GIVE 2.0, Revolutionizing NG9-1-1 GIS Data Management

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Introduction

In the fast-paced world of Next Generation 9-1-1 (NG9-1-1) systems, where efficiency, accuracy, and collaboration are paramount, the introduction of GIVE 2.0 marks a transformative solution. GIVE (Geospatial Integration, Validation, and Editing) is a pioneering SaaS platform designed for multi-agency NG9-1-1 data development and integration, supported by a range of services tailored for NG9-1-1 data processes, sharing, and provisioning.

GIVE 2.0 stands at the forefront of NG9-1-1 data management by redefining NG9-1-1 data development and integration with its collaborative and extensible framework, real-time data validation, intuitive issue exploration, and efficient anomaly resolution.

1. Vision and Objectives

GIVE 2.0 embodies a visionary approach to NG9-1-1 data management, underpinned by shared infrastructure that harmonizes the complexities of a multi-constituent community. In this vibrant ecosystem, agencies with varying technical sophistication converge to nurture a common data infrastructure while tending to their unique internal GIS needs.

Our design objectives, which define the DNA of GIVE 2.0, are structured to usher in a new era of NG9-1-1 data management. They are as follows:

> **Support for All Communities**: GIVE ensures inclusivity by providing unwavering support for participating communities, regardless of their GIS maturity levels. Whether you're well-versed in geospatial intricacies or just beginning your journey, GIVE has your back.
>
> **Beyond Integration: Seamless Collaboration**: GIVE breaks free from the tiresome cycle of integration and introduces a seamless collaborative integration paradigm. Say goodbye to the days of repetitive integration efforts and hello to a future where collaboration is effortless.
>
> **Real-time Data Validation**: At the heart of GIVE is real-time data validation, a game-changer for ensuring data accuracy. Unveil data anomalies as they happen and explore issues with unparalleled intuitiveness.

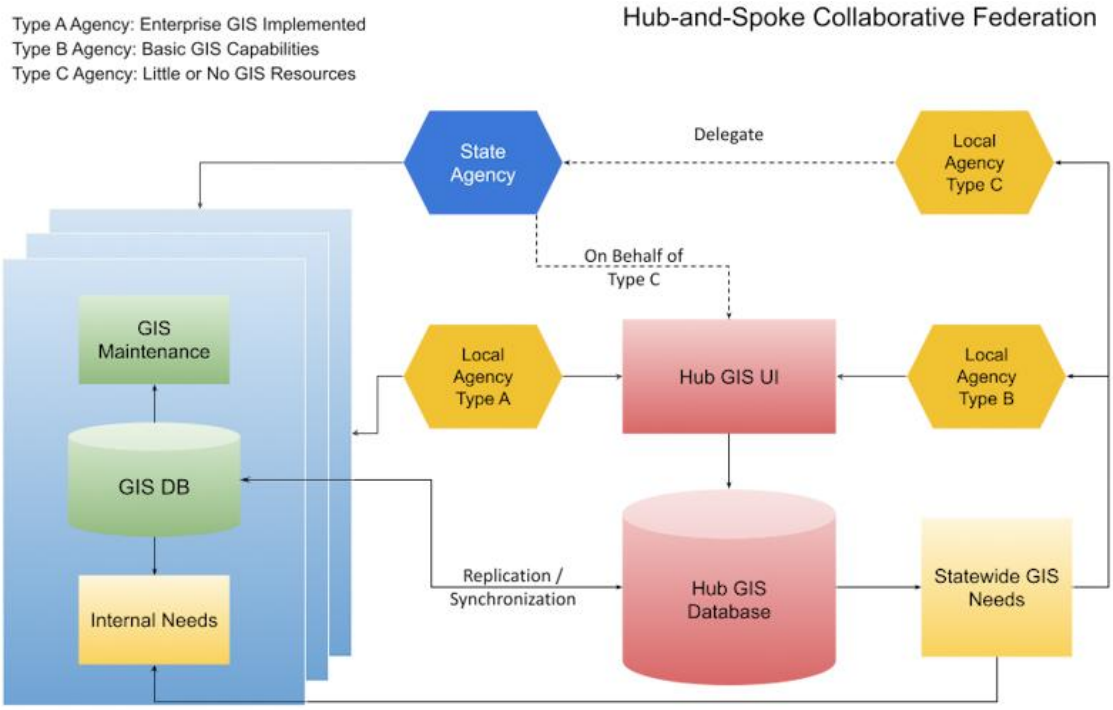
Tailored Data Resolution: GIVE guides users through efficient data resolution mechanisms meticulously tailored to specific operations or anomaly-specific workflows. It's all about addressing issues swiftly and effectively.

With these objectives as our guiding stars, GIVE 2.0 is poised to revolutionize NG9-1-1 data management, driving efficiency, collaboration, and precision to new heights.

2. Enabling Technology Highlights

Architecture

The biggest hurdle to a successful NG9-1-1 data management is a lack of effective and efficient state- or region-wide collaboration paradigm that requires little cat-herding from the top and no “wash-rinse-repeat” from the bottom. Built on the Hub and Spoke Collaborative Federation (HSCF) model, GIVE allows agencies of different GIS maturity to effectively collaborate in creating a common good while satisfying their diverse internal needs without the threat of data authority divergence.



The Hub-and-Spoke Collaborative Federation Model underpins the robust framework for multi-agency collaboration and integration.

Topology Simplified

Managing polygon topology, even for agencies with substantial GIS investments in software and training, can be a complex endeavor. GIVE’s web-topology engine eliminates the significant

hurdle in maintaining and delivering NG9-1-1 compliant boundary data layers. This engine converts object-based boundary layers into topologically consistent layers by identifying and resolving gap and overlap slivers with effortless precision. Boundary topology is maintained through the Boundary Wizard, an integral component of the GIVE user interface.

Comprehensive and Real-time Quality Control (QC)

GIVE boasts the industry's most comprehensive and high-performing NG9-1-1 quality assurance engine. However, what sets GIVE apart is its unique incremental QC capability, delivering real-time performance that dramatically enhances workflow efficiency.

ArcGIS Synchronization

GIVE seamlessly synchronizes views and data between ArcGIS Pro and GIVE, eliminating concerns related to data authority and the need for repetitive data transfer and validation cycles.

Lossless Schema Mapping

GIVE employs advanced lossless schema mapping technology, preserving source data in its original schema and full content. This serves as the foundation for GIVE’s bi-directional synchronization feature.

Revolutionizing Address Parsing

A3i stands as a groundbreaking address-parsing and normalization engine meticulously crafted for NG9-1-1. Harnessing the power of Machine Learning technologies and fortified by Gistic's expertise, the A3i engine achieves an astonishing parsing success rate of over 99.0%, seamlessly transitioning between Legacy and NG9-1-1 street name formats.

3. Key Concepts

The bedrock of GIVE's design rests upon several pivotal concepts that underpin its innovative framework:

Layer Types

GIVE harmonizes multi-agency collaboration by deftly integrating data from diverse sources, distinguishing among three layer types:

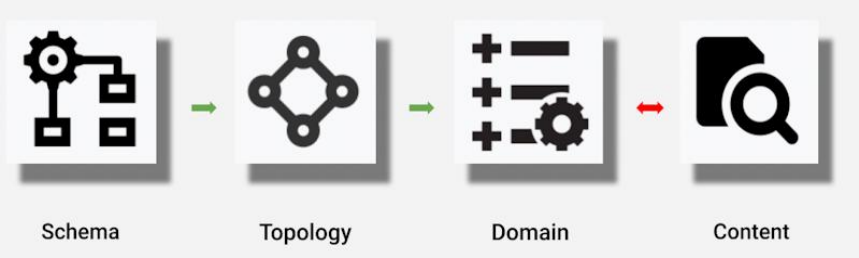
Live Layers: These layers are initially uploaded and maintained within GIVE. They remain hidden from other peer member agencies or parent agencies until publication.

Replica Layers: A specialized form of Live Layers configured to synchronize with the source layer in an agency's enterprise geodatabase through CloudLink.

Published Layers: These are snapshots of Live Layers created for sharing purposes. This design empowers local addressing authorities or designated data custodians to manage and maintain live layers while contributing to regional or state repositories through published data.

Phased Validation

Addressing NG9-1-1 data quality is a multi-step journey organized into sequential phases: Schema, Topology, Domain, and Content. This approach ensures data quality by systematically guiding data through various editing phases, offering a tailored User Interface (UI) conducive to each phase.



Schema Views

GIVE offers users distinct data views under three schemas: locally-defined (original) schema, NENA schema, or optionally, State-wide schema. This data presentation and preparation flexibility proves invaluable, mainly when editing non-NENA ancillary system attribution.

Filters

Introducing GIVE 2.0's dynamic data presentation framework governed by a trio of filters: Error Code Filter, Attribute Filter, and Map Filter. The synergistic combination of these filters empowers unparalleled performance and flexibility.

Data Editing Mechanisms

GIVE introduces an intuitive editing paradigm through three primary user interfaces:

Data Card: Ideal for changing, reviewing, and transacting records as a group.

Resolution Center: A comprehensive platform for research and addressing specific anomalies, providing tailored information and UI.

Wizards: Guided multi-step workflows encompassing both map and attribution operations.

SSAP-RCL Inheritance

By introducing the concept of SSAP-RCL inheritance, where an address point's attribute is perpetually associated with a road centerline, GIVE eliminates manual data entry for inherited attributes, significantly reducing the risk of inconsistent outcomes.

Dynamic Fishbone

SSAP to RCL relationships are vividly represented as fishbones within GIVE 2.0. This feature provides instant feedback on the health of SSAP-RCL relationships by maintaining fishbones in real time. SSAPs lacking valid road centerline relationships are classified by error type and symbolized for swift issue identification.

Contextual Information

Context is king in GIVE's user interface. Pertinent information is readily accessible by hovering over a field name or a data cell with issues. For comprehensive assistance, GIVE's help opens in a separate browser window synchronized with the main GIVE session. This invaluable tool offers descriptions, examples, and instructions tailored to different anomaly types, making it an indispensable resource for learners.

QC Rules

GIVE's Quality Control (QC) validation arsenal comprises several rule categories:

Domain Rules: Ensuring data values adhere to predefined domain values, ranges, or patterns, validating data compliance with established standards.

Geometry Rules: Assessing the spatial aspects of data, checking geometric properties of features for correctness and adherence to spatial integrity and topology requirements.

Schema Rules: Validating the structure and organization of data within a database or system, ensuring data consistency in formats, data types, and relationships.

Topology Rules: Evaluating spatial relationships between features, checking for connectivity, adjacency, and spatial interactions to maintain data integrity and spatial consistency.

Business Rules: Encompassing specific guidelines and requirements set by organizations or industries, governing data collection, processing, and usage and ensuring compliance with operational and regulatory standards.

4. Redefining Data Presentation

Unparalleled Flexibility in Data Presentation

In the dynamic landscape of data integration and quality control, GIVE 2.0 is a beacon of innovation, recognizing that the one-size-fits-all approach simply doesn't suffice. It's a platform designed to empower users with unprecedented flexibility in presenting and working with data, redefining the essence of data presentation.

Multi-Model Compatibility

GIVE's flexibility begins with its ability to accommodate diverse data models seamlessly. It's a recognition that different projects and agencies often demand distinct data representations. With GIVE, users hold the power to effortlessly transition between various data models, ensuring that the data they engage with aligns precisely with their unique requirements.

Locally Native Schema: This model mirrors data in its raw, native format, offering a granular level of detail ideal for advanced users or specific project needs.

State or Regional Models: For large-scale projects or inter-agency collaborations, GIVE empowers users to work with state or regional data models, providing a broader geographical perspective.

NENA Compliant NG9-1-1 Data Model: In compliance with the stringent standards set forth by the National Emergency Number Association (NENA) for NG9-1-1, GIVE delivers a tailored model crafted explicitly for the needs of emergency services, ensuring data adheres to industry standards.

Dynamic Data Filtering

At the heart of GIVE's user-centric design lies its dynamic data filters, catalysts for efficiency and precision that offer users unparalleled data presentation and manipulation flexibility. These are not mere tools; they are transformative agents that elevate data handling to new heights.

On-the-Fly Data Switching: With GIVE's dynamic data filters, users wield power to apply filters and seamlessly transition between different data models in real-time. It's a fluid and dynamic approach that adapts to evolving project needs, ensuring data perfectly aligns with objectives.

Precision Control: In fields where accuracy is paramount, such as GIS and emergency services, precision in data representation is non-negotiable. GIVE's filters bestow upon users precise control over data granularity. During quality assurance or editing endeavors, users can view data at varying levels of detail, facilitating edits with surgical precision and minimizing errors.

Instant Adaptability: GIVE's filters are designed to accommodate your workflow, not dictate it. Whether your focus is data validation, quality control, or editing, the system seamlessly aligns with your needs, eliminating confusion, streamlining decision-making, and optimizing workflow efficiency.

GIVE's dynamic data filters epitomize its dedication to user-centric design. By embracing diverse data models, offering real-time data switching, and allowing extensive customization, GIVE grants users the liberty to interact with data on their own terms. It ensures that projects aren't just efficient; they are precisely tailored to unique requirements.

5. GIVE's Streamlined Workflows

At the heart of GIVE lies a treasure trove of workflows meticulously crafted by NG9-1-1 professionals for NG9-1-1 professionals. These workflows serve as guiding lights, directing users to task-specific contexts enriched with pertinent information managed through intuitive UI controls.

Seamless Uploading and Quality Check

GIVE's data uploading process is a testament to user-friendliness and accessibility, residing comfortably within the Dashboard. Users embark on a journey where they can effortlessly upload source datasets, select layers, and map incoming source layers to their desired target layers within GIVE.

The Quality Control (QC) validation framework becomes the guardian of data health, orchestrating a harmonious blend of automated and on-demand validation processes. These cascading validation events culminate in a comprehensive assessment, ensuring data integrity, adherence to standards, and the pinpointing of anomalies. This knowledge allows users to seamlessly embark on effective correction and maintenance endeavors.

ESINET Provisioning

When the need arises to provision data into ancillary systems, GIVE simplifies the process to merely selecting the desired schema and map layers. For NG9-1-1 system provisioning, setting the schema as NENA is all required. GIVE demystifies the complexity, ensuring data flows effortlessly into the intended systems, minimizing friction, and optimizing efficiency.

Address Point Placement and Management

Thanks to its user-friendly multi-modal toolset, address point placement becomes an art form within GIVE. Placement types, including ad-hoc, stacked, or sequenced, are executed seamlessly via an intuitive wizard. Once placed, a point of ingress is thoughtfully identified along a given Road Centerline (RCL). This suggests a starting address number and facilitates the transfer of attributes from the segment into the newly created address point. This meticulous process guarantees that any address point placed is intricately associated with the appropriate road centerline right from the start, eliminating the possibility of anomalies. Stacked address points receive special attention, depicted on the map with distinctive symbology and a halo. GIVE's address point modification feature streamlines the management of individual points and empowers users to work efficiently with multiple stacked features and their attributes.

Unlocking Efficiency: Street Name Parsing and Normalization

Precision is paramount in the ever-evolving landscape of Geographic Information Systems (GIS) and emergency services. Accurate address parsing and validation lie at the heart of this precision, and this is precisely where GIVE's street name parsing capabilities come into play, redefining the standards for accuracy and efficiency.

The Machine Learning Advantage

Advanced machine learning technology lies at the core of GIVE's street name parsing prowess. It's not just about accurately parsing addresses; it's about adapting to the myriad formats and variations that real-world data presents. GIVE's machine learning expertise ensures that it can handle a wide range of address data, from the conventional to the complex, enhancing data quality and consistency across the board.

Safeguarding Data Integrity

One of the standout features of GIVE's street name parsing is its proactive approach to data integrity. By flagging discrepancies during parsing, GIVE acts as a gatekeeper, preventing erroneous data from infiltrating production systems. This vigilance not only improves data accuracy but also elevates the reliability of address-related information, a critical factor in emergency services and GIS.

Adaptive Learning for Continuous Improvement

GIVE doesn't rest on its laurels; it continuously evolves and improves. GIVE gains insights and adapts through constant monitoring and analysis of parsing failures. This adaptive learning process ensures that GIVE becomes more proficient over time, offering ever-increasing accuracy and efficiency in address parsing. As a result, users benefit from reduced errors and streamlined operations, making their tasks more efficient and reliable.

In conclusion, GIVE's street name parsing and normalization is not just about consistency and efficiency but also continuous improvement.

6. QC Validation and Anomaly Resolution

In the ever-evolving landscape of Next-Generation 9-1-1 (NG9-1-1) systems, precision and reliability are non-negotiable. GIVE 2.0 sets out to place data health and accuracy at its core, delivering a robust quality assurance framework encompassing comprehensive, customizable, real-time validation and intuitive, performant, and effective anomaly resolution.

Data Validation: The Foundation of Quality Assurance

GIVE's validation engine is the cornerstone of its quality assurance framework, managing a comprehensive array of rules. However, GIVE's approach to validation goes beyond the ordinary. It employs a phased validation approach that guides users in prioritizing data corrections. Real-time validation is seamlessly triggered by a user's commit request in an edit session, providing instant feedback.

NG9-1-1 data is inherently complex, often involving multiple layers of information. GIVE's QC validation extends beyond individual layers, ensuring data consistency and integrity are upheld across all layers. As an example, the fishbone analysis illustrates GIVE's inter-layer validation mechanism, a fundamental requirement for seamless data integration and precise emergency response.

Data Editing and Resolution: Four Innovative Mechanisms

Identifying data issues through validation is only the first step in NG9-1-1 data management. In addition to flexible and user-friendly ways for data issue review and understanding, GIVE provides four innovative mechanisms for issue resolution:

> **Data Cards:** Imagine having your features neatly organized as individual cards, each containing all the information and attributes for review, update, and correction. Any individually modified features, geometry, or attributes are kept as cards that can then be transacted (committed or canceled) as a group. Card view, GIVE's foundational edit mechanism, offers robust controls such as card collection navigation, domain-controlled attribute handling, attribute name definitions, and color-coded field status indicators.

Wizards: The complex, multi-step, map-driven tasks such as Address Assignments, Boundary Topology, and Centerline Management are best served by GIVE's wizard UI.

Batch Update: Unlike the Cards UI, which is for individual feature modification, the Batch UI empowers administrators to update all features meeting predefined filters, with support for SQL-based operators enhancing its capability.

Resolution Centers: The Resolution Centers dramatically enhance the visibility of data anomalies and significantly simplify their correction by presenting a focused information context for a particular data anomaly and providing targeted tools for issue exploration and resolution. There are two types of RC, the Domain Resolution Center, and the Content Resolution Center, each serving a unique purpose tailored to a specific need.

The Domain Resolution Center ensures data integrity and conformity to standards during the data validation process. Its capacity to efficiently detect and rectify anomalies, coupled with its role in facilitating the transition to the Content Phase, makes it an indispensable tool for effective data management and validation.

Setting the Content Resolution apart is its ability to provide focused context for the data issues. Users can quickly grasp all problems associated with a particular record, eliminating painstaking manual attribute comparisons. Tools tailor-made for the issues are provided in the UI for data correction and instant feedback.

GIVE offers users various strategies for understanding and correcting anomalies. Incorporating them into your workflow streamlines complex data management tasks, reduces errors, and accelerates your project's progress. GIVE's edit mechanisms allow users to navigate through data challenges confidently, ensure data accuracy, and contribute to the overall efficiency and reliability of NG9-1-1 systems.

7. Supporting ArcGIS

In the dynamic landscape of Next-Generation 9-1-1 (NG9-1-1) GIS data development, the coexistence of cloud-based solutions and on-premise systems such as ArcGIS poses a formidable challenge for enterprise GIS establishments. GIVE's synchronization mechanism emerges as the linchpin solution to address this critical challenge, serving as a pivotal enabler of seamless collaboration and data consistency.

View Synchronization: Uniting Perspectives in Real Time

GIVE CloudLink introduces a paradigm shift in geospatial data management through its robust view synchronization capabilities. In the multifaceted world of Geographic Information Systems

(GIS), synchronizing views across diverse platforms is essential, and GIVE CloudLink delivers precisely that.

GIVE CloudLink empowers GIVE and ArcGIS Pro users with real-time view updates. When changes are initiated in one platform, whether they involve data edits or map adjustments, these alterations instantaneously manifest in the other. Manual view synchronization becomes a thing of the past, streamlining workflows and ensuring all stakeholders consistently access the most current geospatial information.

GIVE CloudLink's real-time view synchronization fosters enhanced collaboration among agencies and teams. Whether you're a GIS professional refining map layers or an emergency services provider fine-tuning location data, GIVE CloudLink aligns everyone's perspective, promoting efficient decision-making and nurturing a more agile and responsive approach to geospatial data management.

Data Synchronization: Maintaining Data Source Authority

GIVE Replica Layers are Live Layers configured for two-way replication between the on-premises ArcSDE data sources and their replicas in the GIVE cloud. For enterprise GIS shops, data synchronization is critical to maintaining data source authority. Any modifications made in GIVE are pushed to ArcGIS Pro instantaneously; GIVE pulls changes made in ArcGIS Pro. Whether you're actively editing, validating, or viewing geospatial data, you can trust that you're consistently working with the most current information.

Manual data transfers or repetitive uploading and downloading become obsolete with the GIVE replication setup. It streamlines the data synchronization process, saving precious time and mitigating the risk of data discrepancies. This capability is a potent tool for preserving data accuracy and consistency, especially in the high-stakes realm of NG9-1-1 systems.

In summary, GIVE view and data synchronization features are pivotal in augmenting collaboration, streamlining workflows, and preserving data authority and accuracy within NG9-1-1 systems. Whether synchronizing views for improved decision-making or ensuring data consistency across platforms, GIVE emerges as a potent ally in geospatial data management.

Conclusion

In the NG9-1-1 era, where accurate data is paramount for saving lives and ensuring public safety, GIVE 2.0 is a transformative solution. It embodies efficiency, adaptability, and collaboration, setting a new standard for data integration and quality control.

GIVE ensures efficiency, boasting capabilities like phased validation, spatially aware domain value management, topology editing, real-time validation, tailor-made anomaly resolution

mechanisms, and Esri integration. These advancements mark a quantum leap in NG9-1-1 system GIS development data quality management.

GIVE's high adaptability caters to agencies with varying GIS capabilities, diverse domain values, and different workflows.

Moreover, GIVE fosters collaboration through a comprehensive suite of features that empower organizations to manage, validate, and integrate live Geographic Information System (GIS) production data.

GIVE 2.0 redefines data integration and quality control in NG9-1-1 systems, breaking down data silos, promoting collaboration, and delivering precise, real-time data validation. It empowers agencies to respond to emergencies confidently and efficiently in an environment where every second counts. GIVE 2.0 is the bedrock of data reliability and integrity, ensuring NG9-1-1 systems protect and save lives.

Contact Information

For General Inquiries: If you have any general inquiries about GIVE 2.0 or how it can benefit your organization, please do not hesitate to contact our dedicated support team. You can contact us via email at info@gisticinc.com or 480-656-9962.

For Demonstrations: Seeing is believing! We understand that you might want to see GIVE 2.0 in action. Our experts can schedule personalized demonstrations tailored to your specific needs and interests. To request a demo, please contact Brian Brady at brian.brady@gisticinc.com.

Connect with Us on Social Media: Stay updated on the latest news, product updates, and industry trends by following us on social media. You can find us on Youtube and LinkedIn.

We are committed to providing the best support and information to meet your needs. If you have any further questions or require additional assistance, please don't hesitate to contact us.

Thank you again for considering GIVE 2.0, and we look forward to the opportunity to serve you.