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INTERNET OF THINGS
CLOUD SERVICE

The Internet of Things: Unlocking New Business Value

Let Oracle energize your business with IoT-enabled applications.

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***Cloud technology** is well suited to enable IoT, offering high degrees of agility, low and flexible costs, and excellent resource utilization. Moreover, cloud technology offerings lower the bar to entry, permitting organizations to start small and scale up for both short-term and long-term growth.*

The Internet of Things (IoT) represents the next big wave of real technological change, and it's a wave that's rolling in fast. Organizations in virtually every industry will benefit from this technology—if, that is, they're able to take advantage of the opportunity and avoid the potential pitfalls of both implementation and production.

Some 4.9 billion connected objects will be in use this year, up 30 percent from just last year, predicts research firm Gartner. By 2020, it adds, that number will increase to some 25 billion connected objects worldwide (see Figure 1, "Annual IoT Installations by Industry," below).

The growth of IoT technology is being supported by the increased use of the cloud, as the two technologies grow hand-in-hand. Cloud technology is well suited to enable IoT, offering high degrees of agility, low and flexible costs, and excellent resource utilization. Moreover, cloud technology offerings lower the bar to entry, permitting organizations to start small and scale up for both short-term and long-term growth.

FIGURE 1: ANNUAL IoT INSTALLATIONS BY INDUSTRY [1]
(millions of connected things)

	2013	2014	2015	2020
Automotive	96.0	189.6	372.3	3,511.1
Consumer	1,842.1	2,244.5	2,874.9	13,172.5
Generic business	395.2	479.4	623.9	5,158.6
Vertical business	698.7	836.5	1,009.4	3,164.4

Data and Forecasts: Gartner, November 2014

The market today offers a multitude of increasingly powerful, connected devices at low cost. These smarter devices enable companies to increase their capabilities on the network edge. By moving more intelligence to devices and gateways via better applications and better data management for latency reduction, organizations empower themselves to make better and faster business decisions.

Big data and analytics help, too. With the technologies now available, organizations can analyze massive amounts of IoT-related information in real or near-real time. This, in turn, can provide them with the critical insights they need to support the development of new products, services and business models.

A Technology for All Industries

The number of IoT connections is expected to grow rapidly, especially in the manufacturing, retail, automotive and public sectors. Predictions from market-intelligence firm ABI Research and carrier Verizon show that the number of business-to-business (B2B) IoT connections will grow by nearly 30 percent a year through 2020. This will mean some 5.4 billion B2B connections in place at that time, up nearly four-fold from the 1.2 billion connections in 2014, ABI predicts (see Figure 2, "The Fast-Growing Pace of B2B IoT," on page 2).

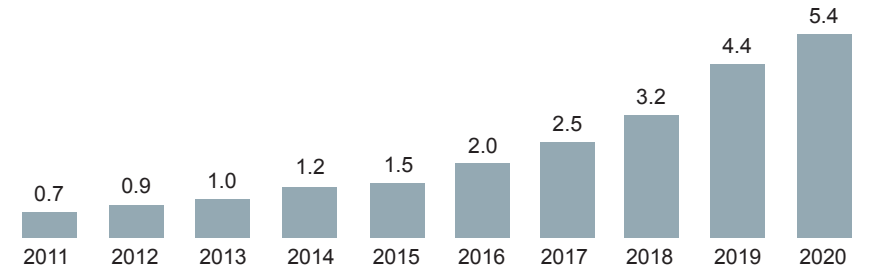
While virtually every industry will eventually feel the impact of IoT, some industries are especially well suited to the concept of connected objects. Today's IoT industry leaders, according to a recent survey by mobile telecommunications provider Vodafone, include: consumer electronics, energy and utilities, manufacturing and automotive (see Figure 3, "Percent of Companies with Machine-to-Machine Solutions in Place," on page 3).

[1] Gartner, "4.9 Billion Connected 'Things' Will be in Use by 2015," November 2014
http://www.gartner.com/newsroom/id/2905717

Retailers, restaurants and hotels *can use IoT systems to improve the customer experience and increase loyalty. Using IoT, hospitality-based businesses can better track customer behavior and preferences to deliver rewards and more tailored services that differentiate their businesses.*

Manufacturing companies use IoT technologies to collect data from devices that have failed or otherwise needed repairs, and then analyze this data to help provide predictive maintenance. They can ask, based on actual performance, which devices are most likely to need what types of maintenance at which specific times. Manufacturers also use IoT to identify opportunities to either develop new products or improve older ones. For example, an auto-parts manufacturer uses sensors in an assembly line to collect data about each step in the production process, and then analyzes the data to improve efficiencies and reduce errors.

FIGURE 2: THE FAST-GROWING PACE OF B2B IoT[2]
(number of connections in billions)



Data and Forecasts: Verizon/ABI Research, 2015

Transportation and logistics represent another industry segment that benefits from IoT. These organizations use IoT to track and trace assets, such as trucks and products. They also use intrusion detection and location-based services to reduce losses of shipped goods and optimize fleet operation. IoT even helps them improve loading and dispatching with more effective location-based routing. The latter provides a beneficial side effect for the environment: Truckers who drive shorter routes generate less polluting exhaust, and they consume less fuel, too.

Utilities companies benefit from IoT approaches by developing smart meters and smart grids. These instruments gather and use digital information about power usage, enabling power companies to more closely monitor usage. Then, based on consumption data, these companies can help consumers conserve energy and use it more efficiently.

In building automation and facilities management, IoT enables systems—such as heating, ventilation and air conditioning (HVAC), lighting and security—to be more closely monitored and managed for enhanced energy efficiency and safety.

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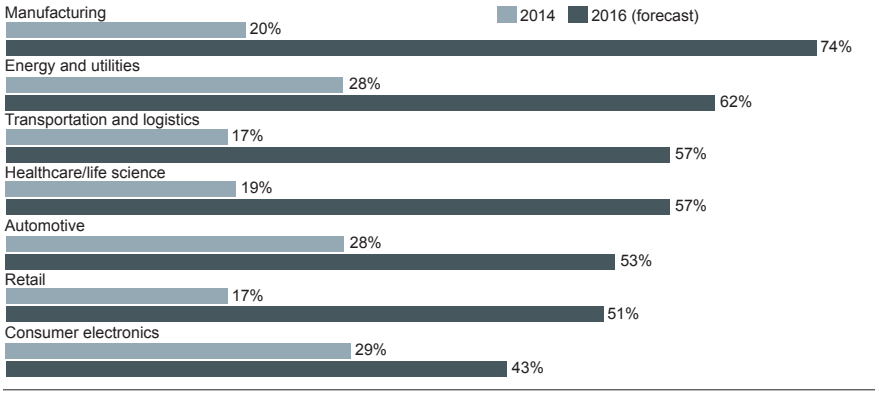
Healthcare and pharmaceuticals companies also leverage IoT. In the pharmaceuticals industry, IoT is being used to track and trace drugs throughout the production and distribution cycle, helping manufacturers and their distributors stem the flow of counterfeit drugs. Healthcare providers offer wearable fitness devices to monitor patient behavior and activity. In addition, IoT can be used to maintain costly and complex medical equipment.

[2] Verizon/ABI Research, "State of the Market: The Internet of Things 2015." http://www.verizonenterprise.com/state-of-the-market-internet-of-things/

It's important to keep in mind *that IoT is a new technology segment, not just a rehash of existing technologies. That's why, regardless of industry, IoT is driving strategic change to both business and operations.*

The public sector can benefit, as well. For example, cities increasingly leverage IoT technology for traffic management. They monitor connected traffic lights, install sensors in parking meters that let mobile device users more easily find parking spaces, and provide tools that law enforcement personnel use to gather and analyze data from connected devices in an effort to better address safety risks.

FIGURE 3: PERCENT OF COMPANIES WITH MACHINE-TO-MACHINE SOLUTIONS IN PLACE[3]



Data and Forecasts: Verizon/ABI Research, 2015

It's important to keep in mind that IoT is a new technology segment, not just a rehash of existing technologies. That's why, regardless of industry, IoT is driving strategic change to both business and operations. These two organizations are being brought together by the need to jointly support IoT initiatives. Companies that include both business and IT leaders in these efforts are well positioned to succeed.

Another important role for IT is determining which enterprise applications and big data analytics tools should be linked to which IoT technologies. These linkages help ensure that an organization obtains the maximum value from the data it gathers. CIOs can also help by determining the best way to secure their companies' IoT data and minimize the risk of data exposure.

Get Started Now

As IoT matures, some barriers still remain. For one, IoT data needs to be integrated into existing enterprise processes and applications for the full value of that data to be realized. This work involves blending IoT information with data from other sources—such as customer relationship management (CRM) and supply chain management (SCM) systems—and then enriching the data for new business insights. For another, despite the many benefits of IoT technology, some companies have failed to act and invest due to resource constraints and competing priorities. Others don't yet understand the benefits. Still others think—incorrectly—that IoT is too complicated, difficult or costly.

That's a serious mistake, and a potentially costly one. In fact, IoT technology can help nearly any organization:

» Better understand its customers' needs and tailor products and services to them. For example, sensors on consumer products provide data showing how and whether the product is being used optimally by customers.

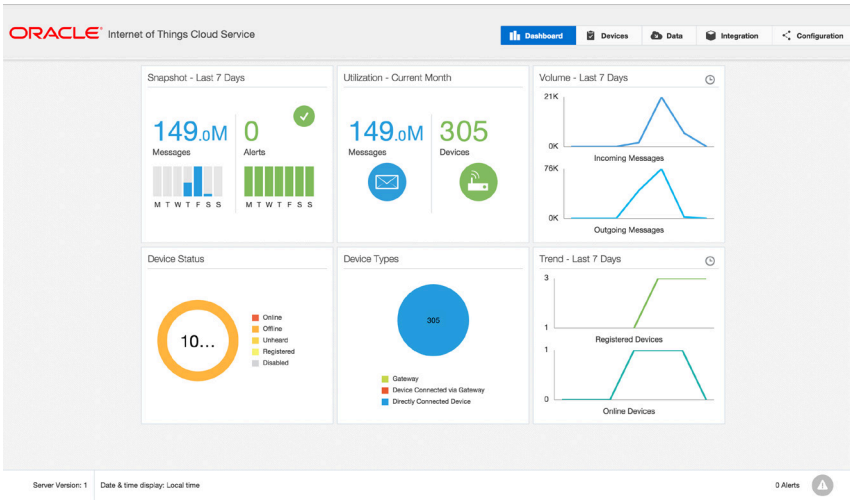
[3] Vodafone, "The M2M Adoption Barrier 2014." https://m2m.vodafone.com/cs/m2m/insight_news/2014-07-02-the-m2m-adoption-barometer-2014

The Oracle Internet of Things Cloud Service *empowers organizations by providing a basis from which they can design and build IoT applications more easily. It makes IoT implementation straightforward, quick and effective.*

» Run the business more effectively and at lower cost. IoT can enhance efficiency through automation, increase control with more data insight and provide greater visibility into business processes. For example, logistics companies use IoT in their vehicles to improve routing and load monitoring, increase driver efficiency and reduce costs through lower fuel consumption.

» Extend its competitive advantage, differentiation and new business opportunities. Many new types of products and services can take advantage of IoT-driven data and analytics. For example, vehicle manufacturers use IoT to enable proactive maintenance based on driving habits and usage rather than time intervals, which reduces overall maintenance and, in turn, helps increase customer loyalty.

FIGURE 4: ORACLE INTERNET OF THINGS CLOUD SERVICE MANAGEMENT CONSOLE DISPLAYS A SUMMARY OF IOT DEPLOYMENT OPERATIONAL STATUS



Connect, Analyze, Integrate

Even with the right team in place, launching an IoT project can be challenging. That's especially true for organizations whose resources and knowledge of devices and integrating device data into their business are limited. Fortunately, new platform solutions can help. The Oracle Internet of Things Cloud Service empowers organizations by providing a basis from which they can design and build IoT applications more easily. It makes IoT implementation straightforward, quick and effective.

» Connect: Reliably and securely collect data from any device in any market and accelerate your time to market with an open, secure and scalable platform.

» Analyze: Perform real-time, big data and predictive analytics, delivering insights into streamed IoT data and events to identify new services and improve customer satisfaction through enriched enterprise data.

» Integrate: Use open interfaces and pre-integrations with Oracle's platform as a service (PaaS) and software as a service (SaaS) offerings to reduce total cost of ownership (TCO) for IoT data enriched applications and processes.

Adoption of the Internet of Things *is happening now across a wide range of industries. This technology enables organizations to capture and analyze data from disparate devices at volumes and velocities previously unseen. By adopting IoT, organizations can rapidly identify important changes and proactively take action.*

Why Oracle? Because with more than 400,000 customers—including 100 of the Fortune 100—and with deployments across a wide variety of industries in more than 145 countries, Oracle offers a comprehensive and fully integrated stack of cloud applications, platform services and engineered systems. Oracle also has decades of expertise in both managing and extracting value from all types of data. What's more, the Oracle IoT Cloud Service empowers companies to unlock even greater business value from the many Oracle technologies and applications they already rely on to run their businesses.

Conclusion

Adoption of the Internet of Things is happening now across a wide range of industries. This technology requires organizations to capture and analyze data from disparate devices at volumes and velocities previously unseen. By adopting IoT, organizations can rapidly identify important changes and proactively take action.

The Oracle IoT Cloud Service enables organizations of all types—including enterprises, as well as services and solutions providers—to address their customers' needs. The Oracle platform has been designed to IoT-enable an organization quickly and with low risk.

Oracle and its partners are uniquely positioned to help both IT and line of business (LoB) managers simplify their IoT planning and implementation. The Oracle IoT Cloud Service can integrate new IoT systems with enterprise applications. And it empowers organizations to generate value from IoT devices by correlating and integrating the right data at the right time.

With the Oracle IoT Cloud Service, your company can deliver innovative products, services and business models to transform your digital business.

Oracle Corporation, World Headquarters
500 Oracle Parkway
Redwood Shores, CA 94065, USA

Worldwide Inquiries
Phone: +1.650.506.7000
Fax: +1.650.506.7200

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