



**Tele Atlas**

***OneMap***

# *OneMap*

*OneMap* brings the concept of a spatial-data infrastructure to fruition. The idea of a *National Spatial Data Infrastructure* (NSDI) was born decades ago, when leading minds of GIS recognized that the lack of a standard landbase would hamper so much of the vision of GIS. While the publicly-sponsored framework for spatial data provides certain layers of information, it is *OneMap* that provides the high-quality landbase layers critical to so many GIS applications. It is *OneMap* that supplies the contiguous features from layer to layer and the highly-uniform horizontal accuracy, road naming and address range assignment from coast to coast.

*OneMap* is the name Tele Atlas gives to our product of a geographic information landbase kept current through collaboration with our many partners, and including content to support the applications of all State-agency users as well as the Counties and Municipalities within the State. *OneMap* represents both the database and the opportunity for a State to define its requirements for specification and maintenance of the database content. States have both common and unique requirements, and for the early adopters of the concept, Tele Atlas has successfully interpreted those to satisfy the needs through *OneMap*.

## **THE COMMON DATA STRUGGLE**

Within State government, street-centerline information often exists with content and extents required by a single agency. State Departments of Transportation, for instance, typically have road centerline vectors representing the roads for which they are responsible. Address information is often not included on those roads, and in some cases even road name is absent. Other agencies may have chosen to develop streets layers to support their specific missions, but often without street-address information. When addressing is a necessity, agencies may use a centerline layer such as TIGER data, or may acquire a commercial dataset. This may provide the desired attributes, but if the data is to be maintained, that will be done by staff hired to perform other jobs. Maintenance entails collection of GIS data from local governments and other publicly available sources. The data may be provided in various formats, ranges of age and quality of content. With the need to interpret and assimilate the content from the various inputs, collection and management of the source data becomes a monstrous job in itself. Time and money that is meant to be expended providing service to the public is consumed instead in the uphill struggle to support an in-house solution for road centerlines that may not be designed for all the applications. If this approach does solve the technical problem of developing the necessary streets layer, it still may produce a practical problem by creating various versions of streets that should match from agency to agency but do not. The second obvious problem is the duplication of effort in creating these versions that are local to each agency.

## **ONEMAP PROVIDES THE SOLUTION**

The *OneMap* enterprise solution entails a process between Tele Atlas and the client/partner that defines the database content and quality needed by the client's GIS applications to be supported. This approach results in a single database including the common information needed by all agencies, while supporting the unique data and applications of each.

## REQUIREMENTS ARE THE CRITICAL FIRST STEP

Starting with our Nationwide inventory of highly accurate streets, Tele Atlas works with the OneMap client/partner to establish the detailed content, accuracy requirements, schedule and product formats for the deliverable data. Tele Atlas also works with the OneMap client/partner to **define the maintenance approach that best-suits the client** needs for keeping this critical data current.

The OneMap model includes elements making it incomparable as a commercially produced GIS database. First, it is constructed from the content of Tele Atlas' core *Dynamap*<sup>®</sup> database. The core is a massive and highly detailed relational database that stores everything Tele Atlas knows about the street network. The core coverage includes the entirety of the United States and Canada, and boasts a **high degree of uniform positional and address accuracy**. However, the street network requires constant maintenance, with growth, modification, renaming and new addressing. In a word – *change*. Change keeps Tele Atlas in perpetual update mode, compiling the ever-improving source of OneMap. *Compilation* is the approach that Tele Atlas uses to **assimilate the goodness from the tens of thousands of sources** we reference constantly. Tele Atlas couples the efforts of our field-data collection teams with compilation, as an extra measure in delivering the best possible OneMap product. Tele Atlas has more than 200 New Hampshire-based staff, trained in the use of our advanced editing applications, making millions of data edits annually, so that the core keeps pace with real-world change. When Tele Atlas signs-on a OneMap client/partner, the imperative for tracking change is focused on achieving the requirements for their specific geography.

## BENEFITS TO STATES AND LOCAL GOVERNMENTS

OneMap provides the same current and maintained landbase to be used by each and shared by all other agencies of the State and its localities, yielding a **uniform understanding of location**. This is a core benefit of OneMap. What good is a common understanding of location unless it is accurate and current? Tele Atlas works with scores of data providers and client/partners who produce the most current information available to maintain the quality of OneMap content. Literally **millions of updates are applied to the core database annually**, in the constant pursuit of currency. In practice, Emergency Management and the State Police are responding to the same events and need to know that they will find all locations for which they are responsible. Transportation and Motor Vehicles are analyzing and cataloguing the same traffic incidents. Health and Social Services are both geocoding their case locations. Environmental Protection and Parks & Forestry are both working to optimize use of the same State lands. In each of these cases, and countless others, the ability to share a GIS database that is kept current and offers the series of landbase layers that each of the agencies needs, combine to provide benefits to the quality of analysis and supports repeatable outcomes no matter who is using the data.

The heart of OneMap is Tele Atlas *Dynamap*<sup>®</sup>/*Transportation* Street-Centerline data layer. Each street segment is encoded with street name and address range, as well as ZIP Code, and municipal-boundary correspondence. This attribute information is critical to apply geocoding at multiple levels. Also included is the information to support routing analysis; speed limit, one/two-way directionality, segment length in miles, travel time in minutes, intersection connectivity, and turn-by-turn navigation information of the best quality in the industry.

A premium is placed on horizontal accuracy and validity of navigation attributes in the OneMap database. As a result, not only is location accurate, but also is the path to travel from one location to another.

The street centerlines of OneMap comprise a powerful resource as an independent dataset, but the database includes additional layers supporting many GIS mapping and spatial-analysis applications.

**The additional layers include:**

- |  |   |
|--|---|
| <i>ZIP Code Boundaries and Inventories</i>           | <i>Water features; both linear and open</i> |
| <i>Large Landmarks, Recreational Areas and Parks</i> | <i>All levels of Political Boundaries</i>   |
| <i>Airports and other Transportation Terminals</i>   | <i>Rail Lines</i>                           |

*Dynamap*<sup>®</sup> data is also available for **adjacent political subdivisions**, so that routing, mapping and analysis are not cut off at the boundary of the client’s area of responsibility.

In addition to the key qualities of the uniform nationwide *Dynamap*<sup>®</sup> product, another critical element of OneMap is the **option for custom variations**. Emergency Service Zones, mile post locations, bridge locations, driveway-entrance points, building location points, linear reference systems (LRS) and other data layers or attributes can be captured and mapped as a component of a State’s OneMap database. The LRS in particular has become a common addition to OneMap delivered for a State.

**IMPORTANT STATEMENTS TO CONSIDER REGARDING *DYNAMAP*<sup>®</sup>/TRANSPORTATION**

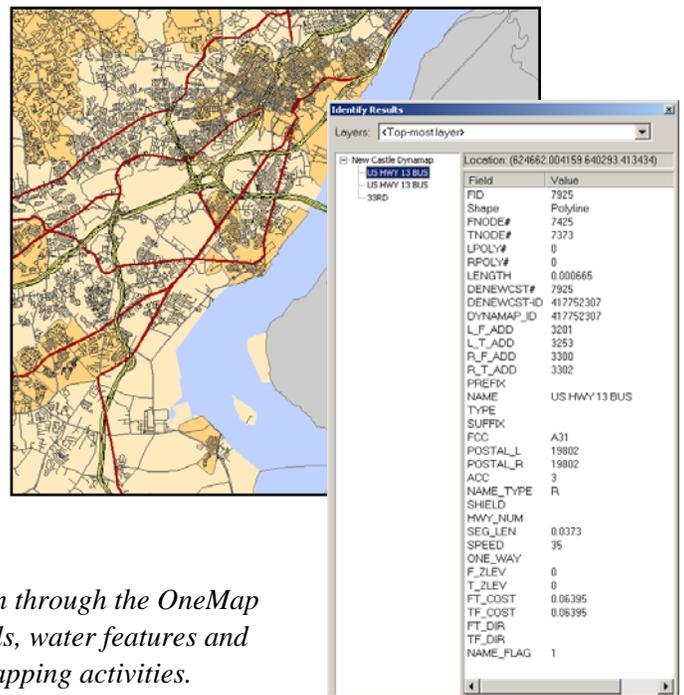
*With a high degree of uniform accuracy, Dynamap*<sup>®</sup> provides the network that ties street addresses to all other mapping layers used by State agencies.

*Dynamap*<sup>®</sup> is designed for geocoding, mapping, routing and spatial analysis.

*By supporting a spatially accurate network of street centerlines, and by including street address, Dynamap*<sup>®</sup> ties your GIS to the world of geocoded information, as well as the world of spatial analysis.

*Any agency that uses addresses for its facilities or its work locations can make important use of Dynamap*<sup>®</sup> for notification, routing, facilities identification, inventory management, and an endless range of other activities that associate information with a location.

*Any group of agencies that share Dynamap*<sup>®</sup> information through the OneMap solution will be using the same geometry, addresses, rails, water features and boundary layers to conduct their spatial analysis and mapping activities.



## **GUIDELINES FOR COMPARISON**

When comparing the OneMap offer with alternatives that may be available, there are key qualities that must be considered. In each and all of these qualities Tele Atlas places its emphasis, to distinguish our core product. Taking these all into careful consideration will guide you to the more and more widely accepted conclusion that there really are no alternatives to compare.

### **Completeness of Attribution**

High quality geographic data is complete and provides all the information necessary to support those applications for which it will be used. For geocoding applications, completeness means having the street and having it properly named with current ZIP Codes and up-to-date address ranges. For many geocoding applications, it also means having accurate Census tract and block group codes. For routing applications, completeness means having one-way street information, intersection turn restrictions, and highway interchange and ramp information.

### **Geographic Coverage**

Comprehensive, seamless data coverage is critical to ensure consistency throughout all areas of the state. While detail in major cities or fast-growing suburbs is important because of the number of people impacted, detail in rural areas is also important because governments have obligations and mandates for rural citizens as well as for those in cities and suburbs. A consistent data model that applies the same quality standards throughout the state street centerline database is critical to ensure the ability to leverage the database investment across the entire state.

### **Accuracy**

Accuracy is more than simply measuring the quality of position. True data accuracy involves the quality of data resources, established compilation procedures, and ongoing quality check and analysis in addition to positional accuracy. All of these elements impact the quality of the data, and thus the accuracy and reliability of applications using the data.

### **Change Management and Currency**

The geography of the road network is constantly changing and a GIS database has to be as dynamic as the world it covers. Identifying, capturing, and delivering that change in a usable way is critical to ensuring the value of a client's data investment. The data supplier must offer options for update cycles, as well as tools and processes that help the State manage its recognition and assimilation of change.

### **Cost-Effectiveness**

Obviously price is only one element in evaluating the real cost of an investment in spatial data. Data quality as well as deliverables tailored to the State's specific needs ensure the best investment of resources.

## EXAMPLES OF ONEMAP IMPLEMENTATION

At Tele Atlas, our ambition is to help States who recognize the gap in their GIS landbase and seek to close it with expert commercial help. Following are examples of States that have been working with Tele Atlas to produce their OneMap, meeting requirements for content and spatial accuracy, supporting specific map-database application needs, and providing a high-quality landbase for use in all State and Local government GIS applications.

Tele Atlas worked with client/partner, **New York State**, to develop a database that supports a range of agency applications, starting with statewide tracking and analysis of automobile accidents. Tele Atlas employed aerial-photo imagery in extending the *Dynamap*<sup>®</sup> network, and correcting the horizontal accuracy to meet the State's requirements. Tele Atlas also employed data resources from local governments and from the State Office of Real Property, to achieve the State's requirement for street naming and address-range assignment. Tele Atlas will maintain the ongoing process to meet the State's requirements. Over a period of 4 years, New York State funded the completion of this statewide effort to enhance vector centerlines in the 140,500 miles of road network.

Tele Atlas has worked with **Pennsylvania** State Police, over the past 2.5 years to deliver a database of uniform statewide-addressing quality, representing a road network of 165,000 miles. As the State licenses Dynamap for all agencies and local government, and distributes the data through its *Enterprise License Agreement*, the State's investment will yield incalculable benefits to the quality of spatial operations and mapping across State and local government. As Tele Atlas maintains the data, the investment in annual licensing and maintenance will continue to pay valuable dividends.

Tele Atlas is working with the State of **Tennessee** to deliver a statewide database of road centerlines at uniform accuracy for both horizontal accuracy and completeness of naming and addressing. The State is providing excellent imagery and tax-parcel data resources to make achievement of their specifications possible. Tennessee will spend 3.5 years in seeing the project to completion for its 118,978 miles of road network.

In these cases, as well as others, Tele Atlas is providing unique value that is unmatched in database development and maintenance by any other provider or source.

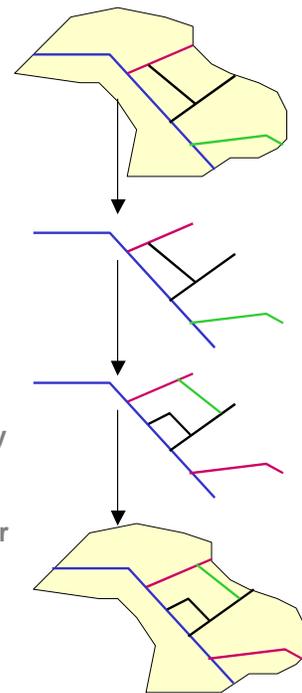
## ONEMAP DISSEMINATION & MAINTENANCE

Tele Atlas provides OneMap data in a range of formats, including ESRI's ArcSDE Geodatabase, which is ideal for supporting State Enterprise GIS applications. Through the applications and Enterprise support provided by the Geodatabase, OneMap is successfully employed by a broad range of GIS applications, while it is maintained and even hosted by Tele Atlas. This approach to maintenance provides expert professional support for keeping the database current and allows public agencies to focus on tasks that are their professional expertise. Geodatabases can be versioned to facilitate the distribution of data updates. Through versioning functionality, Tele Atlas is able to provide OneMap data delivery cycles whereby only new or changed information is delivered to the client's geodatabase.

The key qualities discussed here point to more of the elements that distinguish Tele Atlas's OneMap as the superior data product for the purposes mentioned above. Because Tele Atlas offers products that are constantly updated with our current knowledge, our clients who rely on currency also need product-maintenance options allowing them access to it. Clients for whom cost-effectiveness is most important prefer options primarily supporting this need. With the OneMap offer, the range of maintenance options includes real-time, customer-defined monthly and quarterly updates.

### Maintenance Flow Example

1. Client will download a county from the online data server and edit road centerline attribution and/or geometry
2. Client indicates all edits with appropriate metadata in the supplied metadata fields
3. The edited county will be provided to Tele Atlas via ftp
4. Tele Atlas will extract changes to be applied to the core TANA database
5. Changes will be applied by Tele Atlas to the core database
6. Tele Atlas will extract the content from core, and automatically update the OneMap database
7. Tele Atlas will post updated product layers to the online server
8. Client will download the latest version of the affected county tile
9. Modeling and quality requirements will be defined by the client's *Tele Atlas Database Modeling Specifications*,



*Example Maintenance flow for a OneMap client participating in database enhancement activity*

## THE ONEMAP PARTNERSHIP

OneMap works when groups from State agencies, County and Municipal governments, non-profit cooperatives, and public utilities agree to collaborate in developing the single best map-data source for their common coverage area. Not all of these groups are involved in each OneMap development effort, but where a State agrees to engage with Tele Atlas as the lead client/partner in the project, all can contribute and benefit. Each participant has requirements of the data that results from the OneMap effort, and each provides map-information resources that contribute to the final content. Tele Atlas employs its expertise to compile the optimal knowledge-base for positional accuracy, road-network connectivity, and street-address range correspondence. Tele Atlas may acquire the resource for mapping, or the State may provide the resource, which is normally orthogonally-corrected aerial or satellite photography (ortho-photos). The same is valid for resources needed to achieve a requirement for naming and addressing completeness and geocoding hit rate. Together Tele Atlas and the client/partner determine what will be produced as the State's OneMap result.

Take for example a State where funding is available from the Federal government for communications and information technology enhancements in support of public safety and homeland security. An improved street-centerline layer for 911 database maintenance and emergency-response routing is commonly the first and most important facet of the programs funded by that money. The Director of Public Safety may involve the State's Director of Geographic Information to assure that a sensible approach is taken to developing or possibly redeveloping that data layer. The data that results from the effort can and should support as many mapping and spatial analysis applications as possible within the State, so the Director of Geographic Information will want to work with other GIS-user organizations inside and even outside of State Government. The State's Transportation Director has a great interest in the new GIS layers, as do the Directors of Public Health, Finance and Environmental Protection. The Department of Transportation is interested in street centerlines with a high degree of positional accuracy to support location of its facilities as measured in its LRS and to support facilities design. In rural parts of the State where addressing distances are random and sequential house numbering is rare, geocoding an address to an interpolated location within an address range is often inaccurate. As a result, the Departments of Health and Finance are interested in addressed point locations, representing accurate positions for residential and commercial structures. A non-profit agency; the State's One-Call group, is responsible for damage prevention when individuals or companies plan to dig anything from a post-hole to an office building or roadway cut. Knowledge of the organizations affected by any excavation comes together at the one-call center. Currency and completeness of the street network is of major importance for them to avoid service outages and possibly gas-line explosions.

The OneMap database is compiled from the centerlines that Tele Atlas maintains, along with sources such as parcel maps provided by participating Counties, and high-resolution imagery provided by the State. When the initial project work is done, all State, County and Municipal government agencies simultaneously gain access to the positionally accurate and completely addressed street centerlines. For States that require advanced data development, the next project phase may see the DOT collaborating with Tele Atlas to implement its LRS atop the enhanced centerlines. When a major roads project is defined, the DOT will provide milepost of address-range information to the State DEP, which will conduct environmental impact studies based on the accurate locations in their shared database. Affected property owners will be notified based on address correspondence between impacted centerline address-ranges and the State Tax Assessor's roles.

County DOT's with access to the same centerlines and LRS information are able to piggy-back or to delay their road-development or maintenance projects based on information shared and accurately mapped against the common OneMap database. Integrated project work like this has the potential to save substantial amounts of time and money for a State and its local governments, based on the efficiencies gained from accurate analysis and reporting, directly due to the exceptional quality of the shared Geodatabase. So, from the initial investment in Statewide Public Safety, the positive effects can easily be spread across multiple public services.

## ONEMAP DATABASE DEFINITION AND FEATURE MODELING

The *Dynamap*<sup>®</sup>/*Transportation* core of OneMap is a nationwide database. Every State and Local government can participate in a OneMap project with confidence that a substantially complete and accurate dataset exists for their area before project work even begins. The 80/20 rule can reasonably be used to describe the completeness of OneMap at the start of a project. In this case, that is to say typically 80% of the necessary content of the final database already exists in *Dynamap*<sup>®</sup>. The remaining 20% includes the unique requirements for each project.

For instance, the base horizontal accuracy of *Dynamap*<sup>®</sup> is 12 meters in a particular State. It is likely that accuracy is based on the day-to-day effort in the Tele Atlas data factory to develop and maintain a uniform standard of quality. In developing the OneMap for that State and its local governments, the requirement to Tele Atlas is to achieve 3-meters of horizontal accuracy. The State may supply a data source that supports realignment of road-centerline and other spatial features, to meet the higher positional standard. In addition, a special application of OneMap data, such as zonal State Police response routing, will require that Tele Atlas develops a layer that is not standard to the *Dynamap*<sup>®</sup> database. As with the standard layers though, the State Police Response Zones will be integrated so that lines representing a coincidence in the real world are provided as coincident lines in the deliverable database.

As mentioned above, Tele Atlas' approach to a OneMap database starts with the detailed definition of the State's requirements. A *Database Feature-Model* (DBFM) workshop is conducted with the client/partner, to convey an understanding of how Tele Atlas does its work, and how the resulting OneMap model of the real world will look. Tele Atlas specialists educate the client/partner on our approach to centerline development and enhancement. They present Tele Atlas' standard technique to modeling centerlines, intersections, overpasses and features on other layers within core *Dynamap*<sup>®</sup>. The State's requirements for accuracy are reviewed, along with the available resources to be used in achieving that accuracy. In addition to positional accuracy, Tele Atlas works with the client/partner to define requirements beyond standard *Dynamap*<sup>®</sup>. On one hand, a OneMap solution may involve additions as limited as data-fields format changes from those in the standard *Dynamap*<sup>®</sup> product. On the other hand, a more extensive solution may require substantial development to produce layers not offered Nationwide. It may involve conflation activity; the transfer of attributes between the same or related features across layers. Establishing feedback loops may be required, allowing clients to produce updates that Tele Atlas accepts and uses in the enhancement of the OneMap database.

The DBFM requirements of the client are compiled into the State's requirement document that details all aspects of the development process; feature capture, accuracy and attribute coding. Tele Atlas also signs up a to a delivery schedule for specific components of the *OneMap* database.

## SUMMARY OF THE ONEMAP SOLUTION

OneMap meets its goal to provide the single enterprise-wide GIS data source and capability to support the broad range of business applications for State and Local Government agencies. Tele Atlas provides the OneMap Solution, composed of mission-critical geographic information in a range of formats, including a supported Geodatabase and managed through the Spatial Database Engine (SDE). Defined around the Tele Atlas *Dynamap*<sup>®</sup>/*Transportation* core, designed for geocoding, mapping, routing and spatial analysis, OneMap offers a high degree of uniform positional and address accuracy. OneMap is most effective when all or any of the State agencies, County and Municipal governments, non-profit cooperatives, and public utilities agree to collaborate in developing the single best map-data source for their common coverage area.

### KEYS TO THE BENEFIT OF *ONEMAP*

The mapping content of OneMap ties your information to identifiable locations; not only to latitude and longitude, but also to street addresses. The OneMap database starts with the definition of the State's requirements, and the resulting *Database Feature-Model* (DBFM) document defines the detailed deliverable that will meet the State's unique application needs. Each street segment in the OneMap database is encoded with street name, and address range, as well as ZIP Code, and municipal-boundary correspondence. Data within adjacent political subdivisions is available to OneMap client/partners, so that routing, mapping and analysis are not cut off at the boundary of the client's area of responsibility.

Data Layers provided in the standard OneMap Solution include:

*Street Centerlines*

*All levels of Political Boundaries*

*ZIP Code Boundaries and Inventories*

*Water features; both linear and open*

*Large Landmarks, Recreational Areas and Parks*

*Airports and other Transportation Terminals*

*Rail Lines*

An *Enterprise License* is available, allowing a State to provide access to the current and spatially-accurate GIS database of addresses and other geographic information for all agencies within the State and its local governments. Any group of agencies that share layers of GIS information through the OneMap Solution will be using the same geometry, addresses, rails, water features and boundary layers to conduct their spatial operations and mapping activities, and will have a uniform understanding of location. The completeness of attribution, geographic coverage of the data, currency and accuracy of the content, quality of change management in the development process, and cost-effectiveness of the final solution all combine to provide a OneMap product that will support you and all of your collaborating organizations in the application of mission critical GIS.