



NG9-1-1 GIS Service Guide

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1. Introduction

This Service Guide describes Intrado's Next Generation 9-1-1 ("NG9-1-1") GIS software and service offerings (collectively, "Services").

NG9-1-1 GIS Data Management & Map Display Solutions

2. Spatial Engine

Intrado's Spatial Engine is Intrado's GIS data validation and integration system serving as the nexus for all of Intrado's GIS data processing. The Spatial Engine has integration points for other Intrado GIS products and enables Intrado to provide the comprehensive set of integrated spatial data solutions described in this Service Guide. Spatial Engine is bundled with many of the GIS managed services described in this service guide, and not typically sold as a standalone system.

Spatial Engine is a secure, cloud-based service used by local, regional, or state-level GIS data sources for ongoing quality assurance/quality control (QA/QC) validation and reporting, coalescing and provisioning of GIS data. It provides automated GIS data format standardization and data aggregation between regional or state-level individual participating agencies.

When using Intrado's NG9-1-1 core services, the Spatial Engine serves as the i3 Spatial Interface ("SI"), provisioning the Emergency Services Network ("ESInet") functional elements including the Emergency Call Routing Function ("ECRF") and the Location Validation Function ("LVF").

In areas where Intrado manages the Automatic Location Identification ("ALI") database directly or in partnership with the Local Exchange Carrier ("LEC"), the Spatial Engine allows users to automatically initiate ALI-to-Road-Centerline ("RCL") and ALI-to-Address-Point ("AP") GIS data comparisons and receive match rate reports. This service is called Spatial Engine Auto-ALI to GIS Comparison Reporting. This service allows the local or regional GIS data manager (referred to as a "GIS Authority") to immediately identify if a GIS change or omission results in an ALI to GIS comparison error or fallout.

The Spatial Engine GIS data validation services include critical error detection and reporting in an automated fashion. The Spatial Engine service provides:

- Secure file transfer via secure two-factor authentication
- Support for ESRI file geodatabase and shape file
- Ability for GIS Authority's data to be maintained in its native format and schema
- Automated schema change detection and error notification
- Browser-based attribute field mapping configuration driven by the GIS Authority
- Automated email notifications for upload and data processing status
- NG9-1-1 GIS data compliancy checks
- Address Point, RCL, and response boundary layer validation checks
- Validation report retrieval

2.1. Spatial Engine - Optional Services and Software Integration

Spatial Engine provides the following add-on options:

- Auto-Upload Service
- On Demand ALI to GIS Comparison Reporting
- Standalone Spatial Engine Training Sessions
- Integration with Spatial Pro, Spatial Manager and Spatial Command & Control.

2.1.1. Auto-Upload Service

The Spatial Engine Auto-Upload Service enables GIS data sources to submit GIS data to the Spatial Engine in an automated fashion at scheduled intervals. This service provides custom scripts to automatically provision GIS data to a secure FTP site, without the use of the Spatial Engine portal and includes the following:

- Bypass web portal for ongoing submissions after initial configuration is completed via the portal
- Includes sFTP (MoveIT) account creation for secure file transfer
- Provides script/configuration file to automatically submit GIS data at scheduled intervals
- Spatial Engine automatically retrieves file and continues automated QA/QC processing and provisioning steps
- Upload and validation reports via Spatial Engine web portal

2.1.2. On Demand ALI to GIS Comparison Reporting

The Spatial Engine offers an On Demand ALI to GIS Comparison Reporting feature allowing end users to request automated ALI-to-Road-Centerline and ALI-to-Address-Point comparisons through the Spatial Engine interface, and in turn receive automated reporting that identifies which ALI and/or GIS records are discrepant with each other and require further customer investigation and resolution. With these reports, the end user is notified of potential ALI to GIS matching issues and can quickly correct their GIS data where necessary to improve ALI mapping/geocoding success rates.

This feature requires that Intrado is contracted to provide ALI database management services either directly or on behalf of an Originating Telephone Service Provider.

2.1.3. Standalone Spatial Engine Training Sessions

Individual Spatial Engine training sessions are conducted remotely via webinar, lasting two hours each. Note that Spatial Engine training sessions are included with other services described below.

Training Session #1

Conducted via webinar following Spatial Engine user access enablement, this training provides the following:

- System overview and understanding dataflow
- Understanding GIS Data readiness and file structure requirements
- Access and navigation of the Spatial Engine user interface
- How to perform GIS schema field-mapping
- How to perform initial GIS Data upload through successful Spatial Engine submission
- Validation Report Retrieval

Training Session #2

Conducted via webinar following the initial successful submission of GIS data into Spatial Engine, this training provides the following:

- Detailed 9-1-1 Spatial Engine Data Upload and Validation Report review
- Understanding GIS data validations and error types
- Validation Error corrective action suggestions

3. Spatial Pro

Spatial Pro is a desktop application that integrates closely with ESRI's ArcGIS® for Desktop to streamline GIS data maintenance and accuracy.

Spatial Pro enables the synchronization of MSAG and GIS data. Spatial Pro delivers GIS data maintenance tools including:

- Street and structure editing
- Street, structure, and response boundary validations
- MSAG and ALI compare and synchronization tools
- Easy to use reporting tools

Street and structure editing tools simplify common tasks by pre-populating attributes, accelerating the data management process, and reducing the potential for errors.

Spatial Pro validations use over 30 proprietary algorithms to analyze GIS data to locate errors. Spatial Pro then presents the errors in an easy-to-use format, which enables the streamlined correction of the errors through tools specifically designed for the error type being corrected.

Reporting tools enable generation of reports in Adobe PDF format. Reports are generated on validations and MSAG/ALI compares. Users may customize reports by adding specific elements such as an agency logo, custom titles, and customized headers and footers.

Spatial Pro enables Customer to create and maintain accurate 9-1-1 GIS data and to synchronize the GIS and 9-1-1 databases.

Spatial Pro is installed locally, at Customer's location, and operates through an interface within ESRI's ArcGIS Desktop (ArcMap®) product. Various toolbars are available for accessing the available tools and features. The functionality that resides in the ArcGIS Desktop framework remains available while using Spatial Pro, including editing, drawing, layouts, and/or spatial queries.

Using Spatial Pro and ArcGIS Desktop, new GIS data records (streets, structures, polygons, etc.) can be input into Customer's GIS data through multiple methods including field GPS, on-screen digitizing, import, and auto-generation. GIS data is stored in an ESRI format. Spatial Pro supports ArcGIS Desktop 10.1 through 10.8 and requires a file geodatabase or an Enterprise Geodatabase through ArcGIS Server ("ArcSDE®").

3.1. System Requirements

Intrado does not provide workstation or server equipment for this application and is only supported on Microsoft Windows-based platforms. Spatial Pro supports published ESRI hardware and software requirements for Microsoft Windows systems.

Spatial Pro is highly configurable and is designed to work with most GIS data. The data must be in an ESRI format such as File Geodatabase, or Enterprise Geodatabase (ArcSDE). For Customers using Enterprise Geodatabases, Spatial Pro supports only Microsoft SQL Server. An Intrado GIS professional will review the data format and communicate any changes necessary for the deployment of Spatial Pro.

The most current version of Spatial Pro requires ESRI ArcGIS version 10.4.x through 10.8.x. Intrado must be notified of end customer's ESRI software release version and request a version of Spatial Pro which is compatible with Customer's ArcGIS software.

3.2. Implementation and Support

Spatial Pro will be installed on end customer systems remotely by an Intrado GIS professional. Implementation of Spatial Pro includes user training delivered by an Intrado GIS trainer. Training can be conducted remotely via webinar or onsite at end customer location. Onsite training will include additional travel fees for the Intrado GIS trainer. Additional training may be purchased by end customer desiring periodic refresher training or training for new users following system implementation.

Spatial Pro subscription includes ongoing support and maintenance services. This provides telephone support for all users during normal business hours and software updates (including patches and updates of major and minor releases). The Customer must be current on its monthly payments for the Spatial Pro software to receive support and maintenance services and to maintain access to support and software updates.

Additional training sessions following system implementation may be purchased separately if an agency requires additional user training.

3.3. End Customer Responsibilities

Each Customer deploying Spatial Pro will be responsible for providing the hardware and additional software necessary for Spatial Pro installation and operation, including the proper ArcGIS license(s).

Spatial Pro is an add-on to ESRI ArcGIS for Desktop and requires an active ArcGIS for Desktop license at each Spatial Pro-enabled workstation. End customer is responsible for acquiring and maintaining the necessary ESRI licensing. At the customer's request, Intrado can facilitate acquiring the necessary ESRI licensing.

Each Customer requiring Spatial Pro training will provide a suitable training facility and required equipment.

4. Spatial Manager

Spatial Manager enables people with varying degrees of GIS proficiency to request changes to the data and perform live data validation and editing using a map interface. This solution can benefit those jurisdictions who don't have a full-time GIS person and need to make infrequent updates to the data. Data is hosted by Intrado and works with the Spatial Engine to validate updates against the current national standards.

Spatial Manager Highlights:

- Accepts datasets in common formats, such as file geodatabases
- Transforms and formats contributed data to a standardized statewide format and database
- Supports quality assurance through data quality checks and user edits before data are considered authoritative (i.e., supports quality control at the data contribution and edit level)
- Different workflows for data management depending on expertise of the user and organizational structure
- Non-GIS users can suggest edits to data within their jurisdiction and these edits are then queued for verification and validation by GIS professionals and other data experts
- Maintains a statewide database of authoritative data in all necessary domains

5. Spatial Command & Control

Spatial Command & Control is a browser-based, cloud-hosted 9-1-1 call mapping application that locates incoming calls on a map display using customer GIS data and call location data received from the Intrado call handling system. Spatial Command & Control addresses the challenges many public safety agencies face with their mapping systems today. Spatial Command & Control provides a common operating picture of calls in and around the incident location, giving first responders a single map display for everything geospatial. Emergency telecommunicators can use "Google-like" search features to help locate not only the address of where help is needed but also retrieve specific information about the building, floor, unit, and room where first responders are en route. The system helps agencies integrate GIS data from surrounding jurisdiction, regions, or the entire state into a seamless detailed view.

Customers are required to provide their GIS data for provisioning within Spatial Command & Control and are required to maintain their GIS data unless Intrado has been contracted to manage the data on the Customer's behalf.

GIS Services included with the Spatial Command & Control deployment:

- GIS deployment services to evaluate and configure GIS package
- Remote configuration for all main and backup positions
- GIS data hosting services within the cloud environment

Post-deployment GIS services included under the Spatial Command & Control Services:

- Re-configuration of a Customer’s GIS data potentially required to resolve a software related issue

Post-deployment GIS services not included with Spatial Command & Control:

- GIS data package re-configuration services after the initial system setup and installation
- GIS data update service one-time or recurring (Optional services are available)

Spatial Command & Control is accessed over the internet and requires the following minimum bandwidth:

Active Position Count	Bandwidth (Mbps Download)
1-3	1.5
4-6	3
7-10	5
11-15	7.5
16-20	10
21-40	20
41-50	25

- The Customer can choose to host the data or have Intrado host the data. The price for Spatial Command & Control mapping is the same regardless of who is hosting.
- Currently, if Intrado hosts the data, Intrado must perform the data updates. The Customer would need to purchase Map Data Update Service for either 2, 4, or 6 times per year.
- In the future, if Intrado hosts the data, there will be tools available for the Customer to perform their own data updates. Intrado anticipates having these tools available later in 2022.
- If the Customer hosts their data, they can perform updates as often as they would like.
- Integration with Rapid SOS is active.
- Spatial Command & Control Mapping supports the receiving and plotting of Z-axis values but relies on the Customer to have ESRI Web scene or other oblique imagery available.

6. Spatial Insight

Map-centric viewer for Emergency Data Broker (EDB), which is a service that enables a PSAP to retrieve supplemental data pertinent to location or telephone number associated with a call. This content can include information such as IoT sensors (alarm monitoring), building floor plans, a caller’s geo-location coordinates, automotive telematics sensor data, etc.

NG9-1-1 GIS Data Management Services

7. NG9-1-1 GIS Managed Services

Intrado's NG9-1-1 GIS Managed Services facilitate the implementation and provide ongoing support of NG9-1-1 geospatial location validation and call routing data management. NG9-1-1 GIS Managed Services are tailored specifically to deliver essential GIS data onboarding services and provide ongoing GIS data management support services to the GIS Authority. NG9-1-1 GIS Managed Services is scalable to support individual PSAP or local authority deployments up to the largest regional and statewide NG9-1-1 implementations.

NG9-1-1 GIS Managed Services are powered by coupling the Spatial Engine with an assigned Intrado i3 GIS coach. The Intrado i3 GIS coach is not only an expert with GIS data and technology, but also possesses a deep understanding of E9-1-1 and NG9-1-1 data structures and how they must work in unison with the Spatial Interface and other downstream systems in order to drive successful NG9-1-1 geospatial call routing. An i3 GIS coach is assigned to each GIS Authority, or Spatial Engine GIS data submitting agency, and is available to help manage the project, provide system access and training, GIS data upload assistance, error report interpretation, go-live support and ongoing consultation and support.

NG9-1-1 GIS Managed Services are provided in two stages: onboarding and ongoing post-deployment support. Onboarding services deliver the services, training, and support needed to successfully deploy NG9-1-1 GIS data within Spatial Engine prior to NG9-1-1 go-live. The post-deployment stage of NG9-1-1 GIS Managed Services provides continued support of the Customer's NG9-1-1 GIS data provisioning to the Spatial Engine following the successful completion of the onboarding stage. Intrado's NG9-1-1 GIS Managed Services provides support directly to the GIS Authority throughout all phases of deployment on the Spatial Engine and maintains the lines of communication between Intrado, the 9-1-1 Authority and the NG9-1-1 core services provider. End users will continue to receive i3 GIS coaching and support along with periodic Spatial Engine refresher training services.

7.1. NG9-1-1 GIS Onboarding

NG9-1-1 GIS Onboarding services can be purchased as a standalone service but is included with NG9-1-1 GIS Managed Services and Transitional Database Management Services (TDMS).

Intrado's NG9-1-1 GIS onboarding delivers the essential services, training, and support needed to successfully deploy NG9-1-1 GIS data and the Spatial Engine within a NG9-1-1 environment.

Intrado will provide web-based training and setup of the Spatial Engine system and assist with the initial GIS data load, clarifying the role of the Spatial Engine as the NENA Spatial Interface, and defining its features and functionality. NG9-1-1 GIS onboarding services establish communication between the end customer, Intrado, and the NG9-1-1 service provider throughout the GIS onboarding phase and the Spatial Engine implementation.

NG9-1-1 GIS onboarding includes Spatial Engine setup and the following services:

- Assignment of an i3 GIS coach
- NG9-1-1 GIS onboarding kickoff meeting
- Spatial Engine overview, user training, and field mapping training (web-based)
- Spatial Engine report interpretation & error correction consultation training (web-based)
- On demand Spatial Engine ALI to GIS comparison reporting
- ALI to GIS report review and error correction consultation training (web-based)
- GIS data testing and remediation
- General NG9-1-1 GIS Q&A support
- NG9-1-1 GIS go-live support

Exclusions and Limitations:

- All GIS data editing is outside the scope of NG9-1-1 GIS onboarding services. It is the 9-1-1 or GIS Authority's responsibility to maintain GIS data based on agreed upon GIS schema as outlined in

the Spatial Engine User Guide. The service is provided Monday – Friday, 8:00am-5:00pm Mountain Time, excluding Intrado Holidays.

7.2. NG9-1-1 GIS Post-Deployment Support

NG9-1-1 GIS Post-Deployment Support services provide Spatial Engine data upload monitoring and troubleshooting support for agencies that have transitioned to a live ESInet and are routing calls geospatially. NG9-1-1 GIS Post-Deployment Support services are provided by an Intrado i3 GIS coach directly to the GIS data source or agency uploading GIS data into the Spatial Engine.

Spatial Engine is used for the initial provisioning of Customer GIS data, as well as the ongoing provisioning of GIS data used for geospatial call routing and location validation. As such, it is imperative that ongoing monitoring, troubleshooting, remediation, maintenance, and support of GIS data uploads, as well as configuration changes, are appropriately handled by a dedicated support team of GIS professionals that understand NG9-1-1 GIS data requirements as well as the innerworkings of the Spatial Engine application. NG9-1-1 GIS Post-Deployment Support services provide Spatial Engine monitoring to ensure GIS data uploads to the system are successfully processed and proactively take corrective action steps to reach resolution when issues are found.

NG9-1-1 GIS Post-Deployment Support services includes the following:

- Dedicated i3 GIS coach assigned to each Spatial Engine GIS data supplying agency, allowing direct contact and interaction for rapid GIS data related issue resolution.
- Ongoing Spatial Engine overview, user training, and field mapping training (web-based), if requested, for new hires or refresher courses for existing personnel.
- Spatial Engine GIS data validation report interpretation & error correction consultation, when requested.
- GIS data testing and critical error remediation assistance.
- General NG9-1-1 GIS data Q&A support via email or phone.
- Monitoring Spatial Engine system notifications for upload activity to ensure data is processed and provisioned successfully.
- Troubleshooting any failed uploads and coordination of Customer's GIS data re-load to the Spatial Engine application.
- Provisioning Boundary change coordination between all parties involved in the boundary change (i.e., neighboring agencies)
- Schema or configuration change review and approval within the Spatial Engine application.
- Additional GIS layer submission review and approval within the Spatial Engine application.
- Feature count override validation when needed (needed when the GIS data feature count is changed by a specific threshold (i.e., the PSAP boundary polygon count is lowered due to a PSAP consolidation).
- Configuration of optional sFTP (MoveIT) provisioning tools, when requested.

Exclusions and Limitations:

- All GIS data editing is outside the scope of GIS Post-Deployment Support services. It is the 9-1-1 Authority's responsibility to maintain GIS data based on agreed upon GIS schema as outlined in the Spatial Engine User Guide.
- GIS Post-Deployment Support services are provided Monday – Friday, 8:00am-5:00pm Mountain Time, excluding Intrado Holidays.
- NG9-1-1 GIS Onboarding services cover the necessary GIS related support provided by Intrado during implementation of the Spatial Engine and therefore fall outside of the scope of Post-Deployment support, which cover services provided after the Spatial Engine submitting agency has gone live with geospatial call routing on an Intrado NG9-1-1 routing platform.

8. Advanced NG9-1-1 GIS Data Managed Services

Advanced NG9-1-1 GIS Data Managed Services are available for 911 and GIS Authorities that require additional assistance beyond what is covered by NG9-1-1 GIS Managed Services or TDMS Services. This is a custom solution that includes robust project management services and dedicated support staff along with continuous monitoring and oversight to support a successful geospatial call routing operation.

Advanced NG9-1-1 GIS Data Managed Services include the software tools and services required to get GIS data ready for NG9-1-1 ahead of an ESInet or NG9-1-1 deployment as well all of the tools and support to maintain the mission critical GIS data used to drive the NG9-1-1 geospatial call routing operation. These services include access to the Spatial Engine and NG9-1-1 GIS Managed Services, but also includes the following:

- Dedicated Project Management and Support
- NG9-1-1 GIS Data Assessment and Report
- Custom i3-compliant GIS Data Model Creation
- Workflow Plan: Roles and Responsibilities
- QA/QC Plan: Detailed processes and workflow
- Outreach and Education
- Source Data Acquisition Process
- Source Data requirements Gap Analysis
- Database completion and workflow integration
- Boundary conflict facilitation
- Continuous GIS data submission monitoring
- Custom reporting and analysis
- Optional integration with Spatial Pro and Spatial Manager

Note: Advanced NG9-1-1 GIS Managed Services is a custom solution that requires custom pricing for each customer.

9. NG9-1-1 GIS Data Reports

Intrado offers a variety of standalone GIS and NG9-1-1 readiness and accuracy reporting services. Many of these reporting services are included with managed service offerings but are also available for purchase as one-time individual reports. In order to provide these reporting services, the Customer is required to provide Intrado with GIS and 9-1-1 data.

9.1. NG9-1-1 GIS & 9-1-1 Data Assessment

This is provided as a one-time service and delivers a comprehensive analysis of the GIS Authority's existing GIS and 9-1-1 data (MSAG and ALI) and a report detailing GIS data readiness in preparation for migration to NG9-1-1.

Intrado will perform an in-depth analysis on the GIS data layers required to implement NG9-1-1. This analysis is followed by detailed reports of Intrado's findings and recommendations for the steps needed to achieve full i3 GIS data readiness.

Intrado will perform the data analysis and assessment, develop detailed reports of findings, and communicate these findings and recommendations to end customer.

After Intrado presents the report findings and recommendations, the jurisdiction or GIS Authority may elect to manage the data directly or contract with Intrado for additional GIS data professional services, solutions, and support.

For customers requiring analysis and reporting only on existing GIS layers used in E9-1-1 applications, Intrado offers spatial data analysis performed only on layers impacting E9-1-1 operations.

The NG9-1-1 GIS & 9-1-1 data analysis will be performed on and between the following layers:

- Road Centerlines
- Address Points
- PSAP Boundary Layer
- Emergency Service Boundary Layers(s)
- Provisioning Boundary Layer
- ALI-to-GIS and MSAG-to-GIS comparisons

The report delivered to end customer will contain:

- GIS data readiness process
- Documented data standards
- GIS data validation reports
- Data analysis recommendations
- Reference documentation for i3
- Conclusion

Exclusions and Limitations:

- All GIS data editing is outside the scope of this service.
- The service is priced on a per GIS data source basis.

9.1. ALI to Road Centerline Comparison Report

This is provided as a one-time service and delivers a comprehensive analysis of end customer's RCL data and end customer provided ALI data managed for the jurisdiction.

Using GIS and 9-1-1 data, Intrado will run QA/QC validations between the 9-1-1 ALI data and the RCL GIS data layer. Intrado uses proprietary 9-1-1 GIS data validation tools to determine conformance to GIS schema requirements and performs QA/QC for critical errors.

A report will be created and provided to end customer identifying the ALI-to-RCL match rate and critical errors which would prevent data from being suitable for use in NG9-1-1 call routing.

Intrado will perform the data analysis and assessment, develop a detailed report with findings, and communicate these findings to end customer.

9.2. ALI to Address Point Comparison Report

This is provided as a one-time service that compares the customer's Address Point data and customer provided ALI data.

Using GIS and 9-1-1 data, Intrado will run QA/QC validations between the 9-1-1 ALI data and the Address Point GIS data layer. A report will be created and provided to end customer identifying the ALI-to-Address Point match rate.

Intrado will perform the data analysis and assessment, develop a detailed report with findings, and communicate these findings to end customer.

10. GIS Data Services

Every jurisdiction faces unique challenges when trying to achieve public safety grade GIS data. Intrado offers a spectrum of GIS data services to provide 9-1-1 and GIS authorities with data assessments, error corrections, workflow design and documentation development services to maintain mission critical GIS data used in E9-1-1 and NG9-1-1 environments. These services can be separate or combined with other GIS data management products and services to provide a comprehensive solution. Intrado provides the following GIS Data Services:

- **GIS Data Assessment**
 - Intrado will administer an initial GIS data validation to determine overall data quality and completeness. Intrado uses proprietary tools and processes that perform over 30 different validations against points, lines and polygon features that check for quality, completeness and topological rule adherence.
 - Customer will gain a complete understanding of the current state of their GIS data for determining its NG9-1-1 readiness.
 - The final results can be delivered in a NG9-1-1 GIS data readiness report that helps identify data errors and missing data that should be corrected before use within a NG9-1-1 environment.
 - From here, the Customer can decide to resolve the identified errors themselves, or hire Intrado to improve the data on their behalf.

- **GIS Data Improvement**
 - Intrado uses specific tools to correct the data, streamlining the process and reducing the possibility of additional errors.
 - Layers identified within the GIS database as missing or incomplete can be developed by Intrado under NENA GIS data model standards.
 - Intrado's experienced GIS team can provide boots-on-the-ground field work to enhance your GIS data.
 - GIS data synchronization with MSAG and ALI databases.
 - From here, the Customer can decide to maintain the data themselves, or hire Intrado to maintain the data on their behalf.

- **GIS Data Maintenance**
 - Intrado uses specific tools to streamline the process of maintaining GIS data that reduces the possibility of introducing additional errors and ensures data accuracy.
 - Workflow design and documentation development with specific guidelines and recommendations to help your jurisdiction maintain consistently accurate GIS data.
 - GIS data validation, testing and provisioning to NG9-1-1 systems.

Intrado understands the importance of GIS data alignment between agencies because we understand how GIS data is used in a NENA NG9-1-1 geospatial call routing environment, and that discrepancies between (overlaps), areas of non-coverage (gaps) or other situations such as shared features on the same border can cause geospatial call routing issues if not first coordinated with and agreed to by the adjacent neighboring agency(s). When performing GIS data services for multiple jurisdictions providing neighboring data, Intrado will take every effort to ensure alignment is achieved between agencies. Intrado will strive to get the most recent data and information available during the creation, validation, synchronization, and implementation of GIS datasets and will pursue the highest level of positional accuracy possible for all required GIS layers.

GIS Data Services project pricing is typically based on the population covered by the GIS data. However, some GIS Data Services projects may require and benefit from additional GIS Project Management and/or GIS Professional Services that are priced on an hourly basis.

GIS Project Management includes project schedule creation and maintenance, project coordination and communication with clients and their constituents, routine status reporting, task management and follow through, attending meetings as needed and ultimately is responsible for ensuring overall project success.

GIS Professional Services provides advanced GIS data specific tasks that are atypical of State and Local government 9-1-1 or NG9-1-1 GIS Data Services work and may include solution workflow development, process automation or consultative services.

11. Web Map Service

GIS data used within a web mapping application, such as Spatial Command & Control or a 3rd party web mapping application at the PSAP, must be hosted as a Web Map Service. Intrado can provide your organization with Web Map Services to power the multiple web mapping applications at your PSAP and beyond. Intrado will store your GIS data in the cloud, design the map services to meet your needs, and host the map services within an ArcGIS Server environment. The web mapping application can simply use the URL for consuming these web map services.

Subsequent updates to the web map services will rely on the Customer sending Intrado their current GIS data. The web map service subscription includes weekly updates. Changing the schema of your existing map services layers, adding new layers, and providing new Imagery data is all outside the scope of this service. Customers needing these additional services will receive a quote for GIS data services to reconfigure and republish the map services.

12. Transitional Data Management Service

Intrado's Next-Generation 9-1-1 ("NG9-1-1") Transitional Data Management Service ("TDMS Service") is an enhancement to the ALI Data Management Services already being provided to Customer, either directly or through an OSP partner. The TDMS Service enables the Customer to use locally sourced and maintained Geographic Information System ("GIS") data to manage the existing tabular MSAG and prepare for an NG9-1-1 implementation.

The TDMS Service will enable authorized users to upload Customer's GIS data as the authoritative source information for the MSAG, rather than manually submitting and approving MSAG change requests through Intrado's legacy 9-1-1 NET[®] interface.

The TDMS Service is designed to alleviate the need for Customer to do frequent comparisons between its MSAG and GIS data and the manual entry of MSAG changes in Intrado's 9-1-1 NET tool to keep its MSAG synchronized with its GIS data.

The Service also provides a collaboration portal called GIS Director that incorporates Customer's map data to help Customer to resolve errors and report discrepancies as they occur.

12.1. TDMS Service Overview

The TDMS Service allows Customer's GIS data to serve as the authoritative source for 9-1-1 address validation by supporting legacy Originating Service Provider ("OSP") subscriber provisioning and ALI database management. It provides the following benefits:

- Operational efficiency: 9-1-1 address management using GIS data instead of traditional MSAG data by only having to manage one authoritative data source: the GIS data.
- Improved data accuracy: continuous GIS, MSAG, and ALI synchronization.
- No changes required for OSPs (i.e., carriers): supports legacy OSP subscriber provisioning and ALI database management.
- Improves i3 GIS data readiness facilitates the transition to NG9-1-1 by keeping the GIS, MSAG, and ALI synchronized.
- Supports i3 interim call routing by significantly streamlining implementation of Intrado's i3 Routing Services.

NENA 71-501 v1 is an informational document that describes a recommended method to synchronize the MSAG and GIS data. Ongoing synchronization between the two or more databases requires periodic MSAG to GIS comparisons to identify discrepancies between the databases, which then need to be manually researched and corrected in either the MSAG, GIS data, or both. The Service supports this method of initial synchronization as well as alternate mechanisms for initial synchronization designed to save Customer time and expense.

Once the legacy MSAG has been replaced with the GIS-based MSAG, the authoritative GIS source data will be used to drive changes to the GIS-based MSAG, replacing the need to manually enter individual MSAG CRs. Intrado refers to the GIS-based MSAG as a “geoMSAG”.

12.2 Scope

The Service provides services and tools incremental to Intrado ALI Data Management Services, either provided directly or through an OSP partner. The Service includes ongoing MSAG synchronization as GIS updates are received from Customer, as well as access to GIS Director for discrepancy reporting and error resolution.

The Service includes the Spatial Engine portal to allow Customer to upload GIS data. Changes between the GIS data and the previous data upload are identified automatically. Changes are subsequently made to the geoMSAG, unless a given change causes an error. In the case of an error condition, MSAG CRs are created in GIS Director to facilitate error resolution.

The Service includes the following:

- On demand ALI to GIS Match Rate Reporting: identified discrepancies between ALI and GIS.
- geoMSAG Creation: generation of GIS-based MSAG to be used for TN Simulation testing.
- TN Simulation: reports on any TNs that do not have an associated geoMSAG, so these potential error conditions can be researched and corrected prior to geoMSAG replacement. Two TN simulations included (the first to identify where remaining errors exist and the second to verify errors have been satisfactorily resolved):
 - One time:
 - geoMSAG Replacement: once an agreed upon ALI-to-GIS data match rate has been met, creation of a GIS-based MSAG (geoMSAG) load file from Customer’s GIS Road Centerline (“RCL”) data or Address Point (“AP”) data will be used to replace the previous MSAG used for OSP subscriber address validation with the geoMSAG.
 - Ongoing:
 - Spatial Engine: GIS data upload and validation portal including automated data validations and reports. Spatial Engine supports either Shapefile or File Geodatabase formats and allows the authoritative GIS data to be maintained by Customer using Customer’s native schema.
 - GIS Director: hosted web-based collaboration user interface used for discrepancy reporting and error resolution. GIS Director includes training on application and associated workflows. It is the NG9-1-1 map-based interface replacement for 9-1-1 NET. Note that not all 9-1-1 NET functionality is pertinent within GIS Director. Certain functions may require the continued use of 9-1-1 NET. GIS Director allows Customer to review its legacy ALI and geoMSAG 9-1-1 data through a user interface that leverages Customer’s map data. Users can request changes to resolve errors and discrepancies, and GIS-validate addresses.
 - GIS to MSAG Synchronization: GIS data becomes the master data set that drives changes to the geoMSAG.

TDMS Service Turn-Up Process and Key Milestones

- Step 1: Customer agreement initiated with Intrado.
- Step 2: Customer provides required GIS data and permission to retrieve its ALI data.
- Step 3: Intrado compares Customer's ALI database against the GIS dataset (RCL or AP feature class) and provides a report identifying discrepancies. Customer will then have the opportunity to resolve appropriate errors with its GIS data and/or ALI database.
- Step 4: Intrado creates the geoMSAG to support Telephone Number ("TN") Simulation. If geoMSAG build errors occur, Customer will have the opportunity to resolve appropriate errors with its GIS data.
- Step 5: Intrado performs TN Simulations to identify discrepancies between the ALI/TNs and the newly created geoMSAG. Intrado will provide all ALI discrepancies to Customer. Customer will then perform error correction either to their GIS data or ALI records.
- Step 6: After all comparison and simulation testing outputs result in either a 98+% or other agreed upon match rate between the ALI and GIS, Intrado will replace the legacy MSAG with the geoMSAG which will then be used as the MSAG database of record.
 - Note that if the agreed upon match rate is less than 98%, additional Intrado GIS Data Services are available, to be quoted on a case by case basis.
- Step 7: Intrado performs ongoing GIS to MSAG synchronization using Spatial Engine and GIS Director.

Ongoing GIS to MSAG Synchronization Services

- Step 1: Customer submits GIS data to 9-1-1 Spatial Engine.
- Step 2: Spatial Engine performs validations on the GIS data.
- Step 3: Spatial Engine provides critical error reports and GIS data representing errors. Critical errors are defined as those that will negatively impact the creation of the geoMSAG. Customer corrects critical errors in GIS data file and resubmits to Spatial Engine.
- Step 4: RCL or AP changes automatically submitted for the geoMSAG and ALI validation (step 6).
- Step 5: GIS data sent to GIS Director map.
- Step 6: geoMSAG and ALI validations are performed. If the geoMSAG change does not introduce ALI errors, the change can automatically be applied to the MSAG. If a GIS change would create an ALI or TN fallout error, the change is submitted to the Customer in GIS Director for review (step 7).
- Step 7: geoMSAG referrals (any change that would cause TN fallout) will be communicated to Customer via GIS Director.
- Step 8: Customer reviews geoMSAG referrals and either corrects RCL data or AP data, and uploads updated GIS data to Spatial Engine or indicates a TN issue needs to be corrected.
- Step 9: geoMSAG changes that pass validation are applied to the MSAG. These changes will be used for future OSP TN record validation and applicable existing TN records will be updated in ALI.

12.2. Responsibilities

12.3.1. Project Lead

Intrado will designate a contact to act as Intrado's project lead and the primary interface with the Customer's contact for project implementation, including identification and communication of key milestone dates and events for the implementation timeline. The Intrado project lead manages overall program tracking of the master project plan and task management of the project implementation.

12.3.2. Intrado Unified Portal

Intrado will provide and maintain a hosted web-based interface to Intrado's suite of web-based tools and applications, otherwise known as the Intrado Unified Portal (IUP). IUP will provide the Customer, PSAPs, and TSPs secure access to applicable Intrado support tools and documentation. The following web-based applications and information are available through IUP following user authentication through the Intrado identity management system:

- Intrado Spatial Engine for provisioning Customer's GIS updates
- GIS Director-for 9-1-1 and GIS data search, review of 9-1-1 data errors, and location validation
- 9-1-1NET for MSAG and ALI database queries
- Document Library for accessing training materials, user's guides, and other documentation

As part of TDMS implementation, Intrado will convert existing 9-1-1 NET accounts for PSAPs and Coordinators to GIS Director accounts once each region converts to the geoMSAG. Following receipt of the user forms from Customer, Intrado will also configure up to five new user accounts for each Customer. Additional user accounts are available as optional services.

12.3.3. Spatial Engine

The Spatial Engine will be utilized by Customer to upload and update its GIS data for provisioning to systems used in the Service. Intrado will validate GIS data submitted through Spatial Engine and return critical errors to Customer for resolution.

The Spatial Engine web portal provides secure GIS file transfer to Intrado, and Customers can maintain their local database schema and configure database schema changes on the fly. Spatial Engine provides field mapping tools that allow the Customer to maintain its current GIS data schema. As long as the required fields are available within the Customer's GIS data and remain consistent, the field mapping to the Intrado NG9-1-1 data schema is saved for future updates. Note that the NENA NG9-1-1 GIS Data Model Version 2 working group is still in operation and the associated data model document is under review. Once published, Intrado will evaluate and communicate the roadmap to accommodate additional changes.

As part of the Service turn-up, Intrado will work with Customer to set-up Customer's Spatial Engine account which allows Customer to provision its GIS data from a single, aggregated data source. Additional Spatial Engine accounts are available to allow Customer to provision GIS data from multiple data sources. Intrado will provide Customer with detailed information on GIS data requirements and recommendations as well as formats supported (Esri file geodatabase or shapefile). As part of the Intrado Spatial Engine account set-up process, an Intrado GIS analyst will contact the Customer to obtain GIS data and metadata information. Intrado will also work with Customer to provide training and support for Customer to establish its GIS data field mapping to the Intrado NG9-1-1 schema.

Following the GIS match rate verification(s) and Customer Spatial Engine account set-up, Intrado will work with Customer to execute and validate an initial GIS data load. Intrado will provision the Customer's GIS data to components used in the Service including GIS Director and Intrado systems that support other services contracted by Customer including the Intrado geocoding system or LVF.

12.3.4. GIS Match Rate Verifications

As part of the TDMS Service turn-up, Intrado will perform up to two match rate verifications of the Customer's Road Centerline (RCL) or Address Point (AP) GIS data against the ALI database and provide discrepancy reports to the Customer. The Customer is responsible for correcting errors within the GIS and/or ALI database. A 98% ALI to GIS match rate is highly recommended before proceeding with geoMSAG replacement.

12.3.5. TDMS Responsibility Matrix

The following matrix outlines the typical responsibilities of each party for the implementation and ongoing provision of the Service. Where both parties have been listed, additional detail on the responsibilities of each party is included in the sections below. Failure of a party to satisfactorily complete a required task could materially impair Intrado's ability to provide the Service.

Task	Responsibility
<u>Project Implementation</u>	
Project Management	Intrado/Customer
TSP Coordination	Intrado/Customer
Process Documentation	Intrado
Hosted systems for the Service	Intrado
GIS Load File(s)	Customer
GIS Match Rate Verifications and Reports	Intrado
GIS Data - Critical error resolution	Customer
GIS Schema Field Mapping for Spatial Engine	Customer/Intrado
Training on Service	Intrado
geoMSAG Replacement	Intrado
TN Error Fallout error correction during Service Turn-up	Intrado/Customer
<u>Ongoing Responsibilities</u>	
Data Integrity	
Frequent GIS data updates	Customer
GIS Data-Critical error resolution	Customer
geoMSAG Management	Intrado/Customer
Error Correction and Referral	Intrado/Customer/TSP
Trend Analysis/Data Investigation	Intrado/Customer
System Monitoring	Intrado
System Maintenance	Intrado
System Upgrades	Intrado
Log storage and backups	Intrado
Problem Reporting	Intrado/Customer
Problem Triage and Resolution	Intrado/Customer

Figure 3: TDMS Responsibility Matrix

12.3. Data Throughput

- Customer provides ALI data extracts and provides to Intrado GIS department on request or provides Intrado with permission to pull ALI extracts if Intrado is managing the MSAG/ALI databases.
- Customer GIS data is provisioned to the Spatial Engine portal when changes to GIS data are made.
- Spatial Engine automatically emails validation and error reports to Customer.
- Intrado emails additional validation reports, data error reports and recommendations on how to resolve such errors.
- Intrado replaces tabular MSAG with geoMSAG within MSAG and ALI Databases when data requirements are met.
- Intrado provisions GIS Director application when updates are made to Spatial Interface.
- Customer interfaces with GIS Director and 9-1-1 Net to visualize and communicate MSAG based activities.

12.4. Training Services

The TDMS Service includes web-based training on how to use and navigate the Spatial Engine application, GIS data validation report interpretation, and review GIS data management recommendations. The Service includes web-based training on use and navigation of the GIS Director application and training on the differences between Customer's current ALI Data Management process and the new processes introduced with the Service.

12.5. TDMS - Additional Detail and Limitations

- Customer Road Centerline Layer must contain specified fields listed in the applicable table below
- Customer Address Point Layer must contain specified fields listed in the applicable table below
- Customer will address GIS data schema and/or error correction in a timely manner in order to keep project timelines on schedule.
- Customer is responsible for correcting errors within the GIS and/or ALI database.
- Project schedule and pricing is based on a single GIS data supplier.
 - Additional fees apply if additional GIS suppliers are required to cover the geographic region covered by the MSAG(s).
- Customer will use GIS Director to view GIS data and perform geoMSAG transactions and continue to use 9-1-1 Net for certain transactions including ESN query/change requests, ELT changes, Wireless, VoIP and FX records management.

12.7 TDMS Data Requirements

The following table represents the required RCL fields for geoMSAG replacement and ongoing TDMS Service. This list does not include all i3/NG9-1-1 required fields.

Descriptive Name	Example	Type
Road Centerline Unique ID	13575@county.st.us	A
Left From Address	101	N
Left To Address	199	N
Right From Address	102	N
Right To Address	198	N
Street Name Pre Directional*	S	A
Street Name*	Main	A
Street Name Post Type*	ST	A

Descriptive Name	Example	Type
Street Post Directional*	N	A
ESN Left	356	A
ESN Right	356	A
MSAG Community Name Left	Smithville	A
MSAG Community Name Right	Smithville	A
County ID Left**	1234	A
County ID Right**	1234	A
Entity Left**	HA1	A
Entity Right**	HA1	A

*Street name elements should be parsed and abbreviated to match existing/legacy ALI/MSAG format.

**Entity is only required if more than one selective router is present within the region. County ID is only required if there is more than one County in the region.

A = Alpha Numeric/Text/String field

N = Number field

Note: For ongoing TDMS Service, if any of the above fields or associated attributes are not available in the RCL data, Intrado can discuss various options and alternatives with Customer.

The following table represents the required Address Point fields for geoMSAG replacement and ongoing TDMS. This list does not include all i3/NG9-1-1 required fields.

Address Point (AP) TDMS Data Requirements

Descriptive Name	Example	Type
Site Unique ID	13575@county.st.us	A
Address Number	101	N
Legacy Street Name Pre Directional*	S	A
Legacy Street Name*	Main	A
Legacy Street Name Post Type*	ST	A
Legacy Street Name Post Directional*	N	A
ESN	356	A
MSAG Community Name	Smithville	A
County	Smith	A

*Street name elements should be parsed and abbreviated to match existing/legacy ALI/MSAG format.

A = Alpha Numeric/Text/String field

N = Number field