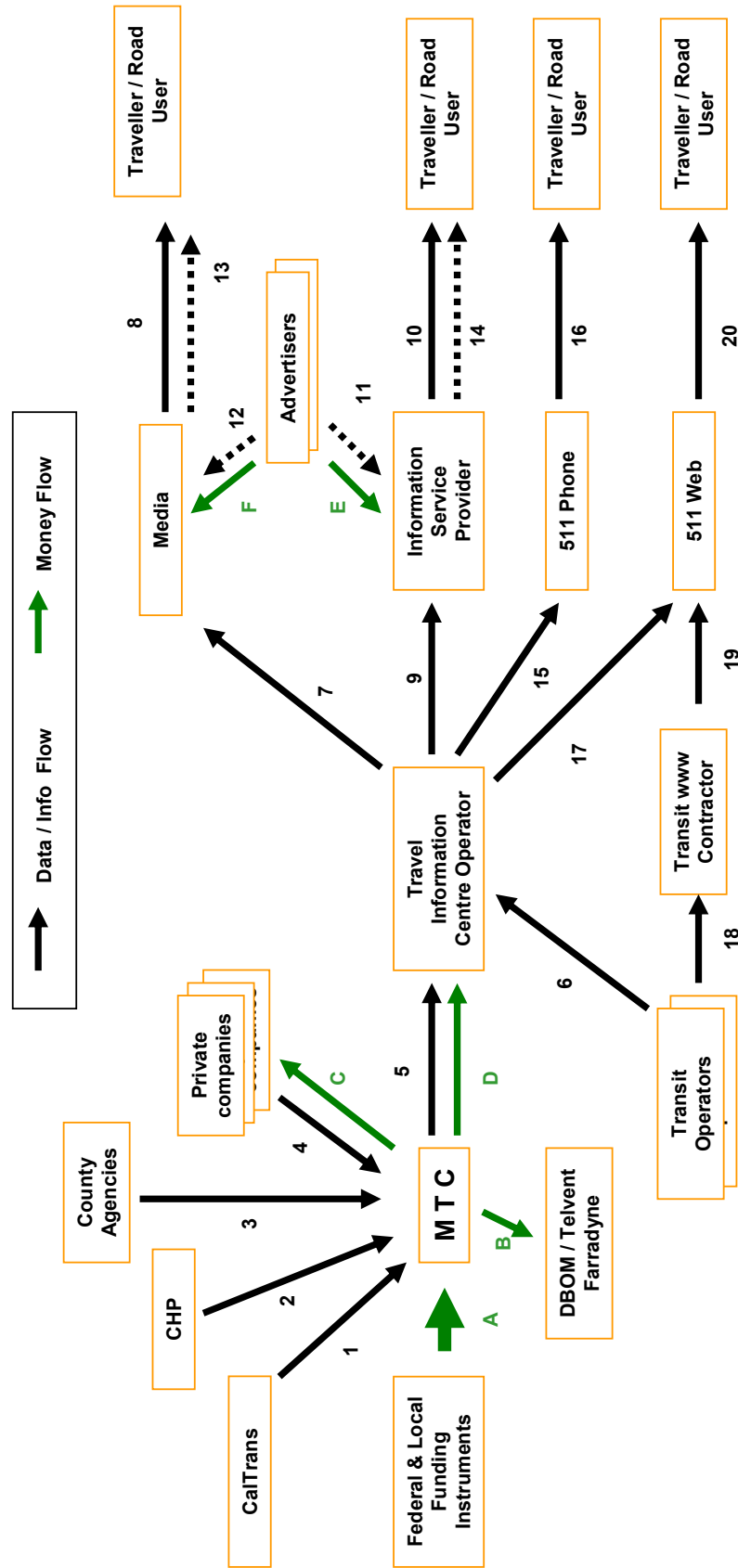| **Data & Information Flows**	
Number	**Description**
1	Raw transport data – CalTrans ▪ Freeway data: road class, road condition, speed limits, etc;
2	Raw transport data – CHP ▪ incidents & disturbances (congestion, road closure, accident, acute weather hazard, etc)
3	Raw transport data – County agencies ▪ road condition, speed limits, speeds, road works etc; ▪ disturbances (congestion, road closure, accident, weather hazard, etc)
4	Raw transport data – Private companies ▪ speeds, delays, etc; ▪ disturbances (congestion, road closure, accident, weather hazard, etc)
5	Consolidated transport data ▪ road condition, speed limits, speeds, road works etc; ▪ incidents & disturbances (congestion, road closure, accident, weather or driving condition hazard, etc)
6	Real time public transport incident information from transit operators to TIC
7	Analysed, integrated, aggregated and transformed transport information content & bulletins to the media
8	Transport bulletins to travellers via media (radio, TV)
9	Analysed, integrated, aggregated and transformed transport information content to the ISP
10	Transport information to travellers from ISPs through multiple Internet, telematics and wireless technologies
11	Commercial advertisement content
12	Commercial advertisement content
13	Commercial advertisement content
14	Commercial advertisement content
15	Analysed, integrated, aggregated and transformed transport information content to the 511 phone service
16	Transport information to travellers through 511 telephone service
17	Analysed, integrated, aggregated and transformed transport information content to the 511 www service
18	Transit operators provide route, schedule and fare information to Bd Systems
19	Transit web page contractor Bd Systems incorporate route, schedule and fare information into transit.511.org
20	Transport information to travellers through 511.org

Table 3. Principal money flows in SFBA 511.

Money Flows	
Letter	**Description**
A	Federal and local funding to MTC for 511 operation
B	MTC payment to contracted DBOM consultancy
C	MTC payments to contracted private transport data providers
D	MTC payment to contracted TIC operator
E	Advertisers' payments to ISP
F	Advertisers' payments to media

4.6 Roles of various actors

The below table (table 4) lists the different actors and their main roles in the service network of SFBA 511.

Table 4. The different actors and their main roles in the service network of SFBA 511 [12].

Actors – Organisation	
Actor	**Description of role**
Advertiser	Advertiser supports service financially and supplies clients with the information of its services/products.
Caltrans	Caltrans supplies MTC with (incomplete) freeway data.
CHP	CHP supplies MTC with traffic incident information.
Client (end user)	Client requests the information needed and receives it.
County agencies	Congestion Management Agencies and smart corridor projects
ISPs	ISPs make 511's traffic and travel conditions data available through Internet, telematics and wireless technologies.
Media	Local media broadcast traffic, incident and construction information provided by 511 over radio and TV.
MTC	MTC coordinates the 511 service. It makes the contracts, collects and consolidates regional traffic data.
PB Farradyne	PB Farrdyne is responsible for designing, building, operating and maintaining the entire traffic information service program.
Private companies	Private companies supplement public agency data collection.
Telecommunication operator	Telecommunication operator passes information between IPSs and clients. (Not illustrated in Service Network figure.)
Bd Systems	Transit web page contractor. Transit operators provide route, schedule and fare information to Bd Systems who incorporate it into transit.511.org.
TIC	TIC is operated by an MTC contractor and it is the control centre for traffic data aggregation. Manual and automated data is consolidated and processed for 511.
Transit operators	Transit operators supply i) TIC real time public transport incident information and ii) Bd Systems (transit internet service operator)with route, schedule and fare information

5. Benefits and Beneficiaries of 511

5.1 Opportunities and challenges from users' point of view

It is clear that from the users' point of view, gathering all the needed information into the same portal makes it easier to get and compare several pieces of information, for instance of different modes, routes, maps, as well as weather. Of course, there is also a challenge in this: the more information is aggregated, the more critical the user interface becomes. Especially, if the information is primarily designed to be provided on the Internet at home or in the office, but is later also used by mobile devices with small displays when travelling or even driving. The same holds with the phone service too. More information normally means more complicated menu systems – which may make using the service too time consuming, even frustrating. From the users' point of view, if the same information is provided in both ways – Internet and phone service – there should be consistency between those two. Moreover, the more users are aware of various available Internet services, the tougher the competition between different services becomes. A new service needs to be not only informative but also easy, fast and even fun to use. [1]

5.2 Opportunities and challenges for new business

Until now traffic and transportation information has been mainly provided by public authorities, for example road authorities and transit service providers. Users have also been used to getting the currently existing information for free. However users have indicated in earlier studies that they would like to get more personalized services and up-to-date alerts for their routes, and would like to be able to get the information both before and during the trip. Consequently there is a question of the roles and responsibilities of the current service providers, especially public authorities: are they willing to develop their services further towards more personalized services? It should also be considered who is going to pay for that kind of development and also for the maintenance of the databases and services. Should the public funding mainly be addressed to developing the data gathering or also to developing the personalized services for individual users? [1]

In many countries there is a new trend of private companies entering the traffic information market. In their case benefits of the services cannot only concern traffic policy such as improving traffic safety and reducing congestion. Providing and maintaining a service must be profitable. Since users are not used to paying for traffic and transit information, business models including the users' willingness to pay for the new services are challenging and still developing.

From the users' point of view, the new service that is not free should bring additional value compared to the conventional free-of-charge services. It is also a great challenge to reach enough users to achieve the financial goals, especially when the charge per usage is low.

Traditionally traffic and transit information have not been marketed very aggressively. Neither has it included commercial information, i.e. advertisements with non-traffic related contents. There has been, however, discussion of financing traffic and transit related information services in the future partly by commercials. It is also admitted that user awareness of the new services should be enhanced, for instance, by marketing. One good example of marketing traffic information services in the US is the co-operation between 511-services and tourism. [1]

5.3 Customer feedback in San Francisco Bay Area

MTC has earlier conducted several web and phone customer satisfaction surveys, consistently finding that about 90% of existing users are very or somewhat satisfied with the services. For the phone, the top reasons cited for satisfaction in 2004 were "getting the information they need," "easy to use," "accurate information," and "quick." For the web, the top reasons for customer satisfaction in 2004 were "accuracy/usefulness of information" and "availability/ease of finding information." [10]

In addition, in previous user surveys, 35–37% said the information they received from 511 caused them to change travel plans:

  - 5% said they delayed their driving trip
  - 20% said they changed their driving route
  - 1% moved from car to transit
  - 1% moved from transit to car, and
  - 9% changed their transit trip. [10]

The most recent user survey [13] was conducted at the end of 2007. This survey concluded the following:

> "The 2007 511 Usage and Satisfaction survey results reveal that users of both the 511 phone service and 511.org are mostly very satisfied with 511 and its features. While the survey results disclose overall a generally positive perspective of 511 among 511 users, they also highlight several areas that users feel are in need of improvement, including the phone voice recognition system and the real-time transit information. However, while some participants did indicate some dissatisfaction with certain portions of 511, the great majority of responses to almost

all questions is overwhelmingly positive, and in no instance did a majority of respondents express negative opinions about a feature of the service. Overall, having attracted over 1,600 web participants and over 1,500 phone participants, the survey resulted in a comprehensive portrayal of current 511 user interest and opinion." [13]

5.3.1 Perceived benefits of 511 Phone Service

Launched on December 13 and closed on December 20 2007, the survey of 511 phone usage and user satisfaction attracted over 1,500 participants. This survey gathered information on various issues, including frequency of usage, satisfaction with different service aspects, interaction preferences, method of access, and user demographics. As stated above, while the results of this survey reveal some instances of user dissatisfaction with the 511 phone service, they mainly show high levels of satisfaction with almost all features. In addition, when compared with the results of a previous phone satisfaction and usage survey, taken in March of 2007, the results of this survey appear to portray a very similar or slightly more positive image of 511-user opinion. Some highlights of this survey's results are detailed below. [13]

- More than 82% of participants are at least somewhat satisfied with the quality of the 511 phone service overall
- Almost 90% are at least somewhat satisfied with 511's accuracy
- Over 85% of participants agree that 511 helps them reduce stress and anxiety
- Over 80% say that 511 helps to save time
- Almost 60% altered their travel plans as a result of calling 511
- Users express highest level of dissatisfaction with voice recognition
- Only 18% of participants experienced a degradation in the voice recognition system, while almost 40% experienced an improvement
- Over 65% of participants report using the 511 phone service at least several times a week
- 18–39 year-olds and 40–59 year-olds use the 511 phone service equally, while relatively few people under age 18 and over age 60 use the service at all.

5.3.2 Perceived benefits of 511.org Web Service

Launched on December 5 2007 and closed on January 2 2008, this survey of usage patterns and satisfaction levels among 511.org users attracted 1,606 complete responses.

Like the phone survey, this survey also gathered information dealing with a variety of issues, including frequency of usage, satisfaction with the web service, details of website usage and demographics.

While this survey dealt less with user satisfaction than the phone survey had, participants in this survey had also expressed a high level of satisfaction with 511.org overall. Some highlights of this part of the survey's results are detailed below. [13]

- 90% of participants are at least somewhat satisfied with 511.org
- 88% of participants are at least somewhat satisfied with the accuracy of 511.org
- Almost 90% of participants report being at least very likely to continue using 511.org
- 55% of participants changed their trip after using 511.org
- Participants report using 511.org to help plan various types of trips
- Highest percentage of participants say that 511.org benefits them most by helping them avoid traffic incidents and unexpected slowdowns
- 80% of participants at least somewhat agree that 511.org enhances their quality of life
- 85% of participants at least somewhat agree that 511.org helps them save time
- Over 80% of participants at least somewhat agree that 511.org reduces their levels of stress and anxiety [13].

5.4 Perceived benefits elsewhere – case Arizona

5.4.1 Introduction

A user survey on the benefits SFBA 511 service was ongoing and completed during the production of this report and referred to in the previous chapter. For comparison, some findings from a thorough survey study analysis of another US 511 service have been used here as a reference – namely a survey conducted in Arizona. [14] The document presents the findings of the national evaluation of the 511 telephone traveller information system "Model Deployment" in Arizona. The United States Department of Transportation (U.S. DOT) National 511 Model Deployment supported a wide range of enhancements to the existing state-wide Arizona 511 system, including the addition of several new types of information and significant redesign of the user interface. These enhancements are then to be transferred to various national implementation guidelines.

The ultimate objective of 511 is to have an impact on the callers who receive the information. What benefits did callers believe they had received from 511 in Arizona? What, if any, changes did they make after receiving the information?

5.4.2 Perceived benefits [14]

To assess the benefits, the respondents were asked to identify benefits they perceived from using 511. The question was open-ended, in that respondents were not provided with a predetermined list of benefits and asked to respond. Instead, the benefits were volunteered by the respondents themselves. The study classified the types of benefits that the respondents said they derived from 511, based upon the study team's classification of the verbal responses. The approach was to identify the principal benefit that the respondent was articulating in the response to the question. When the caller's response included more than one thought about benefits, the dominant theme of the comment was selected. For example, "re-routing myself and getting to my destination on time" was designated as emphasizing the time-saving aspect of having the information.

The most notable aspect of the results is that repeat callers and first-time callers differ markedly in the benefits they say they received from 511. Not surprisingly, the more experienced repeat users identified certain benefits in higher proportions than the new users. Even more significant is the fairly large percentage of first-time callers who perceived no benefit at all. However the lack of a specific perceived benefit does not appear to impact most first-time users' willingness to try the system again or recommend it to a friend.

Among the perceived benefits, having the ability to access current road and weather information was cited most frequently by both repeat (33%) and first-time users (28%). The implication is that other sources of traveller information are either not as accurate or accessible as 511. Having the information leads to other benefits that users identified. The ability to either save time or arrive on time was recognized by 21% of repeat users versus only 6% of first-time callers, suggesting that only with the experience with 511 gained by repeat usage over several weeks or months can those benefits be fully appreciated. Similarly, avoiding traffic congestion and changing routes were identified by 20% and 15% of repeat callers respectively and only 2% and 5% of first-time callers. A few callers emphasized the "serenity" benefit of 511, feeling it made travel more relaxing or easier. Finally, in the categories of "other" and "satisfied," callers did not cite specific benefits but, instead, made comments about the user interface or simply expressed general satisfaction with the service. These types of comments were more prevalent among first-time callers than the repeat callers.

5.4.3 Impact of 511 on travel decisions [14]

To assess the impact of information from 511 on travel decisions, the survey provided callers with a list of possible changes they had made as a result of calling 511 for the particular trip when they were intercepted for the survey. Respondents could report more than one change to their trip, and the total changes mentioned across all respondents numbered 168. Based on the small percentage of respondents making any particular change, one can conclude that most callers did not feel compelled to change their plans based on information on 511. This should not be construed negatively, because under most circumstances travel conditions can be considered "normal," being free of incidents or other adverse conditions that would warrant a change in plans.

For those callers who did make a change, taking a different route was the most frequent type of change mentioned (12% of callers). It is not known whether the decision to change route was made en route or before setting out. Callers changed their behaviour while on the road by changing lanes (12%), slowing down or changing speed (9%), or making stops along the way (4%).

Pre-trip changes were less frequent, but included change in departure time either earlier (2%) or later (2%) or cancelling the trip entirely (1%). No respondents indicated that they took a different bus than the one planned.

5.5 Beneficiaries

Quite clearly the main intended primary target group for any 511 application is the general travelling public. Hence the primary benefits also occur when any user of 511 service adjusts his/her travel decisions regarding his/her time of travel, route choice, mode choice, etc. based on information received from the service. A functional 511 service provides an easy way to obtain travel information anywhere in the country/region, helps travellers make better decisions on travel routes and modes and promotes safety by directing motorists away from incidents and congestion. The users are not required to pay any extra[5] costs for getting those services.

However, the foreseeable secondary effects are the real motivator and catalyst for generating 511 services in the first place. These secondary effects include relief of congestion and the resulting benefits to the society. These benefits could be classified into:

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[5] In the US, 511 is a free service for the calling party, although the caller's telephone carrier may – and usually does – impose local or toll charges for placing the call.

i)   Societal benefits *e.g. accessibility, mobility, security;*
ii) Economical benefits *e.g. efficiency, safety* and
iii) Environmental benefits *e.g. emissions, noise.*

Due to the fact that globally people are not really willing to pay very much for travel information services like the 511 it makes perfect sense that the "secondary beneficiaries", i.e. the public actors are the ones that actually pay for the deployment, operation and maintenance of these 511 services.

6. Material for European 511 Implementation(s)

This chapter briefly summarises findings and conclusions from the studied literature that could potentially be useful for various readers of this report – especially if they are involved in a process of considering or designing the usefulness and feasibility of "511-type" services in Europe – either in individual countries nationally or on European scale.

6.1 Lessons learned from SFBA and the US

6.1.1 Recommendations to 511 deployers

The report [14] lists "Key Recommendations to 511 Deployers". These are as follows:

> If specific, near-term impacts are important, prioritize and focus your 511 implementation.

> Voice recognition is not "plug and play"; expect to spend considerable resources on its implementation. (This refers to application of voice recognition in an automated telephone service, as opposed to users operating the system via touch-tones.) Although voice recognition technology is widely deployed, its successful application to 511 systems is challenging.

> Pursue a vigorous, targeted 511 marketing program. Marketing is essential to building awareness and stimulating usage of 511 systems.

> In the early planning stages, thoroughly investigate institutional and technical issues associated with data input by partner agencies.

> Incorporate mechanisms for capturing user feedback for system evaluation.

6.1.2 Implementation hierarchy in ramping up a 511 service

In order to implement an ATIS system and make use of a 511 dialling code – or equivalent, an implementer must first establish where they are in the hierarchical stages of ATIS deployment. The following examples attempt to outline steps and cost elements for implementing facilities leading to and including 511 implementation based on the implementer's position in the hierarchy [11];

> Stage 1 – Implementer has no data gathering, data fusion engine or telephonic dissemination platform.

- Stage 2 – Implementer has data gathering, but no fusion or processing engine or telephonic dissemination platform.

- Stage 3 – Implementer has data gathering and fusion, but no telephonic dissemination platform.

- Stage 4 – Implementer has data gathering, fusion and telephonic dissemination platform, and would like to implement the 511 code for the latter.

- Stage 5 – Implementer MUST enter into a continuing marketing campaign for the 511 service.

All subsequent stages are built on previous ones and they are all critical prerequisites for the full successful implementation.

6.2 European "511"-service?

In contrast to the US, there are many different countries and language zones in Europe. Therefore, planning a European wide traffic and transit information is even more challenging. A good question therefore is: "Is there really a need for a common European 511-service?" Normally, drivers' and travellers' daily commuting happens in quite a familiar environment. Therefore, they do not need, and most probably do not want to have a European wide service with all the multiple menus to go through. However, there are such users who cross the borders, some even on a daily basis. This group of "lead-users" consists of e.g. long-haul truck drivers, other commercial vehicle drivers and also their operators. In addition, there is a lot of both business and leisure travelling between the EU countries. In these cases, a common "address" or brand for traffic and transit information would make it easier to find the up-to-date information for their trips.

In addition, a common traffic information service – even if kept separately in every country but having a logical address and common phone number as in the US, would enhance, for instance, the drivers' awareness of different traffic laws and signs in the EU member states. This kind of traffic information portals would also give the opportunity to enhance users' awareness of new technology in traffic as well as of other topical issues. Naturally there are many challenges to be taken into account. In addition to the above mentioned language variety, there is also variety in traffic and weather conditions as well as in driving cultures in the member states. [1]

6.3 All viable business models include the public sector

Due to the fact that globally people are not really willing to pay very much for travel information services like the 511 it makes perfect sense that the "secondary beneficiaries", i.e. the public actors are the ones that actually pay majority or all of the costs regarding the deployment, operation and maintenance of these 511-type services.

Over the past 10–15 years, the public and private sectors have discovered that the business models that have been implemented for recovering deployment and operating costs through revenue and profit sharing have not been viable. It must be noted that business conditions change rapidly, and the past is not necessarily a barometer of future conditions. However, one thing appears certain: in order to provide at least the basic level of service desired the public sector must be willing to cover a lion's (or at least some) share of the costs. All business models, including those expected to generate revenue, will require some level of funding from the public sector. This may be seed money to insure that an information service provider, at the start of operation, meets a level of service, or continued funding to insure that a basic service level is always available to the general public regardless of the availability of "premium" services.

Additionally, it should be understood that specific and continued marketing tie-ins are necessary to build visibility and usage of the service. Specific tie-ins with available traveller information services (radio and television broadcast, "cross-connect" telephone links from existing services such as airport or transit numbers) are all essential for building the service. A higher number of users leads to a greater value of service, which in turn leads (possibly but not necessarily) to higher premiums that can be charged for advertising or services in order to make the system more financially stable.

Traveller information cannot eliminate traffic bottlenecks or incidents. It can, however, help people using the transportation system feel more in control, make better travel choices, and help agencies better manage the transportation system. It can be an important tool to mitigate stress that travellers experience during their commute.

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