

EBOOK

Modern Geospatial Delivers Innovation That Meets Every Business Need

Optimize your IT with scalable, blended GIS solutions built for the cloud, AI, and more



Introduction

What's driving companies to innovate?

The new business reality in every sector—from government to commercial, startups to nonprofits centers around IT innovation. Companies invest heavily in technology to increase efficiency, productivity, and sustainability. Indeed, IDC estimates that the pace of digital technology spending will grow **seven times faster** than the overall economy in 2024. In the U.S. alone, spending on digital transformation is projected to reach **3.4 trillion dollars**.

Driving sustained growth in 2024 and beyond involves overcoming several factors, from economic uncertainty to evolving customer expectations, new workforce demands, and shifting climate change priorities. Companies striving to thrive in a hyper-competitive, in-flux global market must treat their IT and data as strategic business assets.

And that's where **modern geospatial** delivers, which leverages blended proprietary and open GIS, flexible architectures, data interoperability, immersive experiences, and the latest in high-tech innovations, including AI and machine learning. Modern geospatial enables companies to optimize operations and drive growth. They can leverage location-based analytics, real-time data feeds, intuitive data visualizations, and map displays across the enterprise for business transformation, modernization, and customer engagement.

The result is better business outcomes—no matter your business. Utilities can reduce laborintensive activities with machine learning; commercial companies can lower costs with cloud-based pay-as-you-go consumption; startups can differentiate products using location services; nonprofits can share and capture insights through responsive and mobile experiences. Both public and private sectors can analyze, predict, and measure the impacts of climate change to develop resiliency strategies. And this list goes on. Modern geospatial provides a platform for innovation that keeps companies on the cutting edge no matter what tomorrow brings.



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The drive to modernize

Every aspect of effective business requires a digital mindset. Digitization, automation, and optimization increase efficiencies and value—smart companies are charting a new course that leverages innovation as a business strategy.

Yet, as companies seek to take advantage of enterprise systems and emerging tech, the questions of "where" and "how" begin to surface. Companies often struggle moving Al from the lab to operational deployment. This makes it difficult to realize the value of their Al investment to deploy Al and machine learning, computer vision technology, augmented reality/ virtual reality, and field mobility solutions. In fact, Axios reported that half of the surveyed IT leaders said their organizations aren't ready to implement Al and suggested it may take five years or more to build Al into workflows fully.

In addition, many organizations find themselves at a tipping point, with their existing IT stack costing more to operate and maintain. Siloed systems, departmental databases, and incompatible applications create IT complexity that stifles data processing, analysis, and usage.

Furthering the complexity—profits and margins no longer work as an organization's sole mission. Transcendent objectives built around sustainability, net zero carbon goals, and climate resiliency now drive prioritizing business practices because that's what consumers want—and that's where they'll spend their dollars. In the U.S., building smart climate

Companies today face formidable IT challenges:

- Lack of strategic innovation and emerging tech
- Incompatible systems, applications, and data
- Inaccurate, incomplete, and antiquated data
- Poor UX/UI for business and consumer applications
- Lack of climate change planning
 and resilience

strategies could deliver **\$3 trillion to the** economy by 2070.

All these factors combine to compel companies to increase IT spending. Further still, Gartner predicts continued investment in Al and automation to increase operational efficiency and bridge IT talent gaps. The question then becomes—how do you modernize your enterprise to meet your business objectives with the latest IT innovation?



Modern geospatial delivers more

In the world of IT, there has never been a better time to invest in geospatial. Modern locationbased solutions offer the power, flexibility, and scalability previously unseen in the market. Companies of any size, in any market, around the world can digitally transform to build new products, optimize operations, and improve services using the power of location.

Whether business operations (net-zero, resilience, and remote staff) or customer engagement (product placement, advertising, and user experience), the global community has a greater awareness of location. It connects every aspect of business and the real world, from buildings to property, infrastructure, assets, customers, competitors, staff, and equipment, because everything has a location.

Yet we've moved beyond a world where simple routing and digital maps matter. Businesses need sophisticated network modeling, intelligent mapping, real-time tracking and routing, advanced spatial query, comprehensive situational awareness, and remote field data collection. Modern geospatial provides all this and more because it delivers superior data, analysis, applications, and insights.

Companies can aggregate vast quantities of data available from free and licensed sources to perform advanced spatial queries at any scale. They can configure information products

Modern geospatial delivers:

- Enterprise power, flexibility, and scalability
- Superior location-based network
 modeling
- Spatial analysis and query
- Intelligent mapping and data visualization
- Predictable and controllable costs

that align perfectly with internal workflows. And data visualization, web services, and mobile applications help users examine and report business results anywhere and anytime.

To thrive in the new digital world—and not get left behind—organizations must invest in modern geospatial. Using location intelligence and analytics, they can optimize their current situation and set the right path to where they need to be in the future. They can collect, organize, and exploit maps and information using location as a strategic business enabler.

Do It All with Enterprise Geospatial | Read the white paper

Modern geospatial enables enterprise IT

At the most foundational level, modern geospatial enables a more effective IT ecosystem. You can implement a true enterprise GIS, such as Esri's ArcGIS software and Utility Network. You transition from departmental GIS to company-wide applications and functionality that seamlessly integrate with other enterprise software like Oracle, Salesforce, and SAP.

Through connectivity with sensor networks, work order management, enterprise asset management, and more, modern geospatial improves an organization's information technology/operational technology (IT/OT) environment. They can employ a spatially enabled platform to leverage data and technologies quickly and efficiently, making it easier to configure applications, manage resources, and predict costs rapidly.

Challenges overcome with modern geospatial IT:

- Isolated enterprise systems
- Legacy databases and applications
- Departmental GIS
- Lack of open data and software
- Inaccurate, incomplete, antiquated data

Organizations can use the cloud as part of their modern enterprise GIS environment to expand capabilities and employ consumptionbased pricing, lowering costs and reducing risk. They can easily integrate various open and proprietary tools and apps to acquire the necessary functionality. This includes adding third-party data services, such as satellite imagery, SAR data, or crowdsourced data. They can monitor and securely track usage that adheres to privacy standards. In addition, companies can take advantage of custom integrations that connect legacy technology to new systems.. You can develop or configure brand-new applications or interfaces to legacy data sources that enable users to benefit from a modernized experience. For example, you can accelerate data extraction and processing functions such as database search and table access management.



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Effective IT continued

Modern GIS uses best-of-breed technology components to design an enterprise IT that's configurable, interoperable, and easy to manage. Companies can pick their database, their code, their UI, as well as their component libraries. They can link common cloud data platforms and cloud-native GIS file formats to support microservices, such as semantic search, vector databases, and object stores, which improve geographic content creation that fuels multiple systems.

These services work on connected data sets and perform geospatial functions such as map view, serving cloud-optimized vector and raster tiles, duplicate data auto-detection, and automatic analytics like hexagon processing and overlay. You can operate in a secure, user-managed environment with search, catalog, and quality management capabilities. For example, a commercial entity can use CRM data to evaluate the impact of marketing campaigns have on their sales in different regions.

Components-based technologies facilitate developing lightweight tools because companies can repurpose modules and develop focused apps and functionality that don't include significant overhead users don't need or want. In addition, they can build a wrapper around

Modern geospatial improves your IT

- Employ modern GIS across departments
- Connect multiple enterprise systems
- Leverage legacy applications and data
- Develop advanced microservices, analytics, and maps
- Increase performance at lower costs and reduced risk

data and functionality using a modern interface. Both approaches accelerate time to value while lowering costs.

Perhaps most importantly, you remove IT complexity, replacing a patchwork of legacy workarounds with a seamless open architecture that connects multiple data sources. This reconciles disparate data to improve accuracy and completeness. And it enhances efficiency. You don't have duplicate data for different teams or apps in various places. Your optimized IT environment becomes more efficient and robust while extending value with rich locationbased capabilities.



Geospatial Technology Opens Access and Promotes Gender Diversity in STEMM Read the Case Study





A modern approach to managing data

Data matters more today than ever, yet many companies cannot transform data into actionable intelligence. Gartner reports poor data quality costs companies an average of \$15 million annually. Other research reports an annual average loss of up to 30% of revenue due to low data quality. For businesses to succeed in today's digital economy, they need timely, complete, and accurate data that delivers value and meaning for diverse needs and use cases yet to be discovered. Modern geospatial platforms integrate data from legacy systems and add rich location context, resulting in actionable intelligence for decision makers.

Enrichment. Whether adding location to existing data or using location to integrate information, location-based enrichment improves your data's usefulness, completeness, and accuracy. Companies can organize and integrate information around geography, linking data stored in multiple departments, multiple databases and 3rd party vendors.

Enrichment also allows companies to integrate and organize external data around geography customer locations, service territories, competitors, or market opportunities. Enriching data from outside sources may help customers better understand how climate change adaptation should be considered as part of their planning strategy. In addition, for many, the time dimension remains an untapped resource. Today, more real-time or streaming data is available for analysis (including evaluating "time slices") than ever before.

Big data. Let's start with the big challenges around big data. Modern GIS makes it easier to take advantage of every data type imaginable, including unstructured data deemed unusable. Businesses can consume real-time data from sensors, cameras, satellites, social media, drones, and IoT. They can generate and share maps using imagery with remote sensor signals, statistical models, and crowdsourced data.

Distributed processing and deep learning capabilities enable large-scale object detection, classification, terrain analysis, and raster analysis. These dissimilar data can be continuously gathered, processed, and maintained in a geospatial platform. Companies can mine and map geotagged Tweets, posts, searches, and other social "tracers" to understand people and communities.

> Glean Insight from Big Data Read the blog



Data continued

Data pipelines

The best way to improve data collection, curation, ingestion, and serving is to build a data pipeline that automates the process. Data pipelines allow you to turn the proverbial data spigot on and off automatically. Suppose there's a change in source data. In that case, you can run it through an established pipeline to manipulate it into the format, structure, and data type necessary for specific use cases and organizational needs. It requires tracking data provenance and lineage from the original. This especially matters when you have source data from outside providers; you must ensure it is securely entering your environments and not opening a potential exposure point.

Companies can add geospatial dimensions to data using internal pipelines that blend geographic and tabular information. You precondition data, for example, to be used in AI models. Most AI models require the proper data structure and schema to build applications that exploit services and leverage 3rd party tools. Data pipelines are a sophisticated way to manipulate data in complex environments, including ETL steps, testing, and data validation from various systems.

Data governance

With the onslaught of available data today—and the enormous efforts employed to make sense of it—good data governance can determine longterm geospatial success. Without it, applications can fail or deviate from intended use, and investments are wasted. Data governance fosters trust in data. Staff and customers will use data they trust, and your business will get the most out of its data investments. It begins in the planning stages and implementation and becomes an essential requirement for long-term IT success.

Data pipelines and governance should include:

- Documented priorities linked to a technology plan
- Stakeholder agreements that define user roles, goals, and timetables
- Well-defined pipelines, procedures, and data lineage
- Identification of existing data and systems that should remain
- Training and adoption activities, as well as feedback loops

Increase Business Performance With Data Enrichment Read the blog

Al with a location-based edge

Artificial intelligence (AI) has arrived. And businesses need to adapt or risk being left behind. Advancements in AI, combined with location-based technology, deliver solutions that enable better processes, remove mundane and time-consuming activities from employee's to-do lists, and transform functions into lean, efficient, and low-cost operations.

Combined with location-based technology, AI and its sub-disciplines of machine learning (ML), computer vision (CV), and natural language processing (NLP) can make a difference for companies looking to embrace high-value use cases. Specifically, linking AI and geospatial technologies helps capture, connect, and organize data in-house and externally using location, no matter where it's stored.

As access to imagery has expanded with new satellite constellations and rapidly evolving drone technology, organizations can now deploy AI to realize greater value than ever before. With the proper engineering, data science, and technical acumen, organizations can use custom-trained models to detect, capture, and classify features and attributes from imagery. Data such as unstructured JSON, point clouds, and hyperspectral imagery from social media, phone-based LIDAR, and nanosats can be processed. This benefits various industries, from government to environmental, energy, transportation, infrastructure, real estate, and nonprofit.

In addition to data management, companies can then automate complex tasks, apply advanced AI functionality to mine data for deeper insight, as well make precise predictions that improve processes. For example, you can apply AI to organizational data lakes to automatically match features and data extracted from imagery, probe signals, and social media. You can perform location inference from text and natural language processing. In addition, you can automate attribute enrichment using image detection and object counts. And that's just the beginning.

With Locana's AI and ML solutions, companies gain advanced functionality:

- Facilities monitoring using security cameras and computer vision models
- Location inference from unstructured text and natural language processing
- Computer vision for object identification and feature extraction
- Creation of synthetic location indices via density/accessibility classification
- Image assessment at scale for photos associated with geographic features





Al and machine learning

Al/ML provides enormous value for automating and streamlining many mundane tasks that keep employees bogged down in monotony for electric, gas, and water utilities, oil and gas, and other asset-intensive businesses.

IT staff can apply ML to detect, capture, and classify infrastructure and assets as features and attributes that enrich geodatabases. With an explosion of data captured from drones and other earth observation (EO) techniques, ML can be used to extract, organize, and add value. ML algorithms can deconstruct and analyze data and detect patterns.

Applying AI/ML and CV improves identifying assets at any scale using optical scanning. For example, a gas utility can identify a regulator station as a location point in a traditional database. Now, that point can link and provide access to attribute records for related devices, pipelines, and objects. CV and ML functionality can identify assets in an asset management system using a detectable bar code captured on camera.

This enables large-scale autodetection of utilityspecific devices, structures, and objects at incredible scale and accuracy. It helps detect anomalies so that routines can be run after data

AI

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collection to limit the amount of manual effort required. Organizations can boost data collection efficiency and accuracy with large amounts of data from drones, satellite imagery, and in situ cameras.

The result? Businesses automate processes, save time, lower costs, and replace mundane tasks so staff can focus on performing higher-value work.

The benefits of Locana's location-based Al and ML:

- Augmented workforce capacity and enhanced productivity
- Improved forecasting, decision-making, and performance
- Automated and simplified workflows and processes
- Enhanced products, services, and customer care
- Optimized assets, operations, and infrastructure

Maximize Your Data with Machine Learning, Computer Vision, and Location Technology | Read the blog

Deliver transformation from the cloud

As more businesses invest in enterprise software systems and corporate-wide digital initiatives, cloud migration becomes a priority. Indeed, by 2027, the cloud computing industry is estimated to reach \$1.24 trillion. Businesses are transitioning to the cloud for many reasons, including cost management, resource management, scalability, and performance.

Modern geospatial takes advantage of cloud capabilities for these very reasons. Migrating to the cloud as part of your enterprise GIS strategy enables a platform-as-a-service, including monitoring, failover, archiving, and backup capabilities. It allows you to adjust your computing power, memory, and storage, as well as repair infrastructure, mitigate environmental concerns, or provide commercial products. It also lowers costs by enabling efficient integration with other systems and data sources.

Organizations no longer have to create and maintain these services internally using limited on-premise resources. They can move to the cloud as a streamlined resource management strategy. This improves your enterprise IT as you modernize and grow your digital capabilities.

In addition, it provides safeguards when issues arise. For example, an engineer's latest code push "blows up" a virtual machine (VM), and you want to restore the previous version; the cloud's platform-as-a-service provides this capability. You don't have to build and manage your virtualization strategy in the internal data center. This is a cloud capability and you simply select it. You gain flexibility in scaling your geospatial solutions and other IT investments using pay-asyou-go consumption and pricing. You can adjust your infrastructure based on the needs of the day or reserve instances in advance based on anticipated increases in usage. You can even pay for dedicated hosting and virtualization when an unforeseeable emergency arises.



Considering Cloud Migration? Why Now Might Be the Perfect Time | Read the blog

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Immersive experiences with real-world accuracy

A global pandemic, supply chain disruption, and economic uncertainty have combined to catapult the need for businesses to go digital. And with newer generation employees raised in a digital world, you have fertile ground for exploiting virtual, augmented, and 3D realities for business.

Combined with geospatial, these technologies merge the physical and digital worlds, encompassing virtual reality (VR), augmented reality (AR), and everything in between—with tremendous accuracy. It overlays digital and location-based information and objects in the real world, providing locationally-aware immersive experiences with 360-degree views. Utilities, construction, government, and other asset-intensive industries benefit from reviewing, analyzing, and comparing projects, resources, infrastructure, work orders, and terrain, as well as reducing truck rolls.

Thanks to the lower costs from the cloud and rendering capacity, combined with more ubiquitous availability for VR devices, more companies are accelerating plans for the potential adoption. Staff and field crews can work more efficiently without going onsite. They can make assessments before field visits using digital representations. Asset construction, inspection, and replacement planning also benefit from these capabilities. When these technologies are effectively deployed, organizations can apply expertise from external sources to solve problems in a safe, secure, controlled environment. It extends the power of knowledge from specialized staff, such as engineers, to quickly support field staff by performing remotely guided troubleshooting. It supplies detailed and precise data to respond to events like extreme weather or damaged infrastructure and get services back online faster.

The benefits of employing AR/VR for business:

- Hands-free workforce operations
- Reduced travel time and operational cost
- Improved field efficiency and safety
- Remote collaboration and training
- Improved customer satisfaction



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Meet modern expectations with location-based experiences

Companies of every size and stage are embracing location-based services and intelligence to differentiate their products and address changing user expectations. The challenge for many of these organizations involves creating spatially-aware applications that users want. This includes creating mapbased apps. Millennials, Gen Z, and beyond have changed the expectations for what applications deliver at home and work.

Modern geospatial provides the tools and power to view and consume information from maps, both in business and at the consumer level. Companies want the most efficient and cost-effective way to integrate maps, geospatial tools, and technology into their workflows. In addition to business and consumer applications, modern geospatial delivers a digital employee experience to help attract and retain talent and elevate efficiency.

Like other application areas, the solution for modern, map-enabled experiences (UX/ UI) involves open-source technologies and proprietary GIS software. Specifically, companies can deploy enterprise software like Esri ArcGIS to build and maintain location data that drive business systems and open-source tools to create consumer-level applications with speed, ease of deployment, and low cost.

Enterprise GIS supplies the geospatial capabilities and data. Open-source technology can be used to design consumerlevel experiences that mimic the ease and accessibility of apps for banking, shopping, travel, and more. In addition, you can build custom capabilities, such as a new form factor or a new UX paradigm, quickly and easily. This is incredibly important in an era when **90% of users stop using** an app due to poor performance. You can connect location with customers and real-time information to make apps more useful and "stickier" because they engage and delight. You make it easier for your users to perform all tasks, from finding the right location to viewing weather, traffic, and nearby places of interest to modeling and visualizing data. And ultimately, you create expectational experiences that consumers will crave.



Climate resiliency for business

Today, more organizations understand that addressing climate change can better position them for business growth and a better future. Executives and IT leaders recognize it's not just good business to adapt and become resilient to changing climate, but there is opportunity in serving customers and communities and creating a better world.

Modern geospatial helps companies develop a data-driven understanding of climate change. With it, companies efficiently integrate external datasets with corporate databases, which often lack the temporal dimension for when and in what sequence solutions must occur. Locationbased solutions allow organizations to perform climate risk analytics, modeling, and reporting using maps and visualizations that people understand. It improves decision-making for necessary mitigation actions and protects people, property, infrastructure, and ecosystems.

Government

Officials can make informed decisions around regulation and policy for everything from energy and emissions standards to zoning and protecting public lands. They can connect jurisdictional and socioeconomic data with scientific data and analyze how best to support the unique requirements of diverse constituents.

Commercial

Businesses can analyze supply chain operations and impacts to lower energy and resource consumption. They can perform site selection to build new facilities that mitigate ecological impact. They can reduce mileage, fuel usage, carbon emissions and ensure compliance with reporting requirements.

Utilities

Providers identify new clean energy sources, including wind, solar, and water, using maps that visualize service areas, customers, existing infrastructure, and available land. They can perform spatial analyses to identify services, products, and technologies that are optimum for each area and increase resiliency while reducing risk.

Social benefit

Nonprofits and NGOs leverage geospatial platforms to identify vulnerable areas and develop mitigation strategies to protect resources. Maps help determine where and when to fund projects and advocate for change. Location intelligence can identify everything from climate impacts on agricultural supply chains and food security to priority wetlands that require protection from sea-level rise.



Your modern geospatial partner

Looking to modernize and don't know where to start? Let Locana, a TRC company, help.

With decades of GIS and innovation expertise, Locana has partnered with clients in the U.S. and worldwide to achieve better business results through state-of-the-art spatial enablement.

Our delivery model and tailored strategy will address your unique business needs. We employ a collection of delivery practices and patterns forged by working closely with clients to ensure projects arrive on time and on budget.

Locana can serve you throughout the entire project lifecycle because we possess a relentless dedication to "owning the customer mission," which means we embrace your goals as our own and commit to successful delivery.

Locana consultants, technologists, project managers, designers, developers, and industry experts bring world-class knowledge and skills in mapping and location intelligence, from proprietary GIS to open applications and data.

Locana maintains experience across industries and organization sizes, from government agencies to utilities, commercial, and nonprofits, from global enterprises to entrepreneurial startups. Locana partners with leading software vendors in ERP, CRM, work order management, asset management, and more. We customize services and solutions using many advanced technologies, including AI-based, cloud-native, and mobile applications. We employ agile methodologies, scrum, and other customer-friendly project management techniques.

More importantly, we prioritize listening first, then designing and delivering an efficient, effective, and streamlined implementation that ensures lower acquisition and total ownership costs. We maintain constant open communication and collaboration through all stages of the project lifecycle, including postimplementation training and support.

With Locana as your trusted GIS partner, you gain:

- Technical GIS, open source, and cuttingedge technology expertise
- Proven track record delivering experiences for digital-native workforce
- Leading industry knowledge and experience working with diverse clients
- Dedicated to transparency, communication, and ownership
- Solutions, packages, and patterns to accelerate deployment





About Locana a TRC Company

Locana, a location and mapping technology company, provides software products and services that solve the world's most pressing business, climate, and social challenges. With decades of experience, Locana is a global leader in enterprise geospatial solutions using proprietary and open-source mapping technologies. By taking a location-first approach to problem solving, Locana builds, implements, and connects innovative solutions for utilities, land and facility management, critical infrastructure, defense, conservation, international development, and technology. In addition, Locana supplies leading-edge applications and services, including Al, cloud migration, climate resiliency, and virtual reality/augmented reality. Headquartered in Denver, Colo., the company also maintains corporate offices in Seattle and London. For further information, visit: www.locana.co or https://www.linkedin.com/company/locana-co/.



Learn more about how you can deliver modern geospatial innovation that meets every business need.

