

The Other N11s: How Are They Provided?

Overview

This paper will overview the other abbreviated dialing codes services and describe their purpose, methods of operation, funding, and historical evolution.

Service Listing Summary

- 211 – Assigned for community information and referral services.
- 311 – Assigned nationwide non-emergency police and other government services.
- 411 – Unassigned, but used virtually nationwide by carriers for directory assistance.
- 511 – Assigned for traffic and transportation information.
- 611 – Unassigned, but used broadly by Local Exchange Carriers (LEC) for repair service.
- 711 – Assigned nationwide for access to Telecom Relay Services (TRS) for individuals who are deaf, hard of hearing, or have speech disabilities and voice users.
- 811 – Unassigned, but used broadly by LECs for business office use.
- 911 – Assigned as the universal emergency telephone number.

How is it done?

Three Digit Dialing Services are designed with efficiency and reliability in mind. Here's how the service works:

- A three-digit N11 code is assigned for use to a “subscriber” in a specific local calling area.
- The subscriber obtains/secures/designates a 7 or 10 digit local number to route the calls made to the three-digit number.
- All switches within the basic local calling area are programmed to translate the three-digit code to the designated point-to number.
- A caller dials the three-digit code associated with a subscriber's information service and/or customer service organization.
- The switch recognizes the three-digit code as an abbreviated dialing string, deletes the three-digits from the dialing string and translates them into the 7 or 10 digit “point-to” number.
- The switch routes the call to the 7 or 10 digit point-to number.
- The N11 subscriber pays for the calls that are routed to the “point-to” number.
- If a subscriber chooses to charge callers for accessing their information, the carrier can record and rate the call for the subscriber via a billing and collection agreement.

Three Digit Dialing Costing Elements

- Service Establishment fee - this is a one-time setup cost based upon population size of calling area.
- Usage Charges – a monthly recurring cost based upon quantity of calls placed to the three-digit code. In several states, a minimum monthly usage charge applies after the initial six months the service has been activated.
- Change of “point-to” number.
- Billing arrangement change - revisions in amounts charged to end-users, change in recording and rating, etc.
- Detailed monthly reports - amount of detail, frequency. May or may not be included as part of the usage charges.

N11 SUMMARY DATA

N11	USAGE	EXTENT OF USE	HOW PAID FOR	LESSONS FOR 511
211	Access to organizations providing community information and referral services.	Larger cities in CT, GA, LA, TN, AL, MS, NC, OH, and UT are currently implementing.	Donations to agencies and grants.	<ul style="list-style-type: none"> • Multilingual capability needs to be built into the system. • An Interactive Voice Response (IVR) capability can be utilized to support automatic referrals during peak call volume. • Use of Web sites to augment services offered. • Service levels need to be agreed upon prior to start-up – more staff or equipment may be required if the service wishes to maintain a low abandonment rate (i.e., hang-up) and low average speeds of answering (i.e., time caller is waiting) • Potential for balkanization of services, different uses in different regions
311	Access to City or County government services (including non-emergency police). Calls answered by operators and forwarded to appropriate agency.	Larger cities in TX, AZ, IL, CA, MD, MI, NY use this service.	Funded by providers.	<ul style="list-style-type: none"> • Monitoring the level and quality of service provided to customers. • Quality review process in place. • Priority and urgency of response is determined by <u>documented</u> policies and procedures. • Establishment of a formal training program for operators.
411	Directory Assistance	Local phone companies, long-distance carriers and many independent providers provide this service.	Costs passed back to users.	<ul style="list-style-type: none"> • Multiple service providers may use multiple databases. This can result in inconsistencies in finding numbers, services, or data. Provisioning for services should be uniform within a market area, region, and ultimately within the entire state area. • A customer service (i.e., directory assistance) needs to be simple and provide value. With competition among directory assistance services the result has been the quality of service remains essentially the same, yet costs are escalating.
711	Access to nationwide Telecom Relay Services (TRS) for individuals who are deaf, hard of hearing, or have speech disabilities.	DE, HI, MD, ME, MA, NH, NY, PA, RI, VT, DC and WV provide this service.	Costs funded by carriers.	<ul style="list-style-type: none"> • Lessons are similar to those found for 211/311 services.
911	Universal emergency telephone number. Connects to Public Safety Answering Point (PSAP)	Widely utilized nationally, though some communities are still using 7 or 10 digit dialing to access emergency services.	Surcharge on customer phone bill.	<ul style="list-style-type: none"> • Provisioning should be uniform with market area. • Level of service and quality of service continually monitored. • Development of contingency plans by PSAPs can ensure continuity of service. • Priority and urgency of response is determined by documented policies and procedures. • Formal initial and refresher training ensures consistent quality of service.

Bringing 511 to market: What do users want?

This paper briefly identifies what is known about advanced traveler information service (ATIS) customer preferences from recent ATIS field test and deployment evaluations. From these studies on ATIS in general, you may infer that a 511 consumer will have similar needs and wants. Please refer to page 7 for a list of sources consulted for this paper.

For the purposes of this paper, ATIS is confined to real-time traffic and transit system data, excluding information on (1) other modes of travel, (2) static route guidance, and (3) recreational information. With a few exceptions, most customer data addressing these three services are in the private domain. Most ATIS customer data in the public domain addresses local metropolitan area travelers; there are some data among the rural ATIS evaluations that measure the ATIS needs of rural and unfamiliar drivers.

Outline

- Summary
- Who is the customer?
- How do customers use ATIS?
- What benefits does ATIS provide to customers?
- What level of service do ATIS customers demand?
- Marketing ATIS
- What are the known obstacles to broad ATIS adoption?
- Conclusions: Missing data and other observations
- Sources

Summary

Customer: Most ATIS customers are employed commuters. They are primarily drivers, male, between the ages of 25-65, with higher than average education and income. Of those who access ATIS by phone, a majority of customers own mobile phones. This profile is confirmed in all research sources.

Typical use: The typical ATIS customer listens to radio or TV traffic reports as part of the news before departing for work in the morning. If there is unusual congestion or there has been an incident on their route, they may delay their departure time or change route. Depending on conditions encountered en-route, the customer may phone ATIS for details about the delay, or for information on an alternate route. Many more ATIS consumers check ATIS in the afternoon before departing from work, or while en-route soon after their departure. Afternoon traffic conditions are considered to be more unpredictable than morning conditions. If they make a change in their afternoon trip plans as a result of the traffic information, consumers most frequently will delay their departure, or choose an alternate route.

Service requirements: Customers want quick, simple, safe access to accurate, timely, reliable, route-specific information. They want coverage of highways and major arterials,

direct measures of speed for each highway segment, identification and description of incidents, and travel time between origin and destination.

Benefits: The greatest value of ATIS to customers is saved time, avoidance of traffic congestion, and reduced stress. Transit customers report that ATIS saves time, helps with route selection, reduces uncertainty, and increases their satisfaction with the decision to take transit.

Marketing: Lack of consumer awareness of ATIS and the benefits it can provide are one of the largest obstacles to ATIS use. None of the field tests or deployments have had marketing budgets sufficient to bring an innovative service to the consumer market. Where there has been advertising, there has been a measured increase in ATIS use rates. There is no evaluation data on how to effectively market and advertise ATIS and the costs thereof.

Obstacles: The primary obstacles to more widespread ATIS adoption are lack of consumer awareness, poor data quality, and lack of consumer belief in the value of ATIS. In some regions, insufficient coverage of the road network also contributes to low use levels.

Missing data: Conclusive human factors research establishing the safest methods and interface for communicating ATIS to drivers is needed. There is scant data on customer response to transit and multimodal ATIS, and the impact of ATIS on mode split. Little is known about how to effectively market ATIS and the associated costs. Little is known about how to provide ATIS to meet the needs of unfamiliar travelers.

Who is the customer?

- ATIS customers to date are primarily drivers, between the ages of 25 and 55, who commute to work alone by car. Drivers' interest in ATIS increases with education, income, congestion level, arrival time flexibility, and constrained alternative route availability.
- Phone service users as a subset of all users are slightly older and slightly more likely to be male. Data from a limited number of ATIS telephone evaluations indicate that phone customers are 35-55 years of age, primarily male, have above average income and education, and commute to work alone by car. However, the rapid increase in mobile phone usage over the past 24 months has undoubtedly changed the demographics of mobile phone users, and thus has likely altered the demographics of ATIS telephone users.
- More detailed market segmentation data for ATIS customers are available from the USDOT Metropolitan Model Deployment Initiative ATIS Customer Satisfaction Evaluation (reference page 8). This study uses population and customer data from the Puget Sound region to segment ATIS customers according to sociodemographic factors, values, and attitudes.
- There are too few ATIS transit customer evaluations to generalize about the ATIS transit customer. Seattle data suggest that ATIS transit customers are employed, somewhat younger than average transit riders, of average income (relative to transit customers), and have limited access to a car.

- Research findings suggest that rural ATIS customers are
 - Long-distance drivers with need for road condition information,
 - Tourists with need for road condition information, route guidance, and interest in recreational information, and
 - Local residents with need for road condition information or paratransit services.

How do customers use ATIS?

- Drivers use ATIS (in rank order) to assess traffic delays, judge the effects of incidents on their trip, decide among alternate routes, estimate how long a trip will take, and decide when to start a trip. Drivers use ATIS less frequently to make a mode choice. Very few drivers change modes with the information.
- The greatest volume of ATIS phone calls and web site consults occur for the afternoon commute from work. The second largest volume is for the morning commute to work. This is true for all ATIS traffic services. Empirically measured traffic data from Seattle confirm that the afternoon peak period is longer and more unpredictable than the morning trip.
- Among Seattle traffic web site users who consult ATIS for their morning trip to work, the most frequent change they report is delayed departure, followed by a route change. For the afternoon commute from work, over 70% of Seattle web site survey respondents said that they left later as a result of traffic conditions; 65% said they had changed a small part of their route; 62% took an entirely different route from their usual route; 53% left earlier; and 36% made stops that they otherwise would not have made (*Please note: these data do not add to 100%; respondents made multiple changes to their trip*). A much smaller percentage of SmarTraveler Boston respondents changed their intended trip as a result of traffic information.
- In one study, route change behavior appears to be linked to customers' confidence in the quality of the traffic information. The TravInfo evaluation reports that 25% of respondents who received relevant traffic information from television or radio changed some aspect of their trip versus 45% of TravInfo phone service users and 81% of TravInfo web site users. However, repeated analysis across multiple markets would be required to determine the true "reason" for route change. Some experts believe that use of ATIS services will by nature heighten the perceived confidence in the content, simply due to the fact that it is new and often delivered via a medium traditionally associated with high-tech or new.
 - All survey respondents say they will listen to radio traffic but find it lacking in accuracy, timeliness, coverage, and personal relevance. All customers with experience of phone, web, or TV-based traffic information rate those services as higher in overall quality than broadcast radio traffic reports.
- Bad weather dramatically increases demand for traffic information. During winter weather and floods, web site user sessions increased over 10 times on the traffic web sites in Seattle and San Antonio. Similar increases in phone volume have been

observed by TravInfo in greater San Francisco, Smart Route Systems Boston, and Partners in Motion in greater Washington, D.C. Some existing ATIS telephone systems have difficulty handling abnormal call volumes by design, others have ample “line capacity” available to handle the highest possible situation. Unfortunately, additional research is required to more succinctly equate marketing to usage levels.

- Traffic phone customers most frequently consult ATIS services via mobile phone during their commute to or from work. For example, 64% of all intercepted calls to ARTIMIS were from mobile phones, and 70% of survey respondents said they usually call from their vehicle; 45% of all callers and 61% of call volume to SmarTraveler Boston in 1994 were from mobile phones (30% of the population owned cellular phones). It’s important to note, however, that as mobile phone usage continues it’s dramatic increase, we anticipate this will impact ATIS telephone usage, but the extent of which is yet to be clarified.
- Traffic customers consult ATIS regularly, with the average users in Seattle (web) and Boston (phone) consulting as often as once a workday and frequent users consulting twice a workday or more. Comparison of Boston SmarTraveler user data from 1993 to 1994 shows that the greatest increase in caller volume came from experienced users, whose call frequency increased approximately 30% per week for cellular and 50% per week for landline users. Similarly, data from Seattle (web) shows that more experienced customers make more frequent use of the service.
- Transit customers consult ATIS much less frequently than traffic customers, partly because most remote-access data, such as phone and web services, are not real-time. Where real-time data is available, such as *TransitWatch™* at transit terminals in King County, Washington, two thirds of those riders who knew of the service’s existence consulted it, and approximately one-third said that they consulted the real-time bus status monitor every time they took the bus.
- Transit riders’ use of and personal benefit from ATIS depends on the content, quality, and location of the service. They use static information for trip planning. Real-time information on platforms enables en-route planning, effective use of waiting time, and notification to others of arrival time. Real-time information by phone or web enables better-timed departures and shorter overall trips.
- Travelers planning trips to remote areas subject to weather problems, such as Snoqualmie Pass in Washington and northwest Arizona, will check traffic reports to plan their trip, including route, time of departure, and special supplies, such as tire chains.
- Research findings suggest that travelers in rural areas would use road condition information and make route changes as needed.

What benefits does ATIS provide to customers?

- Traffic customers report that ATIS saves time, enables them to avoid congestion, reduces stress associated with uncertainty, and increases safety.

- 90% of the respondents to the Partners in Motion evaluation of SmarTraveler reported that it helps them avoid traffic problems; 87% reported that it saves time; 85% reported that it reduces anxiety.
- 93% of respondents to the Seattle traffic web site survey reported that it helped them to saved time; 81% agreed that it helped them avoid traffic incidents; approximately 75% said it reduced stress; and, about one-third agreed that they used the site to avoid unsafe driving conditions.
- 39% of TravInfo respondents identified informed travel decisions as their primary benefit; 36% identified travel time-savings, and 18% identified reduced stress.

- Transit customers report that ATIS saves them time, helps with route selection, reduces the uncertainty of waiting (when the service is real-time), and increases their satisfaction with the decision to take transit.

What level of service do ATIS customers demand?

- Respondents to all surveys are very clear in their quality requirements for traffic information. Traffic customers want quick, simple, and safe access to accurate, timely, reliable, route-specific traffic information. They want coverage of highways and major arterials, direct measures of speed for each highway segment, identification and description of incidents, and travel time between origin and destination.

- Respondents to the Partners in Motion evaluation and SmarTraveler Boston found the abbreviated keypad access to be convenient. Over 80% of Partners in Motion respondents agreed that it was easy to get information from that service.
- Some experts believe that the presence of advertising will reduce usage of ATIS telephone systems. However, there is no clear evidence as to the impact of advertising on usage. Some existing SmarTraveler telephone services did indeed place pre- and post-report advertisements on their phone services, and noted only minor fluctuations in call volumes. Fluctuations that could easily be attributed to other environmental factors, not the advertisements themselves. Other IVR systems outside of ATIS have relied upon advertising, such as MoviePhone in NYC, and the recent influx of “voice portal” systems such as BeVocal and TellMe. All of these examples have witnessed continued increase in use, yet rely on advertisements to support revenue needs.
- Seattle respondents said that weather conditions are useful where they affect driving conditions, especially during inclement weather situations (rain, snow). Other environmental factors such as sun glare, fog, wind, etc, play a role in determined traffic and travel behaviors. General weather conditions, such as a predicted weather report for the remainder of the day, have been found to be useful by customers of ATIS systems. TravInfo, in San Francisco, did not receive similar suggestions from customers.
- Demand for dynamic route guidance varies with the customers’ level of familiarity with local traffic patterns, alternative routes, and gender -- tourists, unfamiliar drivers, and women having most interest in the service.
- ATIS transit customers want information that reduces trip time uncertainty: real-time information, convenient and distributed access, and good quality interfaces.
- For static information, transit customers want current fares, transit schedules and routes, transfer locations and times, detailed maps, and bus stop locations. Traffic customers want additional information on major construction projects, planned events (especially in the vicinity of major sports/entertainment venues), and anomalies such as government holidays that will impact traffic volumes during regular commuting hours.
- ATIS transit customers also want point-to-point itineraries for both transit and multimodal trips, and recommended routes and times for fastest travel to their destination.

Marketing ATIS

- In its evaluation of SmarTraveler Boston, MultiSystems observed a correlation between advertising and call counts: each airing of a radio advertisement was correlated with an increase of 75 calls on the following day.
- Also in Boston, it appeared that the call growth rate intensified during the three-month period of intensifying advertising, followed by a noticeable drop in growth rate

for the remainder of the year, coinciding with a reduction in intensity of advertising volume.

- Broadcast media, radio and television, were the source of first awareness for 45% of new users of SmarTraveler Boston.
- In 2000, TravInfo fielded a nearly continuous advertising campaign using roadside billboards, limited radio spots, internet banners, large print ads in the regional AAA publication, and ads on AAA maps for the greater San Francisco Bay region. Monthly caller volume rose 73% over 1999 levels (unadjusted).

What are the known obstacles to broad ATIS adoption?

- Experience suggests that the largest obstacle to greater ATIS use is lack of awareness. Survey data indicates few members of the general public are aware of ATIS availability. The Partners In Motion surveys conducted in 1998 and 1999 revealed surprisingly small market awareness for SmarTraveler in the Washington DC market, numbers falling below the 20% threshold. Because ATIS use requires a behavioral shift, sustained advertising is required. Research is needed to identify acceptable growth and penetration rates associated with certain marketing initiatives.
- Some research indicates that data quality and coverage figures prominently in travelers' willingness to use ATIS. However, it is clearly identified in focus groups that the perception of quality is truly a subjective measure, and is influenced by a multitude of personal, environmental, and situational factors very difficult to pinpoint. This is an area where additional research is most clearly warranted.
- Some focus group studies with people who are not ATIS customers suggest that, in general, drivers don't believe that traffic information will help them. This obstacle can be addressed with good marketing, as an advertising campaign would highlight the benefits of ATIS.

Conclusions: Missing data and other observations

- Additional human factors research into driver workload parameters, and the impact of various personal and environmental factors, as well as ATIS strategies, on that workload.
- While limited in scope, the data from transit riders who use ATIS appears sufficient as a base for service development.
- There is no conclusive data on the impact of improved transit information services on ridership levels or rider retention.
- There is insufficient data on the question of how traveler information can influence mode split. Existing data is promising, although inconclusive. If 511 is intended to influence mode split as a strategy for improving traveler mobility, then further research is required.

- Focus groups in the Washington DC market revealed that some groups would trust the information more if it came from a private company, although they would not have a problem if that company was sponsored by a state or local government agency.
- There is no data in the public domain on customer response to or demand for an integrated multimodal information service that enables trip planning using auto, transit, paratransit, intercity rail and bus, and air.
- Further exploration into the topic of Data Quality is warranted. Focus group results reveal quality of information to be a potential determining factor for use, yet the definition of quality is incredibly diverse.
- There is limited information describing customer response to dynamic route guidance.
- Additional research on the potential impacts of various marketing schemes to ATIS telephone usage is warranted.
- Very little is known about how to provide traveler information services that are useful to unfamiliar travelers. Most of the evaluation data cited in this paper refer to familiar travelers.
- While there is data from respondents describing what types of decisions customers make with traveler information, the data is not of sufficient caliber to support ATIS operations or planning models.

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