

How Telecommunication Companies Can Gain Enterprise-Wide Geographic Consistency



Executive Summary

Telecommunication companies (telecoms) face unique challenges. Their customers require reliable access to essential services, their shareholders expect a solid return on investment, and regulators and governments demand compliance with a myriad of tax, environmental and overlapping jurisdictional details.

The need for precision-level geographic information crosses many departments throughout the enterprise. Yet, until recently, most of this geographic data has remained siloed within each respective department and application. The result? No single consolidated geographic system exists at the enterprise-level for applications which demand consistent geographic accuracy.

Geospatial technology from CoreLogic® can help telecoms meet the many challenges they face in this area. Precision geocoding and specialized spatial data allow these organizations to make smarter financial decisions, effectively manage their numerous assets, and better prepare for and respond to emergencies. With our patented, standardized national cadastral dataset (parcels), telecoms can now implement the use of a location intelligence building block that can be used to address all the geographic needs of the enterprise.



Location information products from CoreLogic can help telecoms with financial, asset, and emergency management.

CoreLogic Provides Solutions for Telecoms

Accurate spatial technology delivers benefits to key areas of the enterprise:

- ▶ Engineering/Construction
- ▶ Tax
- ▶ Marketing
- ▶ Asset Management

Telecoms quickly benefit from parcel-level CoreLogic PxPoint™ geocoding and spatial analytics. When combined with property characteristics, municipal, tax jurisdiction and natural hazard risk layers from CoreLogic, telecoms can more readily surmount their operational, financial, preparedness and regulatory challenges.

CoreLogic – We Are Our Best Customer

CoreLogic is a leader in locational intelligence products, data layers and enterprise solutions. This leadership was gained by serving many utility companies, telecommunication and cable providers, as well as insurance and other industries. In fact, we are our best customer, as we use our internally developed solutions to run our flood zone determination and risk businesses.

CoreLogic collects and maintains the most comprehensive property databases in the U.S.—encompassing 99 percent of U.S. residential property records. More than one million users rely on CoreLogic to assess risk, support underwriting, investment and marketing decisions, prevent fraud, and improve business performance in their daily operations.

Geocoding Accuracy

Location is critical to telecoms. There is a need for consistent accuracy across the enterprise, whether it is for fiber-to-the-home, engineering applications, special tax district assignment, call before you dig campaigns or marketing to determine household propensity toward telecommunication services and product offerings.

Geocoding converts address or location information into geographic coordinates. To provide the most accurate results, CoreLogic developed PxPoint. PxPoint is a high-precision, parcel-level geocoding and spatial analytic engine. It evaluates multiple datasets, including HERE map content and parcel boundaries, to deliver the best location match possible.

Spatial Analytics

Telecoms need to understand geographic relationships near or surrounding a geocoded location. PxPoint allows organizations to perform many types of spatial analytics.

These spatial analytics help telecoms answer questions like:

- ▶ Which tax jurisdictions are these customers in?
- ▶ Where are lines buried in this area and what boundaries do they overlap?
- ▶ What is the risk of flooding or fire for a specific central office?



PxPoint's geocoding accuracy, combined with parcel-level data, helps telecoms identify tax jurisdictions, assets and service locations with targeted precision.

Specialized Data

To fully analyze the relationship between a location and its surroundings, accurate data is required. To complement PxPoint's locational accuracy and spatial analytics capabilities, CoreLogic also provides geographic layers and custom digitization services. This allows CoreLogic to deliver a complete locational intelligence solution for each organization.

Parcels and Property Characteristics

Parcels are the standard building block to achieve the most granular accuracy in geocoding, allowing companies to take their business into a new dimension of location awareness—for a host of applications. The CoreLogic parcel data set is by far the largest collection in the U.S.

With an offering that combines parcels with property characteristics, CoreLogic simplifies land record management for telecoms. SpatialRecord removes any ambiguity about the location and extents of the property allowing telecoms to significantly improve land management decisions across the entire organization.

Municipal Boundary Database

CoreLogic is the only vendor that owns and maintains a municipal boundary data set. With a staff dedicated to the ongoing research of tracking changes, our data set is always up-to-date. Companies can license these boundary layers in Shapefile format for use within their own Geographic Information System (GIS) applications.

Township Boundary Layers

Our Township Boundary layer contains township-level information for all 50 U.S. states. These township maps consist of contiguous polygonal township or township-equivalent boundaries, and are aligned to our Municipal and County Boundary layers. The township layers are rigorously maintained to reflect current municipal annexations, de-annexations, and census redistricting efforts throughout the nation. The layers can be licensed in Shapefile format for use within CoreLogic software products or a company's existing GIS applications.

HERE Map Content

HERE is a leading global provider of digital map data for navigation systems and location-based solutions. The company has built a map database of the highest quality and precision, employing one of the industry's most comprehensive development and quality control programs and executed by an extensive team of over 500 field researchers. Trusted HERE map content is among the datasets that PxPoint can evaluate when geocoding.

Tax Jurisdiction Layers

The accurate determination of taxes is burdensome for telecoms. If taxes are not correctly assessed and properly remitted, companies can incur negative publicity, as well as costly penalties or other liabilities. CoreLogic tax jurisdiction layers provide access to municipality data as well as enhanced tax data that identifies the lowest-level taxing jurisdiction and remittance data for telecom-specific taxes. Local school district information is provided in a special tax district file for those states such as Kentucky and New York that have specific telecom taxation at that level. Data provided in this layer also identifies whether or not the Special Tax District (SpTDS) tax applies to industry specific services. CoreLogic has a staff dedicated to the collection and maintenance of its tax layers, helping telecoms meet their tax obligations.

Spatial tax data can help telecoms determine:

- ▶ The lowest-level taxing authority
- ▶ The tax remittance authority
- ▶ Whether the location is subject to SpTDS taxes

Special Tax Districts Layers

There has been continued growth in the area of Special Tax Districts (SpTDS) in the U.S., as many local municipalities look for more ways to increase waning revenue. Today, SpTDS exist in 33 states and the District of Columbia, 663 counties and 2,528 municipalities. In Texas alone, there are about 596 special districts, up from 164 in 2010.

CoreLogic has built its Special Tax District layers for transaction taxes to help telecoms identify taxes imposed by state and local governments, supporting the objectives of local public policy. These tax layers, accessible via Xiance®, provide accurate tax jurisdiction assignment along with the Special Tax District ID, Type and Name, if applicable, for the submitted address or latitude and longitude. Telecoms now have access to accurate data about regional transit districts, police jurisdictions, school districts or school boards, along with a variety of other special tax districts that impose transaction tax on industry specific services.

Natural Hazard Risk Layers

Although generic hazard risk data is readily available, the degree of accuracy and usability of this data is suspect, at best. The CoreLogic staff of geography Ph.D.s and scientists has developed comprehensive data layers that enable our customers to better analyze and manage risk, and plan for emergency response.

CoreLogic Natural Hazard Risk Layers are modeled at the most detailed level possible, and risk levels are determined by the proximity to a hazard and by the hazard attributes. All hazard risk layers are accessible via Xiance, or can be integrated into a company's own GIS applications.



CoreLogic Natural Hazard Risk Layers help telecoms analyze and manage risks and emergencies.

Hazard Database	Brief Description
Brushfire/Fuel Rank	Includes the risk value for the location, as well as the distance to the nearest high-risk area. Available for locations in AK, AZ, CA, CO, FL, ID, MT, NM, NV, OR, UT, WA and WY.
Coastal Storm Surge	Outputs the storm surge risk values for Gulf and Atlantic states. Rated from low to extreme risk. Currently available for AL, CT, DC, DE, FL, GA, LA, MA, MD, ME, MS, NC, NH, NJ, NY, PA, RI, SC, TX and VA.
Damaging Winds	Outputs the risk of wind damage for the location. Includes risks for straight-line winds, tornadoes and hurricanes.
Crime Statistics	Outputs crime indices (percentages of national average) of serious crimes for the location.
Earthquake Faults	Outputs information about the nearest earthquake fault for the location. Available for AZ, CA, CO, ID, KS, MT, NM, NV, OK, OR, TX, UT, WA and WY.
Earthquake Risk	Outputs the earthquake risk values for the location. Currently only available for King County, WA.
Elevation, Slope, and Aspect (ESA)	Outputs ESA information for the location. This information can be used to determine fire spread, potential for landslides and other hazards.
FIREbreak +	Determines FIREbreak data for the location, as well as the distance to the nearest wildlands area. Available for AK, AZ, CA, CO, FL, ID, MT, NM, NV, OR, UT, WA and WY.
Fire Stations	Outputs the features of, and distance to, the location's nearest fire station.
Flood Risk	Outputs the flood plain information for the location.
Grid ID	Outputs the ID of the grid cell for the input address. Select the desired grid cell size (such as one square mile or five square mile size). Grid cell IDs can be used to group and analyze information such as risk concentration, customers, homeowners and hazard occurrences. These IDs can also be used for GIS functions such as heat mapping, along with conversion of data from vector to raster formats for presentation and analysis.
Hail	Outputs the hail storm risk for the location.
Hurricane Landfall Probability	Outputs the probability of hurricane landfall for the current location. Available only for coastal counties in AL, CT, DE, FL, GA, LA, MA, MD, ME, MS, NC, NH, NJ, NY, RI, SC, VA and TX.
Mainland Determination and Distance to Water Feature	Determines whether the location exists on the mainland or not, and the distance to the nearest major body of water (ocean, gulf or Great Lake).
Major Earthquakes (1568-2004)	Outputs information about the nearest earthquake occurrence for the location.
Mine and Mine Subsidence	Determines the distance to the nearest mining operations and type of mine.
Real Estate	Outputs the real estate information for the location.
Sinkhole	Determines the distance to the nearest known sinkhole. Only for FL addresses.
Soil	Outputs soil type polygons for the entire U.S. Also contains soil liquefaction information. Utilities can use soil type information to determine how deep to bury poles or what equipment is required to dig in the location.
Windpool	Determines whether this location exists within a known windpool. Valid for locations in AL, FL, LA, GA, MS, NJ, NC, SC and TX.

Improving Engineering/Construction Applications for Telecoms

As telecoms maintain and expand their service offerings throughout the U.S., only the most accurate, current and precise geographic data is acceptable. This data is mission-critical to the success of these infrastructure development operations. To this point, most of this geographic data has been collected from myriad sources and is not standardized, as every state and even local government differs in data availability and quality. Acquisitions and mergers with other telecoms have also created many disparate geographic systems and methodologies. Data collection has been sporadic and incomplete in most cases and there is a need to consolidate the landbase data into one centralized GIS system across all regions of a telecom's construction and engineering groups.

Recognizing this need, CoreLogic created the first and largest nationwide digital parcel boundary data set, ParcelPoint®. CoreLogic used advanced technology to digitally and precisely map 152.8 million U.S. property parcels, covering more than 97 percent of the U.S. With ParcelPoint, CoreLogic was the first entity to create a multi-purpose cadastre that provided the digital fabric required to truly understand property attributes, including unique identifiers such as house number, street name, owner name, city, state, ZIP Code and latitude/longitude.

Improving Financial Management for Telecoms

CoreLogic geocoding technology and data enables telecoms to manage and improve finances in a variety of ways.

Taxes and Fees

CoreLogic can help most telecoms drastically reduce their tax exposures and reporting costs. This is accomplished by combining improved geocoder accuracy with the proprietary data available only from CoreLogic.

Because geographic data, such as U.S. parcel data, changes less often than ZIP Code data, future data updates are more manageable and less costly to perform. Latitude and longitude information never changes, so only annexation changes need to be regularly considered. Companies may now only need to update data quarterly, instead of monthly.

Telecoms can reduce tax exposures and reporting costs by:

- ▶ Fewer “false positives” and other incorrect address matches when precisely geocoding with PxPoint
- ▶ Less frequent data updates required for geographic data compared to postal data
- ▶ More accurate tax jurisdiction assignments to ease tax compliance

Tax Compliance

Telecoms are required to comply with complex, convoluted and overlapping tax jurisdictions and filing requirements. One problem these organizations face on a daily basis is how to correctly determine which of the many tax jurisdictions apply to a particular customer address or service location.

A situs is the place where a property is located for tax or legal purposes. With its high-precision PxPoint geocoding and well-maintained proprietary datasets, CoreLogic returns more reliable results than systems that use common ZIP Codes to determine taxes. With parcel-level data as the primary building block, CoreLogic allows companies to correctly locate addresses to comply with multiple, overlapping tax jurisdictions.

Tax compliance benefits include:

- ▶ Decreased tax exposure, penalties and tax reserves
- ▶ Meeting tax guidelines, requirements and deadlines
- ▶ Completeness and accuracy in tax reporting

By correctly situsing central offices and warehouses, outlying repeater stations, cell towers, underground fiber and cable, and even customer service offices, companies can more accurately manage property and other taxes. Accurate location information can also improve the allocation of linear assets, such as fiber and cable, to the proper jurisdictions.

PAYROLL TAX

Our Payroll Tax Jurisdiction layer can help companies in two ways. It accurately identifies withholding locations and helps telecoms with local business income taxes. It can also allow for proper payroll withholding through special tax district information.

FRANCHISE FEES

Many cities and counties charge a franchise fee to telecoms in exchange for the right to provide service in that location. Because these fees are typically based on gross revenues, it is important to correctly determine if a service location falls within the boundaries of a taxing jurisdiction. Spatial solutions enable companies to make this determination.

Municipal Audits

Telecoms are subject to periodic audits by the municipalities to which they remit taxes. If problems or discrepancies are discovered during an audit, companies are liable for the taxes due. In addition to the taxes due, the company will likely incur penalties and interest.

There is also a significant cost to the audits themselves. For large organizations, an audit may cost the company \$50,000 to \$100,000 or even more. That cost includes accounting personnel, management time, plus the IT (information technology) resources necessary to assemble the data and generate reports.

With a robust spatial tax solution in place, telecoms can streamline and decrease the cost of the audit process, as subsequent reports will usually demonstrate close to full compliance. Organizations can also direct an auditor to the spatial system that was implemented for the purpose of tax jurisdiction assignments. By some estimates, these changes can reduce the cost of audits by approximately 50 percent.

The combination of simplifying the audit process, decreasing the number of audits and reducing exposure to interest and penalties can result in substantial savings for a typical telecom.



CoreLogic helps telecoms cut customer service and audit costs.

Customer Service and Refund Costs

Telecoms incur significant costs investigating tax complaints from customers. These investigations often result in having to issue refunds when customers have been incorrectly billed for taxes.

By correctly assigning tax jurisdictions the first time, telecoms can cut down on customer service and refund costs. By providing customer service operators access to real-time lookups using CoreLogic technology, telecoms can further cut labor costs—while also improving customer service and satisfaction.

A CoreLogic geocoding and tax solution delivers savings in three ways:

- ▶ Reduced volume of complaints that require customer service
- ▶ Decreased amount of refunds issued to customers
- ▶ Reduced labor costs for customer service episodes

Improving Asset Management for Telecoms

Asset management can be defined as a “best way” of managing physical assets to gain the greatest return. It blends best practices, best processes and best technology. The purpose of physical asset management is to ensure that the means of production and operation are readily available. Better asset management allows companies to meet mission, yield, scheduling, quality and cost commitments to allow for optimum return.

Asset management includes these capabilities:

- ▶ Inventory and cataloging of assets
- ▶ Mapping of assets
- ▶ Improved outage response

Asset Inventory and Cataloging

Using the precise positioning capabilities of PxPoint, companies can accurately locate all of their physical assets, allowing for more effective inventory and cataloging of all types of assets. In addition to location information, PxPoint can work with metadata, which is additional data about the data itself. Each dataset contains its own list of attribute fields, providing more detailed descriptive information about the data. Many datasets include numerous attribute fields that telecoms can put to use. For instance, some data provides nearly 100 fields for each street segment.

STANDARDS SUPPORT AND INTEGRATION

PxPoint also allows users to work with ESRI Shapefiles. Shapefiles are a standard GIS file format for spatial data. Many companies have GIS groups that utilize and require spatial data.

Spatial data may be used for:

- ▶ Design
- ▶ Engineering/Construction
- ▶ Tax Jurisdiction Assignment
- ▶ Infrastructure

Because PxPoint supports industry-standard Shapefiles, telecoms can more readily leverage their existing spatial data. This capability also allows PxPoint to be integrated into comprehensive custom solutions.

ASSET MAPPING

While it is useful to know where physical assets are located, it is often more beneficial to visualize the information shown on a map.

Spatial technology enables companies to display information visually, so that business users can easily make sense of the information by utilizing graphics, overlays and even satellite photography.

CALL BEFORE DIGGING

Precise PxPoint location information, along with parcel boundary data, can ease the process of call before digging. By mapping buried lines, telecoms have answers ready for “call before digging” inquiries. Not only saving time beforehand, this approach helps avoid the need to dispatch crews to later handle problems.

IMPROVED OUTAGE RESPONSE

With readily available geolocation information, companies can reduce the number and duration of service interruptions. When interruptions do occur, precise location information helps telecoms improve response to service outages, increasing customer satisfaction.

CoreLogic location intelligence can be integrated with a telecom’s existing routing package. By utilizing CoreLogic parcel data and PxPoint’s street centroid geocoding, telecoms can locate crew and service points more accurately. This precision results in more efficient and effective repair crew deployment. For example, by dispatching a crew already located nearby, telecoms can more rapidly repair downed telephone lines or damaged cable/fiber.

Improved responses to problems like this can reduce liability exposure for damages and injuries, decrease labor and transportation costs, and improve customer satisfaction.



CoreLogic helps telecoms improve their response to outages.

Improving Emergency Management for Telecoms

Spatial technology and data allows telecoms to improve their emergency management processes by allowing for more comprehensive and effective emergency preparedness, emergency response and business continuity planning.

Emergency Preparedness

Preparedness is the first hurdle in emergency management that companies need to address. Telecoms that effectively plan and prepare can more quickly and successfully respond to emergencies.

Accurate geocoding and data is the key to effective preparation. This combination allows companies to correctly identify and rank risk zones throughout their entire service areas. Using parcel data, telecoms can even return hazard risk information and ratings per parcel. That level of detail helps to proactively assess, manage and mitigate risks on dispersed assets ranging from central offices to outlying repeater stations.

Specialized CoreLogic Natural Hazard Risk Layers are available for the most common risks that telecom companies face. For example, the Damaging Winds Layer allows companies to proactively prepare for the damage caused by winds, tornadoes and hurricanes. Other hazard layers include earthquake, fire, flood, hail, sinkhole and more.

EMERGENCY RESPONSE

How effectively telecoms respond to inevitable emergencies depends on their preparation. Applying geospatial intelligence to identify risks and manage assets allows for quicker and more effective response.

In this day and age, it is imperative that every organization have current plans in place to deal with emergencies. The plans should be developed with the cooperation of management, operations, IT and even other agencies. These contingency plans should locate risks and rank their consequences, followed by details about how to best recover from the various consequences.

CoreLogic technology and data enables telecoms to actually pinpoint risks and assets at the parcel level. For example, companies can utilize the CoreLogic Brushfire/Fuel Rank layer to pinpoint certain fire risks to their facilities, as well as to their customers. Plans can then be developed to mitigate and recover from fires at the facilities, or to respond more quickly after fires affect customers. In this case, companies can better predict which assets may be affected, determine which remaining assets can be deployed and along which routes, with which employees, and so on. Smarter planning helps ensure a more effective response.



CoreLogic helps telecoms prepare and plan for wind and hail emergencies.

BUSINESS CONTINUITY PLANNING

A business continuity plan is a telecom's roadmap to recovery. Following a careful risk assessment, every company should develop and test a business continuity plan.

The business continuity plan should:

- ▶ Identify risks and their probability to interrupt business and services to customers
- ▶ Assess the impacts of the risks and assess each business operation and service
- ▶ Identify and prioritize critical services, operations and employees
- ▶ Document how much recovery is necessary to begin conducting business again and provide essential services

With access to precise location data about all its assets, a telecom can improve development of a business continuity plan. In order to develop an effective business continuity plan a telecom needs to fully understand the spatial relationships between assets, customers and geography throughout the entire service territory.

Because of its unique ability to evaluate multiple datasets and provide complex spatial analytics, PxPoint is the application framework that telecoms need to underpin their planning. Only PxPoint and the specialized data that CoreLogic develops and maintains, can provide the detailed spatial insights required for business continuity planning.

Experts Recommend Preparing for Geological and Meteorological Hazards

In its *Standard on Disaster/Emergency Management and Business Continuity Programs*, 2007 Edition, section A.5.3.2, the National Fire Protection Association (NFPA) recommends that:

The hazard identification should include the following types of potential hazards. This list is not all-inclusive, but reflects the general categories that should be assessed in the hazard identification. Naturally occurring hazards that can occur without the influence of people and have potential direct or indirect impact on the entity (people, property, the environment), such as the following:

- ▶ **Geological hazards** (does not include asteroids, comets, meteors): i. Earthquake; ii. Tsunami; iii. Volcano; iv. Landslide, mudslide, subsidence; v. Glacier, iceberg
- ▶ **Meteorological hazards:** i. Flood, flash flood, seiche, tidal surge; ii. Drought; iii. Fire (forest, range, urban, wildland, urban interface); iv. Snow, ice, hail, sleet, avalanche; v. Windstorm, tropical cyclone, hurricane, tornado, water spout, dust/sand storm; vi. Extreme temperatures (heat, cold); vii. Lightning strikes

Web Platform

Xiance® is a ordering and delivery platform delivering positionally accurate tax jurisdiction and natural hazard risk reports through the web.

This tool can help telecom companies better understand their tax liabilities prior to making important digging or asset management decisions.

Conclusion

Why Spatial Solutions are Necessary for Telecoms

Telecoms require consistent geospatial intelligence across the enterprise to help with key areas of their business:

- ▶ Network Operations
- ▶ Engineering/Construction
- ▶ Financial Management/Tax
- ▶ Asset Management
- ▶ Emergency Management

CoreLogic provides complete, customized geospatial solutions for telecoms. These solutions are built on the advanced geocoding and spatial analytics platform, PxPoint. When combined with specialized data, such as the largest U.S. parcel level database, structure footprints, tax jurisdiction and hazard risk data, companies finally have access to the spatial insights they need—across the enterprise. This translates into a single geographic base from which all activities that require a geographic answer can reside to bring maximum efficiency to the telecom.

Web Mapping Service

CoreLogic provides several of its property and hazard data layers via Web Mapping Service (WMS). WMS requests generate a visual response in one or more geo-registered map images (returned as JPEG, PNG, etc.) that can be displayed in a browser application, such as OpenLayers, Bing or Google Maps API. The interface also allows for the transparency of returned image layers from multiple servers.



CoreLogic helps telecoms plan for emergencies and business continuity.

Esri® ArcGIS® Enterprise

Through our integration with Esri ArcGIS Enterprise, we offer you an on-demand, web-based solution, giving you 24/7 access to your desired content. By enabling both Map and Feature Services to suit your specific needs, you can gain access to our industry-leading parcel boundary products directly into your existing Esri tools such as ArcGIS Pro, Portal for ArcGIS and ArcGIS Online. We give you the same exceptionally accurate results, your way.

Achieve a Quick Return on Investment

Because of all of the different integration options, along with the ability to license only the specialized spatial data needed, CoreLogic delivers tailored solutions designed for each customer. A solution focused on the needs of each individual customer pays for itself very quickly.

How Quickly Can a Telecom Get Started?

CoreLogic technology uses modern industry standards, such as XML/SOAP. This flexible technology is user-friendly and quickly integrated, typically providing companies with geospatial intelligence benefits in just a few short weeks.

About CoreLogic

CoreLogic (NYSE: CLGX) is a leading global property information, analytics and data-enabled services provider. The company's combined data from public, contributory and proprietary sources includes over 4.5 billion records spanning more than 50 years, providing detailed coverage of property, mortgages and other encumbrances, consumer credit, tenancy, location, hazard risk and related performance information. The markets CoreLogic serves include real estate and mortgage finance, insurance, capital markets, and the public sector. CoreLogic delivers value to clients through unique data, analytics, workflow technology, advisory and managed services. Clients rely on CoreLogic to help identify and manage growth opportunities, improve performance and mitigate risk. Headquartered in Irvine, Calif., CoreLogic operates in North America, Western Europe and Asia Pacific.

For more information, visit corelogic.com/LocationInformationSolutions

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