Leveraging GIS for Cable Serviceability

Servicing Efficiency

Background

Time Warner Cable launched an initiative to help their Customer Service Representatives (CSRs) more accurately determine if a specific address is serviceable. Before this initiative, this determination was wholly manual and, often, guesswork. When a potential customer (NOTE: Sometimes address is in database) called to request a new service, a truck would have to be dispatched to the address. If the address was serviceable, then an install truck would be dispatched. If the address was not serviceable, then the time and resources used to make this determination were lost. Also, there was no effective or consistent mechanism for persisting this request for service along with the final determination.

A system that could quickly and accurately determine if a given address was serviceable would save resources and allow Time Warner Cable to analyze data related to these requests.

Building Blocks

The creation of a serviceability determination framework consists of many milestones. Some milestones are foundational, such as GIS data and services, while others are supplementary, such as address cleaning services. Also, the factors that compose the concept of serviceability may vary from company to company. For the purposes of this discussion, we will define serviceability as:

> *The quality of a specific physical address that measures the probability that it can receive the products and services offered by a Cable TV and Services provider.*

The products, in this context, are cable-provided services, such as digital cable TV, high-speed internet, and digital telephony (Voice over IP).

GIS

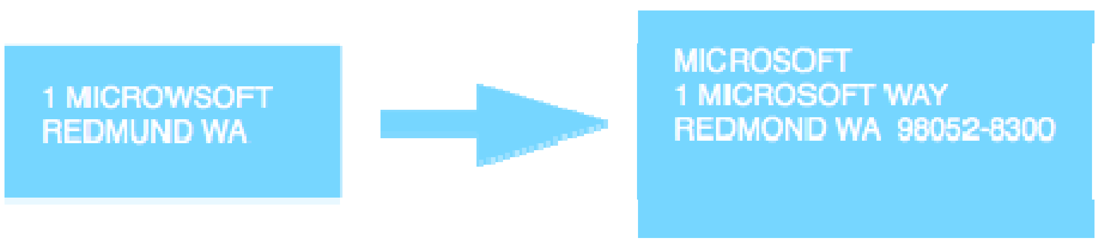
The GIS is the basis for any serviceability framework. In order to determine if an address can be serviced, the location of the network must be known. Most GIS systems start life as a data model that represents the key knowledge desired by the cable provider. In the case of determining serviceability, the key data points are network location and service area. Essentially, the cable company needs to know where it lives.

Another component provided by the GIS is the Geocoder. Geocoding is the process of mapping an address to a geographic point, and is a well-known function of most GIS offerings. When an address is received, it is immediately geocoded allowing the cable company to know where the potential customer lives.

Knowing the location of the service area along with the location of the potential customer, the GIS can be queried using a point-in-polygon function. This function answers the question "Are they where we are?" which is the largest part of determining the serviceability of an address.

CASS/DPV

A common issue with address data entry is ensuring that the addresses are clean and follow a standard. This issue is magnified when the entry of the data is spread over many people, such as is the case with CSRs, and a large service area. Bad or non-standard data entry can derail the entire serviceability process, causing the Geocode component to fail. Coding Accuracy Support System (CASS) is a USPS program aimed at creating clean, standardized addresses. A useful article on CASS can be found here (http://www.melissadata.com/enews/articles/1005/8.htm). In brief, a CASS certified program will scan an address and standardize the different parts of the address. A simple example is changing "STR" and "street" to "ST", matching the USPS standards. However, CASS often will change road names, add company names, or modify other information in the address to make it more accurate. Consider the following example from Wikipedia:



It is apparent that CASS processing is more than simple standardization. It often involves adding data, such as the zip code and company information in the example, and correcting data, such as the street name.

There are many CASS certified products on the market today, each of which can be used to clean up the entry of address data.

Quite often, CASS systems are used in conjunction with Delivery Point Verification (DPV). DPV (http://www.usps.com/ncsc/addressmgmt/dpv.htm) is, in essence, a list of known addresses where the USPS delivers mail. If an address is found using a DPV based system, it is very likely to be a good address.

Using CASS and DPV increases the confidence of the whereabouts of a given address, standardizes the address, and allows the geocoder to be more effective.

Serviceability Algorithm

The serviceability of a given address is not a "yes/no" answer. It is more of a probability of how likely the cable company will be able to serve the customer. The algorithm that determines this probability, while not necessarily complicated, needs to be determined for each company. At a high level, the algorithm has the following operands:

$L \times C$ = a percent score

Where

L = The location of the customer against cable service territory

C = the confidence that L is accurate

The determination of C in the high-level equation is the part that will change from company to company and, possibly, product to product. This confidence factor will also be adjusted over time as the results of the serviceability requests are analyzed. The components that make up this confidence factor are:

- The geocode match score
- How far in/out of the service territory is the address

Each geocoder has a "match score" that determines the accuracy of the geocode. The higher the match score, the higher the confidence. Another key measure is the location of the address in relation to the service territory of the cable company. If an address was found to be well within the service territory boundaries, that was a higher score, obviously, but there were less apparent findings as well. Quite often addresses that were just outside the territory were serviceable, leading the algorithm to be modified to give positive results for addresses close to, but not within, the service boundaries. This distance is the main adjustment point in the algorithm and, often, an indicator of the accuracy of the GIS service boundary data.

Persistence and Data Analysis

Persisting serviceability requests is an important facet to any serviceability framework. It is a good practice to make serviceability requests a part of the GIS data model. Once persisted, the requests can be analyzed to support many other processes.

Analyzing past requests allows the following questions to be answered:

- How much money are we saving by not rolling "check install" trucks?
  - Return on GIS Investment
- Is the time-to-install for the average customer decreasing?
  - Better customer satisfaction
- Where do we have no existing network, but a high request rate for serviceability?
  - Support decisions on future build out.
  - Compare aspects of area to other areas, predict future growth possibilities.
- Where do we have existing network, but a low request rate for serviceability?
  - Focus marketing on this area.

An effective serviceability framework will save resources on the front end by requiring less trucks rolls, but also support many other cable business processes.

Architecture

The supporting architecture for the serviceability framework is similar to any distributed workflow application. The goal is to make the supporting blocks into reusable services while creating a focused application that enables the CSR to easily answer the serviceability question.

UI

Starting with the data entry point or CSR, a lightweight, simple application is an obvious best practice. The UI should be focused, highlighting its responsibility to do the following:

- Provide an easy form to enter address data.
- Provide a simple map to display the address and cable GIS data.
- Provide a straightforward answer to the serviceability question
    - High, Medium, Low

The UI is a client to the building blocks of the serviceability framework, but should not be coupled to these services. Also, in most cases CSRs are not comfortable with using GIS interfaces, driving the interface to be more like Google Maps or Virtual Earth than a typical GIS intranet site. The result is a simple web form and map with minimal GIS controls, as shown in the image below.

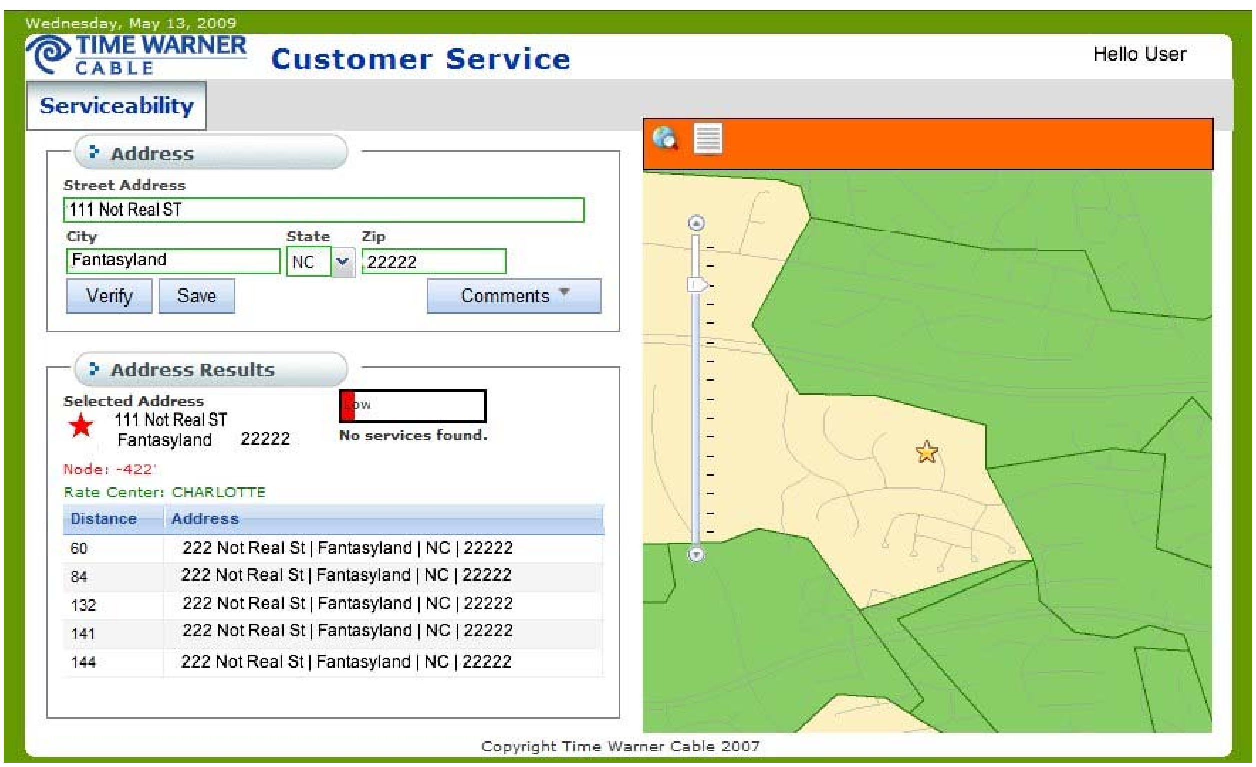


Figure 1 - Web UI

The form is very straightforward and the map has only 3 GIS-based controls. The answer of whether the address is serviceable is given by a familiar web widget (a red progress bar, in this case) along with other information to assist the CSR in making a decision on how to proceed.

Future versions of the UI could focus on helping the CSR "upsell" the client, by providing channel lineups for serviceable addresses, nearest customer data ("Your neighbors have our Triple Play option…"), or what marketing campaigns are available in the area.

Web Services

The building blocks of the serviceability framework map nicely to individual web services. Geocoding, for example, is a GIS function that many applications need, so creating a geocoding web service that can be consumed by the serviceability UI as well as other current and future applications is a best practice. Similarly, address standardization and cleanup is another oft-needed service. In the end, the following services are recommended:

- Geocoding Service
- CASS/DPV Service
- Point-in-Polygon Service

These services should be interoperable and coarse-grained, best practices for any service development.

Conclusion

The aim of a serviceability framework is to quickly determine the likelihood that an address is serviceable. This determination saves money and resources, allowing the cable company to shorten the duration between service request and point of install.

The largest piece of the framework is the GIS, providing the cable company with the location of its own assets, as well as the location of the potential customer. By leveraging supplemental services, such as CASS and DPV, the effectiveness of the GIS functions are enhanced and the framework is improved overall. Persisting the serviceability info leads to the ability to analyze the requests in support of many marketing and engineering functions. A serviceability framework will save money immediately and continually, allowing the cable company to become more efficient at serving its customers.

Authors

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