IDC MarketScape

IDC MarketScape: Worldwide Smart, Sustainable Cities IoT Applications Platforms 2023 Vendor Assessment

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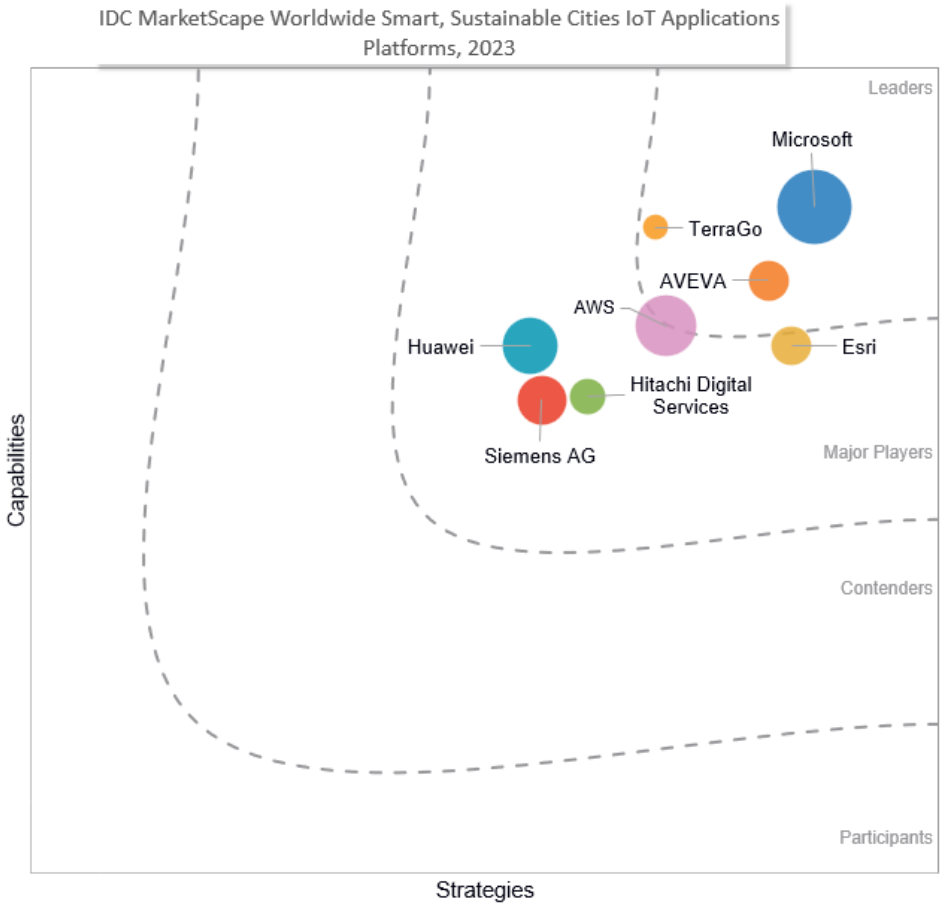
THIS IDC MARKETSCAPE EXCERPT FEATURES TERRAGO

IDC MARKETSCAPE FIGURE

FIGURE 1

IDC MarketScape Worldwide Smart, Sustainable Cities IoT Applications Platforms Vendor Assessment



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Please see the Appendix for detailed methodology, market definition, and scoring criteria.

IN THIS EXCERPT

The content for this excerpt was taken directly from IDC MarketScape: Worldwide Smart, Sustainable Cities IoT Applications Platforms 2023 Vendor Assessment (Doc # US50656123). All or parts of the following sections are included in this excerpt: IDC Opinion, IDC MarketScape Vendor Inclusion Criteria, Essential Guidance, Vendor Summary Profile, Appendix and Learn More. Also included is Figure 1.

IDC OPINION

IDC projects that investment by cities in Smart City platforms will grow as more vendors offer products and services that help cities manage the complexity of IoT implementations, collect key data for improved operations and services delivery, and support work to be more resilient and sustainable.

Cities are looking to smart, connected devices and the Internet of Things (IoT) to capture new and more granular information to enhance decision-making, improve operations and maintenance, and provide new and improved services. Smart Cities are deploying an increasing number of sensors and other IoT devices for a wide variety of services, from air quality sensors to video that reduces traffic accidents to connected lighting controllers to remotely control and monitor outdoor lighting. While cities tend to focus first on the reliability and scalability of these sensors and edge devices, as well as the network infrastructure needed to effectively transmit data, many are looking to platforms that not only manage the operation of these devices but also ingest, process, and manage the data as well as provide analytics support and application enablement. These Smart City IoT platforms aggregate the vast amount of data collected and serve as the middleware between the IoT endpoints and the repositories where the data is stored and from where predictions, notifications, alerts and, sometimes, automated responses are executed.

IDC organizes IoT platforms into two groups: one that focuses on application platforms and the other that focuses on connectivity management. The two types of platforms are not always mutually exclusive. This study focuses on IoT application platform vendors that generally hail from an enterprise or industrial software heritage and tend to have strength in OT (operational technologies such as SCADA systems)/IT infrastructure, applications, and analytics. These companies often partner to provide cellular connectivity options.

In IDC's view, cities and local governments should look for an IoT applications platform that offers some combination of the following capabilities (for a full definition, see the Market Definition section):

- IoT device management
- IoT connectivity management
- Data ingestion, processing, and management
- Visualization tools and dashboards
- Application enablement
- Advanced analytics

IDC MARKETSCAPE VENDOR INCLUSION CRITERIA

It is important to note that this IDC MarketScape for IoT applications platforms for Smart Cities does not contain the full universe of vendors offering an IoT applications platform for cities, but a range of key vendors are represented, including some of the largest vendors, to present a meaningful view of the marketplace. Moreover, there were vendors that were initially considered for inclusion but lacked sufficient Smart Cities marketplace experience or did not meet the study criteria and were consequently not included. The criteria are highly selective in that vendors had to have a specific Smart City offering in place as well as customers in at least two of the three major regions of the world (Americas, Europe, and Asia/Pacific). Vendors for this study met the following inclusion criteria:

- The vendor had a commercially available IoT platform in the market by 2021.
- The platform supports state and local and/or Smart City customers.
- The platform is marketed to the state and local/Smart City market as a solution.
- The platform provides at least four of the following:
  - Device management and identification
  - Data integration, processing, and management
  - Visualization tools and dashboards
  - Application development
  - Advanced analytics
  - Integrating IoT data into existing applications
- The platform currently supports at least two functional areas fundamental for municipal operations (water, transportation, public safety, air quality, lighting, building energy management, etc.).
- The platform offers cities the ability to manage data through a single dashboard.

ADVICE FOR TECHNOLOGY BUYERS

While Smart City IoT applications platform deployments are growing and the enthusiasm by cities for Smart City IoT solutions is notable and expanding, most cities face challenges when looking to deploy large-scale platforms that may span operations from multiple departments. In addition, there are issues with staff limitations or lack of expertise in moving from existing, often legacy, systems that may be more manual or paper based to digital solutions with mobile field applications. Employees that are managing systems like streetlights or sensors are often more used to working with the physical infrastructure and less so with digital tools and accompanying digital processes. Pilot project may also not develop into full-scale production for reasons such as a lack of network infrastructure, budget constraints, and security concerns.

Meanwhile, the market continues to innovate, offering cities new solutions and capabilities. Despite the similarities in cities (e.g., responsibilities for public safety, lighting, streets, water, and other commonalities), the specifics of each city vary in terms of what devices are already deployed, network capabilities, technical competencies, available budget, project leadership, and platform "ownership," along with the attitude of residents toward edge devices. When seeking an IoT platform, based on its specific needs, cities should consider the following areas to weigh their options:

- **Product functionality and breadth:** Cities need to articulate their both sensor strategy and desired outcomes first; these determine what core platform elements are essential, who will manage the vendor and likely cloud relationship, and how users will access information. Core elements include connectivity management, device management, data ingestion, processing, management, visualization tools, application enablement tools, analytics including predictive/prescriptive analytics, and automation. Cities should evaluate whether a vendor solution is offering and packaging a solution in a way that makes it easy to use and administer the product.
- **Protocol/device support:** Cities need to understand the current protocols, device types, and operating system types supported. Cities should enquire as to whether the vendor can support the current and planned IoT endpoints it will need to connect to — over the preferred protocols for connecting to those devices — and ask what is supported out of the box versus requiring additional custom development work.
- **Integration capabilities:** Cities must consider how the IoT platform will integrate with back-end systems and/or other cloud services, which could include databases, applications, and analytics programs. It is important to understand how IoT data will be secured in the context of integration with other systems. In this vein, prebuilt connectors, APIs, and API management will grow increasingly important as cities look to connect IoT data from different systems.
- **Edge support:** Edge support is critical for cities as many processes may be conducted on the edge rather than transmitted to the cloud for processing and decision-making. Transmission costs, bandwidth issues, and processing time impact what should ideally be performed at the edge versus the cloud. For example, real-time traffic control data and dynamic signaling would typically require processing at the edge. Hence, for many city operations, strong edge capabilities are a critical component of IoT platforms.
- **Breadth of complementary offerings:** The majority of IoT platform implementations today require services support. Cities should evaluate the vendor's portfolio of services offerings aimed at successfully strategizing, implementing, and managing IoT deployments. In addition to services, a portfolio of applications or solutions will help cities realize faster time to value.
- **Delivery model options:** While cities may be satisfied with limited options for initial pilots, they may need additional delivery models in the future as IoT deployments or programs expand across a city or into other city functions. Managed cloud offerings generally reduce operational upkeep for cities.
- **Pricing:** Pricing is always a critical consideration for cities. Cities should know their specific needs (versus a generic offering), both currently and as anticipated in the foreseeable future as they consider vendor prices, including the pricing model (license, per seat, per transaction, etc.) and what is included in the price. Vendors need to think about time to deployment, customization requirements and capabilities, amount and type of customer service offered, language of customer service provided, and other features. It is possible, in some cases, to piggyback off public contract and cooperative purchasing vehicles.
- **Ecosystem:** IoT is an ecosystem play with various companies providing technology at the device, network, and software layers. No one vendor can do it all. Cities should discuss their IoT strategies and needs with potential platform providers to understand what kind of ecosystem partnerships they have in place, how partners are trained, and the partnership or marketplace growth strategy. There is more and more "coopetition" where vendors with competing product offerings may partner with each other to go to market together where they have complementary product offerings.
- **Customer service:** IoT data will interact with many potential points of failure and security risk as the data moves from an IoT device to its final destination (which may be more than one

place). Cities should ask vendors which potential issues are supported within the umbrella of the IoT platform under the vendor's customer service program. Cities should also be comfortable with the scope of customer service to be offered given the scope of the platform deployed and the technical capabilities of the city.

IoT platforms should be considered a key solution as cities look to manage more edge devices and data from the edge and "things." These platforms also form a foundation for more advanced use cases such as digital twins.

VENDOR SUMMARY PROFILES

This section briefly explains IDC's key observations resulting in a vendor's position in the IDC MarketScape. While every vendor is evaluated against each of the criteria outlined in the Appendix, the description here provides a summary of each vendor's strengths and challenges.

TerraGo

TerraGo is positioned in the Leaders category in the 2023 IDC MarketScape for worldwide smart, sustainable cities IoT applications platforms.

Founded in 2005, TerraGo began with the invention of a widely adopted geospatial collaboration technology, GeoPDF. TerraGo has since expanded to offer a cloud-native, customizable, and configurable IoT platform designed for mobile field applications, IoT deployment, maintenance operations with analytics as a services (AaaS), and integration platform-as-a-service (iPaaS) solutions. TerraGo has over 2,000 customers in over 70 countries, with a strong presence in the United States; manages over 6 million streetlights, traffic signals, and other infrastructure assets for cities; and processes and stores more than 15TB of data.

TerraGo is focused on the operational challenges and opportunities of IoT initiatives and the unique requirements of IoT deployments. TerraGo's Smart City operations platform is made up of its IoT device management platform, IoTOps, and its Smart City operations center, CityOps. IoTOps is a comprehensive no-code, field operations SaaS platform that can be configured to deploy and manage any type of edge device. TerraGo offers device management capabilities from commissioning to remote management to decommissioning. TerraGo helps a city manage any infrastructure record (e.g., poles, towers) and all attachment assets (e.g. 5G small cells, antennas) according to a defined business process for planning, permitting, installation, inventory, maintenance, work orders, and billing. TerraGo is one of the few vendors analyzed that offers device-based SaaS, priced on the number of IoT endpoints instead of sold on a per-seat basis. TerraGo platform is comms layer agnostic and includes other connectivity types and protocols, such as Wi-SUN, Bluetooth, and TALQ.

CityOps offers a configurable, single pane of glass to manage city operations across assets, devices, and workflow and bringing together data from devices, back-office systems, and field workers. CityOps SaaS product offers product modules for planning, inventory, installation, and work orders with AaaS for each. TerraGo's iPaaS is an intelligent data synchronization and application interface that has integrated over 100 IoT device types, central management systems (CMS), and back-office platforms including all the leading enterprise asset management (EAM), geographic information system (GIS), customer relationship management (CRM), work orders, mobile workforce management (MWM), billing systems, and outage reporting systems.

The TerraGo software includes an AI framework that enables the automated detection of field assets that learns to identify different types of infrastructure based on their characteristics. For example, TerraGo enables a city to automatically create an as-built inventory of existing streetlights from imagery without doing an expensive, time-consuming "boots on the ground" field survey.

TerraGo is an AWS technology partner and its platform is typically deployed on AWS' managed cloud infrastructure though it can be deployed in any commercial (AWS, GCP, Azure, Oracle, etc.) or on-premises cloud environment.

TerraGo standard pricing is based on number of assets per device tier, the functional modules required, and the number of different device/platform interfaces required. Volume discounts are applied as devices are added, and TerraGo can accommodate a flat price to meet city requirements.

Strengths

TerraGo stands out on customer service, flexibility, and agility and has a laser focus on city customers. As one client said "it's not a dangerous flexibility" but rather focused on delivering an environment specific to a city's requirements via configuration and not coding. This means that configuration is an ongoing process and change is "built-in" and included as part of the ongoing annual subscription. TerraGo's no-code configuration editor allows rapid deployment of changes to web and mobile user interfaces, maps, workflows, device interfaces, systems integrations, and analytics. TerraGo is also strong in its attention to large-scale field operations, with access to its platform available via browser, desktop, and mobile device/tablet (available for iOS, Android, and Windows).

Challenges

TerraGo is a relatively small vendor in a market full of large, multinational players. TerraGo, while present in all regions, has less geographic variability in its client base and a smaller number of partners (though its partner program is strong). TerraGo started with streetlights as its main use case and continues to leverage this as a starting point with clients. TerraGo needs to continue to educate the market on the implications of large-scale IoT deployments and IoT devices as credentialed, cyberassets requiring comprehensive chain of custody throughout the full asset life cycle.

Consider TerraGo When

Consider TerraGo when you have a multivendor, complex back-end system with a multitude of IoT devices in the field and can work closely with TerraGo to define your solution and what you need it to deliver. TerraGo should be on your short list if you are looking at starting a smart streetlight initiative. It's a strong solution for cities without in-house development resources to apply to IoT initiatives as TerraGo provides comprehensive SaaS, including all the configuration, deployment, monitoring, maintenance, enhancements, new features, and version upgrades.

APPENDIX

Reading an IDC MarketScape Graph

For the purposes of this analysis, IDC divided potential key measures for success into two primary categories: capabilities and strategies.

Positioning on the y-axis reflects the vendor's current capabilities and menu of services and how well aligned the vendor is to customer needs. The capabilities category focuses on the capabilities of the

company and product today, here and now. Under this category, IDC analysts will look at how well a vendor is building/delivering capabilities that enable it to execute its chosen strategy in the market.

Positioning on the x-axis, or strategies axis, indicates how well the vendor's future strategy aligns with what customers will require in three to five years. The strategies category focuses on high-level decisions and underlying assumptions about offerings, customer segments, and business and go-to-market plans for the next three to five years.

The size of the individual vendor markers in the IDC MarketScape represents the relative market share of each individual vendor within the specific market segment being assessed.

IDC MarketScape Methodology

IDC MarketScape criteria selection, weightings, and vendor scores represent well-researched IDC judgment about the market and specific vendors. IDC analysts tailor the range of standard characteristics by which vendors are measured through structured discussions, surveys, and interviews with market leaders, participants, and end users. Market weightings are based on user interviews, buyer surveys, and the input of IDC experts in each market. IDC analysts base individual vendor scores, and ultimately vendor positions on the IDC MarketScape, on detailed surveys and interviews with the vendors, publicly available information, and end-user experiences in an effort to provide an accurate and consistent assessment of each vendor's characteristics, behavior, and capability.

Market Definition

Smart City IoT applications platforms include a bundled set of capabilities required to connect, manage, and visualize IoT devices and data, often offered in a platform-as-a-service (PaaS) model.

While the architecture and offerings vary from vendor to vendor, they typically include some combination of the following components:

- Device management is for endpoint provisioning, remote configuration, data monitoring, software updates, and error reporting. Device management ensures the ongoing ability of the endpoint to send and receive data. Software is often deployed via an agent client installed on endpoints. Some solutions may also include an identity management component that stores device information and device identities.
- Connectivity management ensures data flows from the edge to the cloud and is managed and secured in transit with encryption capabilities. This may be limited to IP communication via a cloud gateway, which communicates bidirectionally with endpoints typically through protocols such as MQTT, AMQP, CoAP, or REST APIs. For deployments relying on cellular connectivity, some IoT platform vendors can provide SIM management, including billing and SIM alerts. Partnerships are common in this area to meet the requirements of global deployments running over various communication networks.
- For data ingestion, processing, and management, IoT platforms often include rules engines that route incoming data to the correct destination. Typical destinations include storage mechanisms, other applications, or web services. They may also perform basic anomaly detection by comparing incoming data with a set of rules defined by an organization. Data transformation, aggregation, and enrichment and complex event processing capabilities may also be included in some IoT platform products.

- Visualization tools and dashboards allow cities to manipulate IoT data or visualize data and connected and applicable city conditions in real time.
- Application enablement is often in the form of APIs to platform services. With APIs fully documented, organizations or third parties (e.g., app developers, systems integrators, and SaaS vendors) can push and customize IoT platform data according to their requirements.
- Marketplaces are emerging in this area, and partnerships are often localized to a country or verticalized by industry. Some vendors also package application development tools as a standardized platform component. Advanced analytics, such as machine learning and predictive analytics tools, are most often not a standard platform component today but offer a differentiation opportunity for IoT platform vendors.

LEARN MORE

Related Research

- *IDC FutureScape: Worldwide Smart Cities and Communities 2024 Predictions* (IDC #US50296623, October 2023)
- *IDC TechBrief: The Metaverse Services in State and Local Government* (IDC #US49260623, May 2023)
- *Future of Industry Ecosystems — Government* (IDC #US50218323, May 2023)
- *IDC TechBrief: Digital Twins in Cities and Communities* (IDC #US49260723, May 2023)

Synopsis

This IDC study represents a vendor assessment of the current market for worldwide IoT applications platforms for Smart Cities. This research is a quantitative and qualitative assessment of the vendors based on a comprehensive set of parameters of both current and expected capabilities to IoT technology deployments in cities. This IDC MarketScape assesses eight vendors in this space.

"As cities digitally transform and deploy Smart City capabilities to support positive environmental, financial, and social outcomes and improved efficiencies, a centralized platform for ingesting, analyzing, predicting, and controlling data and IoT devices enhances a city's ability to perform and excel. Accordingly, the emerging IoT platform plays a critical role in the future of cities," said Ruthbea Yesner, vice president, IDC Government Insights.

About IDC

International Data Corporation (IDC) is the premier global provider of market intelligence, advisory services, and events for the information technology, telecommunications, and consumer technology markets. With more than 1,300 analysts worldwide, IDC offers global, regional, and local expertise on technology, IT benchmarking and sourcing, and industry opportunities and trends in over 110 countries. IDC's analysis and insight helps IT professionals, business executives, and the investment community to make fact-based technology decisions and to achieve their key business objectives. Founded in 1964, IDC is a wholly owned subsidiary of International Data Group (IDG, Inc.).

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