SOLUTION BRIEF

Internet of Things Technology
Smart Sensor Data Services Platform

Sixgill Delivers the Next Wave of Connected Intelligence with a Powerful Sensor Data Platform and Intel® Architecture-Based Gateways

Automate sensor data services for applications that unite management of people, places, and things for immediate action

"With Sixgill, organizations can holistically acquire sensor data, inform applications, identify actionable data intersections, extract meaning, and trigger the right responses to the right recipients, at the right time, at scale."

—Phil Ressler, CEO, Sixgill

Executive summary

Data from smart sensors is rapidly enabling the next wave of automation in the IoT, IIoT, and IoE. However, many enterprises do not have the capabilities to aggregate and analyze this data or to automate actions based on the resulting insight. Sixgill Sense* is a sensor data services platform designed to meet the requirements of highly diverse sensor-generated data. Sense is fully optimized, end to end, for the efficient and scalable ingestion and organization of time-series data. Sense brings the ability to identify actionable exception events from noisy sensor data streams and trigger programmatic responses reliably and at scale. It includes responsive edge capabilities to preserve functionality during connectivity interruptions, attack network latency, and optimize data transfers to the cloud. Together with high-performance, reliable Intel® architecture-based gateways, Sixgill Sense enables organizations to quickly, easily, and effectively integrate and act on the growing profusion of sensor data.

Challenges

All too often, vast asset populations, ever-increasing sensor and contextual data, poorly collected information, and compromised governance are creating obstacles for enterprises and industries seeking the benefits of the IoT, IIoT, and IoE. According to McKinsey, "companies currently underutilize most of the IoT data they collect."[1]

In order to maximize the value of connected intelligence, a wide range of industries must unify and manage the collection of streaming data from numerous disparate sensor sources. This requires a platform that can find actionable data relevant to a wide range of diverse applications and use cases.

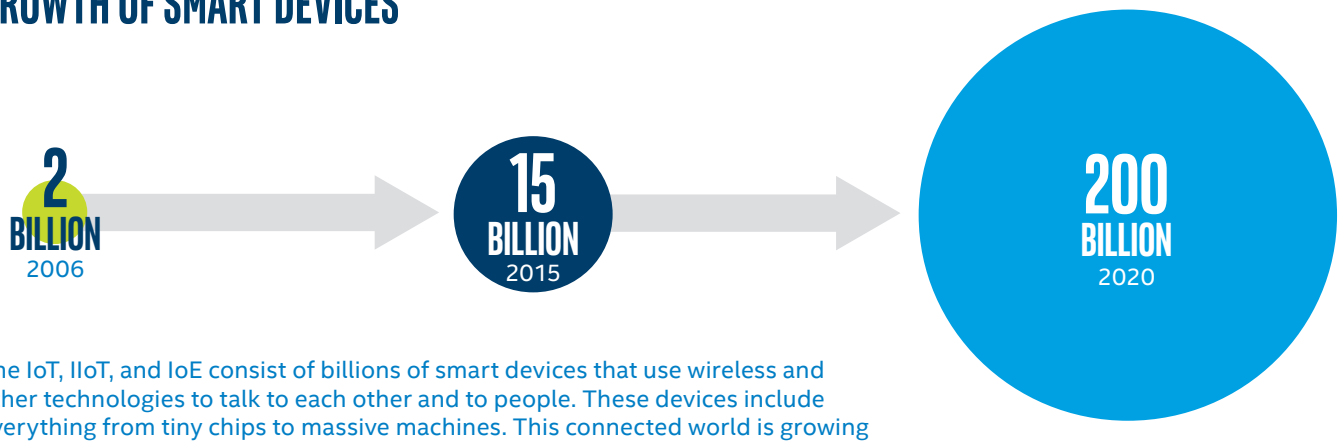
Turning vision into opportunity

The proliferation of connected things has been swift, creating considerable challenges and opportunities for enterprises and industries of all types. Sixgill's CEO, Phil Ressler, describes the evolution of software applications for business needs: "The first generation was archival; the second, application oriented and transactional; the third, social; and, with data-generating sensors becoming ubiquitous, we are now in a new era of sensing applications with data volumes exceeding everything that came before." Sensor data has unique qualities—it is continual and time ordered, with the cadence often being as important as the information itself. Says Ressler, "A commercial jet generates a petabyte of data per week; a smart factory can create a petabyte of data per day. Today, every thing and every person is becoming a data center."

Sixgill is realizing its vision of being a catalyzing company in a synthesizing market. One that delivers the capabilities to ingest, organize, normalize, and act on data at any scale and velocity, from any sensored source.

Sixgill
Govern IoE

GROWTH OF SMART DEVICES



The IoT, IIoT, and IoE consist of billions of smart devices that use wireless and other technologies to talk to each other and to people. These devices include everything from tiny chips to massive machines. This connected world is growing rapidly, on pace to expand from two billion objects in 2006 to 200 billion by 2020—or about 26 smart objects for every human on earth.[2]

Sixgill Sense combined with Intel architecture-based gateways enable the next generation of IoT, IIoT, and IoE solutions. With Sixgill, organizations in every sector of the economy can move beyond data collection and analysis to awareness of the operating state of any operating system or asset population. Events requiring immediate response can be identified while triggering an immediate response from the appropriate system, equipment, or application. Sixgill is a flexible platform for faster, easier development of all types of sensor data applications.

Solution

Sixgill Sense

Sixgill Sense, both in the cloud and at the edge, is designed to continuously acquire, analyze, and decide what actions to take for sensor data from any source, in any volume, and at any velocity. It provides highly configurable sensor data services for scalable, high-speed sensor data ingestion, normalization, enrichment, business rules, and triggered response. The platform is open, data agnostic, and works with SDKs, APIs, and plugins. It provides cost-efficient edge filtering and immediate processing of sensor-generated data, including that which is acquired via Intel architecture-based gateways, controlling how much data is transmitted to cloud.

The Intel architecture-based gateways provide a key ingredient for enabling the connectivity of legacy industrial devices and other systems to the IoT, IIoT, and IoE. The gateways integrate technologies and protocols for networking, embedded control, enterprise-grade security, and easy manageability on which application-specific software can run. By gathering, filtering, and transmitting the data to the Sixgill Sense platform, these gateways enable actionable edge intelligence and save on cost-intensive data transmission.

Gain a holistic view of the connected enterprise with Sixgill Sense* and Intel® architecture

"The Sense* architecture has unique, universal capabilities that allow developers to build applications requiring sensor data from highly diverse and disbursed sources."

—Elizabeth Shonnard, senior VP product & engineering, Sixgill

The Sixgill system identifies valuable data intersections within complex data pipes gathered by the Intel architecture-based gateways. Integration with the gateway enables data aggregation, filtering, and analytics at the edge. The solution can be deployed via public cloud or on-site in private clouds behind firewalls for increased data security and control, or as a hybrid for best-of-breed adaptability. Using edge computing services, Sense maintains operations even when signals are interrupted, offering holistic, in-depth, actionable intelligence.

Sense supports use cases across the full spectrum of industries, while simplifying and accelerating IoT, IIoT, and IoE application development. Features include a massively scalable architecture, dynamic rule triggers, and advanced data correlation features such as proximity and location refinement to help ensure context-enriched insights for sensor and location data. By combining the Sixgill solution with Intel architecture, organizations gain new IoE governance capabilities, including unrivaled visibility into asset availability, location, and operating state—all while keeping assets, behaviors, and actions on track.

Sensor data is typically time-series data that is often combined with contextual data for deeper insights. To facilitate flexible data acquisition and analysis, Sense supports integration of a wide variety of customer and third-party data sources and analytics solutions. It is optimized for aggregation of diverse types of high-velocity time-series sensor data that established enterprise relational databases are often ill suited to support.

Sense integrates easily with internal systems, third-party services, existing tools, and private big data networks.

Sixgill and Intel

Sixgill maintains a variety of strategic relationships across the IoT ecosystem, including membership in the Intel® IoT Solutions Alliance—one of the world's most recognized and trusted technology communities.

These relationships foster greater collaboration while enabling developers to build new sensor-informed applications that leverage the data from people, places, and things generated by the exploding numbers of connected assets.

Combined with highly reliable, high-performance Intel® architecture-based gateways, the Sixgill Sense platform solution creates actionable sensor data intelligence at the edge, while increasing automation and operational efficiency for business and industry.

Organizations gain total flexibility to develop responsive, sensing IoT applications with no limits on data sources, data diversity, applications, or scale.

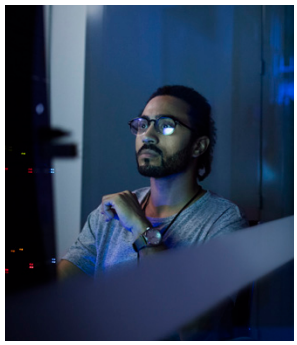
Working in unison, Sixgill and Intel gateways provide foundational data automation technology that helps every industry tap the next leg of productivity growth the IoT is beginning to unlock.

Meeting enterprise and industry requirements

Sixgill Sense enables any organization to acquire sensor data, understand it, and act on it programmatically.*

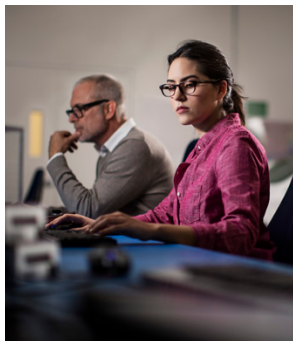
C-suite

C-suite leaders future-proof their organizations with solutions such as Sixgill Sense because they are cost-effective, scalable, flexible, and can improve productivity and increase revenue growth, along with other positive business outcomes.



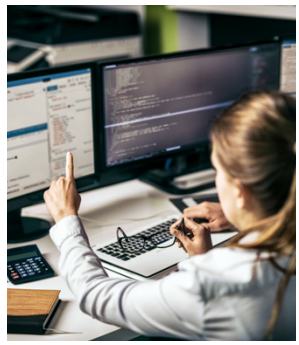
IT

Sixgill Sense helps IT leaders establish a sensor data knowledge base, extract value from highly diverse sensor data streams, uncover relevant insights, and keep pace with the accelerating volume and velocity of data.



Line of business (LOB) managers

Line of business managers appreciate Sixgill Sense because it is flexible, extensible, and adaptable enough for robust use cases as well as task-specific applications that provide cohesive understanding across a wide range of business lines.



Developers

Developers look to Sixgill Sense as a pragmatic IoT application enablement platform that's easy to use and can deal with all types of data, regardless of the technology or system that emits that data, in order to build the widest range of applications.

SIXGILL SENSE* FEATURES *Sense edge computing features help reduce latency, speed response, and manage data flow to the cloud.*	
Edge processing	• Distributes computing across available capacity • Maximizes performance and improves end user experience with time-sensitive responses • Provides built-in failover and redundancy • Shifts assignments based on specified characteristics such as population density and latency requirements
Flexible deployment	• Allows users to integrate with any cloud environment • Supports cloud-managed, on-premise, or hybrid deployments
Intrinsic security	• Includes built-in data security • Encrypts all communication between external data generators and Sixgill Sense* • Leverages a shared secret protocol (TLS/SSL) with a lease for encryption services • Provides the ability to frequently modify encryption keys with access-control decisions based on assigned device keys • Maintains data in operational data stores for immediate processing and persistent data stores for long-term storage
Management and monitoring	• Includes the Sixgill Dash* console for administration and monitoring with editable and configurable rules facility, prelaunch testing, and maintenance tools for applications
Support and service	• Custom support and maintenance by Sixgill's expert team

The data platform for quick development of sensing applications

The powerful unified sensor data automation platform provided by Sense supports development of any sensor-informed application. Unrestricted by data source and unbounded for scalability, the Sense open architecture is designed to meet the diverse needs of today's IoT, IIoT, and IoE developers.

The solution centralizes cross-enterprise asset data knowledge, control, and handling to streamline development. It facilitates rapid and flexible application development via extensible platform APIs, plugins, and back-end services. Sense also supports integration with customers' internal systems, third-party services, existing tools, and private big data networks.

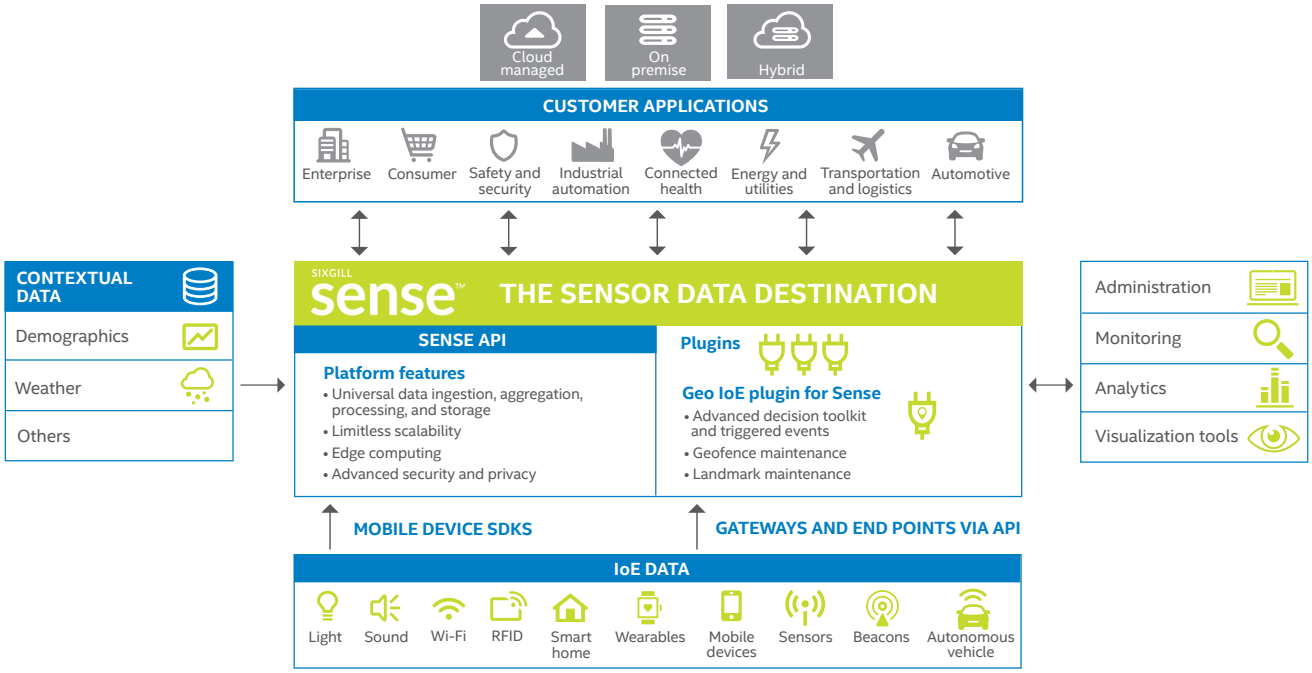
- **One data services backbone:** Supports all sensor-dependent applications, with the ability to acquire, analyze, and act on any type of sensor data across the enterprise with unified asset data knowledge and administration.
- **Open architecture:** Ingests, aggregates, and processes sensor data from any emitter.
- **Extensible:** Sense can be easily adapted to specific enterprise and industry requirements via APIs and plugins (built in and/or custom). The software outputs to any external system and includes editable and configurable rules.
- **Flexible:** Supports data ingestion at any volume, velocity, and scale with flexibility for cloud-managed, on-premise, or hybrid deployment.

The foundation for IoT

The Sixgill solution is one example of how Intel works closely with the Internet of Things (IoT) ecosystem to help enable smart IoT solutions based on standardized, scalable, reliable Intel® architecture and software. These solutions range from sensors and gateways to server and cloud technologies to data analytics algorithms and applications. Intel provides essential end-to-end capabilities—performance, manageability, connectivity, analytics, and advanced security—to help accelerate innovation and increase revenue for enterprises, service providers, and industry.

"With Sense*, organizations have the flexibility to develop business-specific applications served by one data platform that provides unified asset knowledge and data handling."

—Shawn Gunn, senior VP of business development, Sixgill



Sixgill Sense* and Intel® architecture-based gateways enable integration and increase connected intelligence in virtually any enterprise or industry configuration

Real-world gains with Sixgill Sense: Examples

Unify sensor data knowledge and application development across vertical markets and use cases

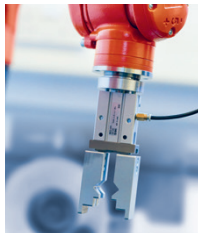
Together, Intel architecture-based gateways and Sixgill Sense sensor data services provide the hardware and software ingredients organizations need to flexibly support myriad IoT, IIoT, and IoE use cases for worksite optimization, smart cities, smart buildings and venues, smart communities and senior living, smart manufacturing, device and asset management, autonomous fleet management, smart agriculture, and more.

Sensor data powers smart applications:

Smart cities application developers require massive scalability and full flexibility for diverse sensor data types and application purposes such as citizen convenience and services, traffic management, parking optimization, crime prevention and suppression, crowd management, and others. Sense serves as a valuable, shared knowledge foundation for all sensor-informed applications.

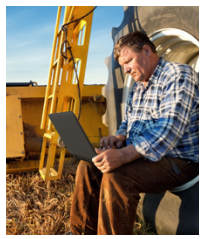
For example, Sense for smart cities enables real-time crowd management applications to easily access and integrate sensor data that also informs crime prevention and suppression applications. From event planning to real-time insights and response, shared awareness increases efficiency and effectiveness of implementation and processes.

Sense for smart construction helps improve work-site safety, worker and equipment health, and productivity. With unparalleled visibility into movement and location of workers and equipment, real-time awareness and automation can better monitor and manage task activity, safety compliance, and equipment utilization.



Sense for smart manufacturing provides continuous, remote visibility into factory operations. Flexibly assign criteria and apply business rules programmatically to trigger targeted actions. Employ edge services to minimize slower, high-cost data transfer to the cloud, automate decisions, enforce safety, optimize equipment usage, and speed actions.

Sense for smart buildings arms organizations with a holistic view of what's going on inside structures. Collect and combine sensor data for diverse factors such as head count, people flow, room occupancy, lighting, and temperature, and take appropriate actions to improve productivity and lower costs. Sensor services for smart buildings can also help enhance visitor experiences, for example, via smart signage, preferred parking, and mobile communications.



Sense for smart agriculture combines sensor data with environmental data in ways that can provide insights into real-time operations, as well as the health and safety of workers, crops, livestock, and equipment. Sense enables location- and task-based communications and unifies monitoring of factors including temperature, rainfall, moisture content, and worker wellness.

Sense* offers extensibility via custom and Sixgill-provided plugins

Architected for extensibility with a modern microservices architecture, Sense enables custom plugin development to target customer needs. Also, developers are given full access to Sixgill-provided plugins, such as the Sixgill Geo IoE Plugin* for Sense. This built-in plugin allows advanced geofencing and dynamic tracking of people, assets, and crowds. Included are real-time location-based features such as automated communication to employees, customers, and partners based on movement and other select criteria.

Conclusion

Sixgill Sense offers essential data services for the full spectrum of applications enterprises and industries will need to build to capitalize on the era of sensor-driven IoT, IIoT, and IoE. Combined with Intel architecture-based gateways, the solution enables actionable edge intelligence, while increasing automation and operational efficiency for business and industry.

Learn more

For more information about Sixgill, please visit sixgill.com or email info@sixgill.com.

For more information about Intel® IoT Technology and the Intel® IoT Solutions Alliance, please visit intel.com/iot.

Sixgill Geo IoE Plugin* for Sense*

Extensible platform features give developers immediate access to Sixgill-provided plugins, such as the Sixgill Geo IoE Plugin for Sense. The plugin allows advanced geofencing and tracking of people, assets, and crowds. Included are real-time mobile messaging features that allow for triggered communication to employees, customers, and partners based on movement and location.

About Sixgill

Sixgill is a leading provider of enterprise IoT, IIoT, and IoE governance solutions enabled by universal sensor data services for sensor-informed applications.

For more information or a demo, email Sixgill at info@sixgill.com or call 424-322-2009.

sixgill.com

1. "Creating a successful Internet of Things data marketplace," Johannes Deichmann, Thomas Reinbacher, and Dominik Wee, mckinsey.com/business-functions/digital-mckinsey/our-insights/creating-a-successful-internet-of-things-data-marketplace.

2. IDC, Intel, and the United Nations, intel.com/content/www/us/en/internet-of-things/infographics/guide-to-iot.html.

Estimated results were obtained prior to implementation of recent software patches and firmware updates intended to address exploits referred to as "Spectre" and "Meltdown". Implementation of these updates may make these results inapplicable to your device or system.

Software and workloads used in performance tests may have been optimized for performance only on Intel microprocessors. Performance tests, such as SYSmark and MobileMark, are measured using specific computer systems, components, software, operations and functions. Any change to any of those factors may cause the results to vary. You should consult other information and performance tests to assist you in fully evaluating your contemplated purchases, including the performance of that product when combined with other products. For more information go to intel.com/benchmarks.

Intel technologies' features and benefits depend on system configuration and may require enabled hardware, software or service activation. Performance varies depending on system configuration. No computer system can be absolutely secure. Check with your system manufacturer or retailer or learn more at intel.com/iot.

Cost reduction scenarios described are intended as examples of how a given Intel-based product, in the specified circumstances and configurations, may affect future costs and provide cost savings. Circumstances will vary. Intel does not guarantee any costs or cost reduction.

0918/GR/CMD/PDF 338072-001US