Watson Internet of Things

Harness the value of big data to build smarter infrastructures

Transform the management of facilities and assets—and ultimately, the business—using big data analytics

Watson IoT™

IBM

Introduction

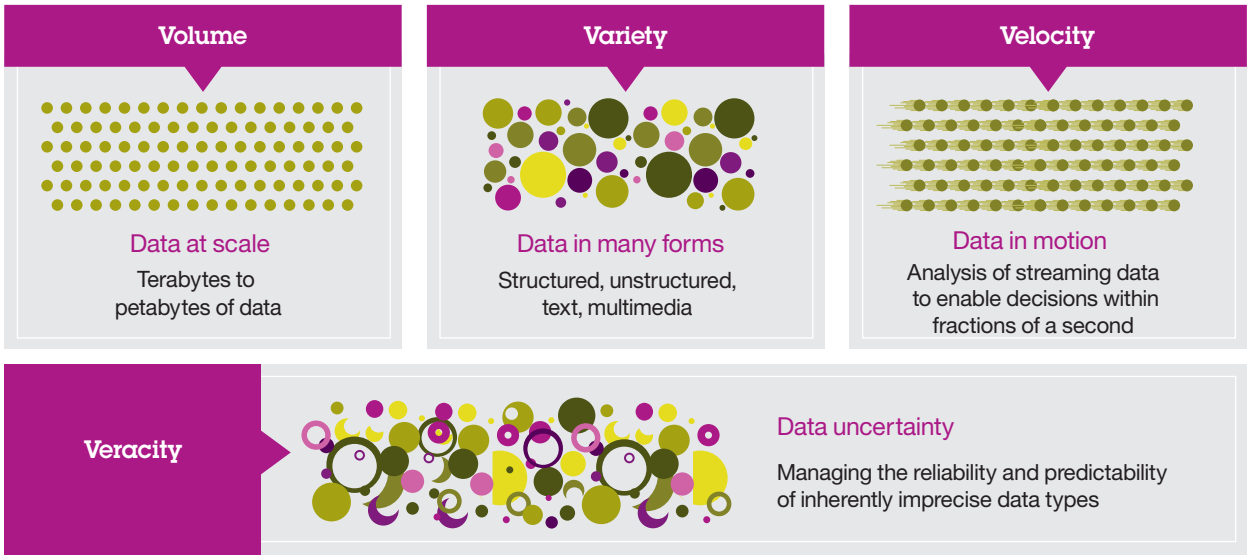
Big data is increasingly prevalent and critical on today's smarter planet, where instrumented, interconnected and intelligent businesses collect, process, use and store more information than ever before. All this information offers tremendous transformational opportunities for organizations—if they can effectively manage and extract the most value from these large volumes of data.

The opportunities afforded through big data can be particularly advantageous when applied to the management of facilities and assets—everything from office buildings to oil-drilling platforms to fleets of ships. This is due to the increased instrumentation of facilities and assets, where the digital and physical worlds have converged to generate massive volumes of data—the effective analysis of which can lead to benefits such as increased revenue, lowered operating expenses, enhanced service availability and reduced risk.

To help improve facilities and asset management operations, many organizations implement transactional systems that provide performance metrics and automated processes that alert them to inefficient facilities, assets or resources and accelerate improvements—but most of these systems only go so far. For example, few of these transactional systems analyze the data in the context of its operating environment—in real time. Many lack the ability to apply advanced analytics to information in its native form, or to integrate and manage the full variety, velocity and volume of generated data.

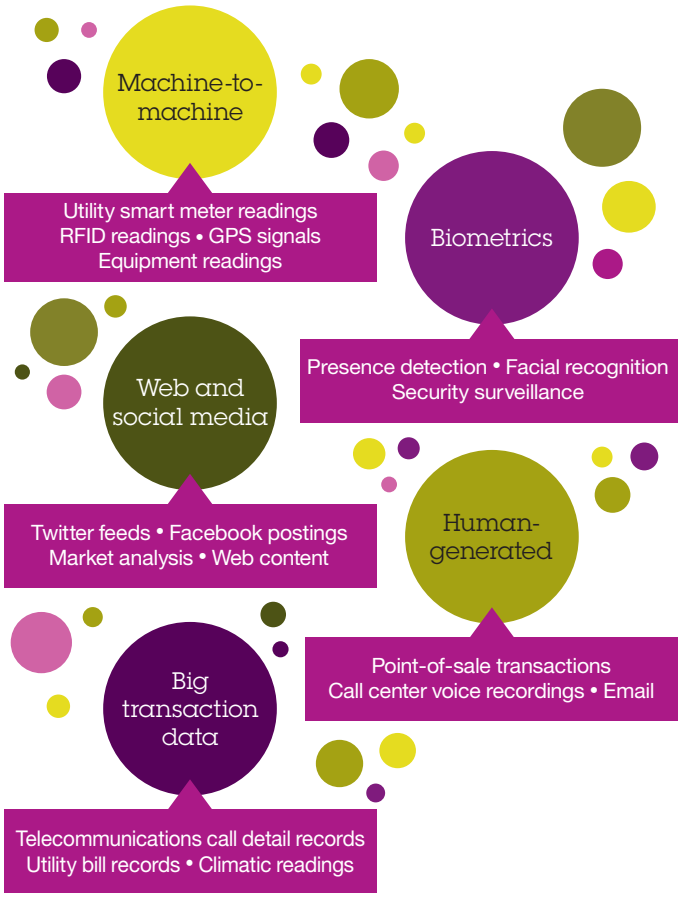
This white paper will discuss how big data analytics, coupled with the right facilities and asset management software, can provide next-generation opportunities to improve facilities and asset management processes and returns. It will examine how different organizations successfully use big data generated by their facilities and assets to help increase revenue, power operational efficiency, ensure service availability and mitigate risk. Most importantly, this white paper will reveal how your organization can leverage big data analytics to achieve similar benefits and transform the management of your organization's facilities and assets—and ultimately, your business.

Big data in dimensions



Big data is made up of four dimensions: volume, variety, velocity and veracity.

Varieties of big data for facilities and asset management



Most big data is generated from five varieties of information,[1] which then comprise data types specific to facilities and asset management.

Define the concept of big data

While the term big data has been used to convey varying concepts—from social media analytics, to next-generation data management, to real-time data and more—what it all boils down to is extreme amounts of data. And buried in the colossal volume, variety and velocity of this data are new facts, relationships, indicators and pointers that previously did not exist, or were simply inaccessible by transactional systems.

Big data embodies four common dimensions:

- Volume: The mass quantities of data that organizations must harness in order to help improve decision making across the enterprise
- Variety: The various types of data and data sources; today's organizations must manage the complexity of multiple structured and unstructured data types and integrate and analyze data from sources both within and outside the enterprise
- Velocity: The constant motion of data; the speed at which data is created, processed and analyzed continues to accelerate
- Veracity: The level of reliability associated with certain types of data; creating context around the data can help manage this uncertainty

Big data is a combination of these characteristics, one that creates an opportunity for organizations to gain competitive advantage in today's digitized marketplace. The challenge lies in an organization's ability to capture the big data that is applicable to its needs, effectively manage it, and extract new and relevant insights in order to achieve breakthrough business outcomes.

Analyze big data in real time to improve facilities and asset management

The big data generated by increasingly instrumented, interconnected and intelligent facilities and assets is useful only if transactional systems extract applicable information and act upon it as needed. The right facilities and asset management tools can allow real-time use of this big data to help improve decisions or generate corrective actions that can create measurable benefits for an organization.

Boosting revenue

Big data analytics can help generate revenue by providing contextual understanding of information that the business can then employ to its advantage. For example, geographic information systems (GIS) can help location-dependent organizations such as retailers, telecommunications and energy companies determine the most advantageous geographies for their business. Organizations can use this data to ideally design and locate their facilities or assets within the most optimal markets.

One of the world's largest wind energy producers has achieved success using a big-data modeling solution to harvest insights from an expanded set of location-dependent factors—including historical and actual weather—to help optimize wind turbine placement and, as a result, turbine performance. Pinpointing the optimal locations for wind turbines enables the energy producer to maximize power generation and reduce energy costs, as well as to provide its customers with greater business-case certainty, quicker results, and increased predictability and reliability in wind power generation.

Another example of employing big data analytics to increase revenue uses streaming data to influence operational schedules for maximum oil production. Because ice floes in its North Sea drilling locations can interrupt daily, and inhibit year-round, drilling operations, a major US oil and gas exploration and production company tracks, forecasts and provides early warnings of ice activity in the Arctic Circle. By analyzing satellite imagery, wind and sonar data in real time, the company can avoid ice-floe-related downtime and boost revenues by hundreds of millions to billions of dollars.

Increasing operational efficiency

Energy efficiency and optimization within facilities can help organizations cost-effectively achieve significant, quick and measurable operational improvements. The ability to monitor and analyze energy-intensive equipment across an organization's facilities portfolio, identify operating anomalies in real time, and generate corrective work orders can dramatically reduce energy consumption.

IBM itself has experienced sustainable operational benefits by integrating building, infrastructure and enterprise systems to enable the collection of real-time data—the analysis of which helps to more effectively manage energy use. The IBM Real Estate and Site Operations team implemented a big data solution that evaluates real-time equipment, energy and climate data to identify and automate corrective actions using more than 50 analytical rules. As a result, the team lowered energy costs across its instrumented assets by more than 15 percent and reduced the time to complete work orders by almost 50 percent.[2]

Ensuring service availability

Solutions that enable optimal maintenance throughout the asset lifecycle can lead to higher asset utilization. To further increase usable asset life and reduce operating costs, organizations should choose solutions that automate operations management and maintenance. Systematically monitoring and benchmarking asset performance data can reduce the chance of business interruption from asset failure—a critical goal whether the asset in question is a data center or a manufacturing line.

An effective facilities and asset management solution can leverage big data analytics to enable organizations to proactively maintain facilities equipment, identify emerging problems and trends to prevent breakdowns, lower maintenance and operations costs, and extend asset life through condition-based maintenance and automated issue notification.

When faced with an aging infrastructure and customer complaints, a major metropolitan water and sewer authority needed to improve its asset reliability and lifespan as well as streamline its business processes. The organization now uses advanced spatial analytics to deliver near real-time information to help predict potential issues and occurrences based on location, time, weather and other factors. Not only has predictive analytics lowered the cost-per-work order and shortened the time to correct problems, but it has also helped reduce the organization's operating costs.

Mitigating risk

To help mitigate risks to facilities and assets, predictive analytics can detect even minor anomalies and failure patterns to determine the assets that are at the greatest risk of failure. Predictive maintenance analytics can access multiple data sources in real time to predict equipment failure—which helps organizations avoid costly downtime and reduce maintenance costs. Identifying issues early helps organizations deploy limited maintenance resources more cost-effectively, maximize equipment uptime and improve customer service levels.

An example of big data helping to mitigate risks stemming from complex operational assets involves a ship classification society in Japan. This company deployed a big data technology solution to combine many critical functions into one common cloud-based infrastructure. Now, sensors capture the operating conditions of critical equipment, such as vibrations from ship engines, and communicate this data in real time to the company's global technology solution for failure analysis and predictive maintenance.[3]

The gathering and analysis of environmental and weather-pattern data in real time is another way in which big data can help mitigate risk. For example, organizations can receive alerts of potential weather impacts in time to shut down facilities operations, or pre-locate emergency response teams to minimize business disruption in advance of dangerous storms.

Big data can help mitigate security risks, as well. A US Department of Energy national laboratory implemented an advanced security and covert surveillance system that captures and analyzes huge volumes of data—such as thermal imaging and vehicle vibrations—in real time to provide unprecedented detection, classification, location, tracking and deterrence of potential threats.

Conclusion

The ability to effectively channel and analyze the massive amounts of data generated from today's smarter facilities and assets can generate real returns. In each of the use cases discussed in this paper, the organizations—including IBM itself—used IBM solutions with proven success. IBM solutions are designed not only to collect and manage big data from facilities and assets, but to programmatically use this data to drive automated corrective actions within transactional systems for facilities and asset management. IBM delivers facilities and asset management solutions equipped to harness the value of big data—and to transform your business.

For more information

To learn more about IBM solutions for facilities management, please contact your IBM representative or IBM Business Partner, or visit: **ibm.com**/internet-of-things/business-solutions/facilities-management

For more information on IBM enterprise asset management solutions, visit: **ibm.com**/internet-of-things/business-solutions/asset-management

Additionally, IBM Global Financing provides numerous payment options to help you acquire the technology you need to grow your business. We provide full lifecycle management of IT products and services, from acquisition to disposition. For more information, visit: **ibm.com**/financing

Footnotes

1. Sunil Soares, “Not Your Type? Big Data Matchmaker On Five Data Types You Need To Explore Today,” *Dataversity*, June 2, 2012. http://www.dataversity.net/not-your-type-big-data-matchmaker-on-five-data-types-you-need-to-explore-today/

2. For the complete case study, view video: http://www.youtube.com/watch?v=Yd2fM1exP7I

3. For the complete case study, view video: http://www.youtube.com/watch?v=8qceRpGcGUg

Software Group
Route 100
Somers, NY 10589

Produced in the United States of America
December 2017

TIW14160-USEN-01

Please Recycle

Watson IoT™