Smart Technologies Provide Big Opportunities

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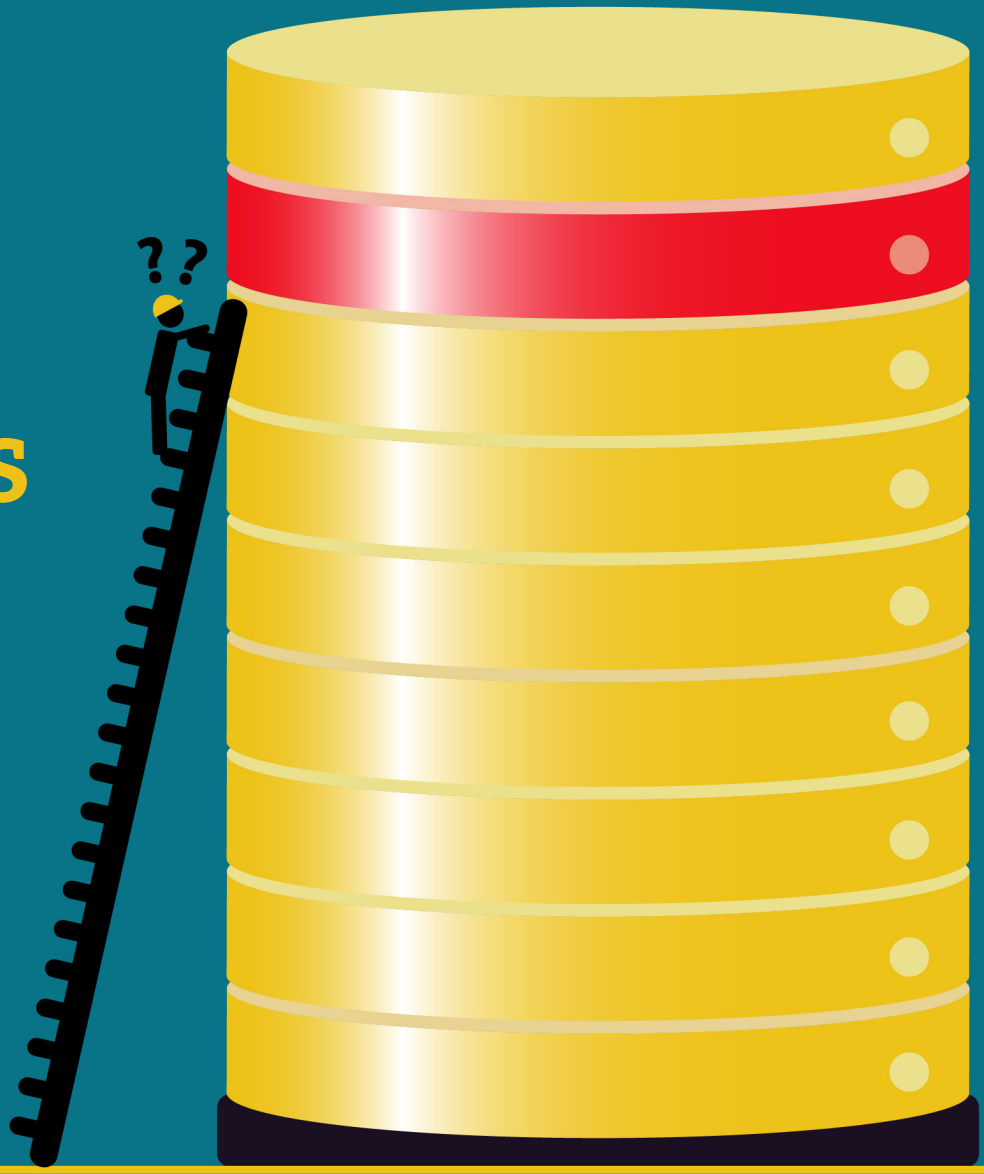
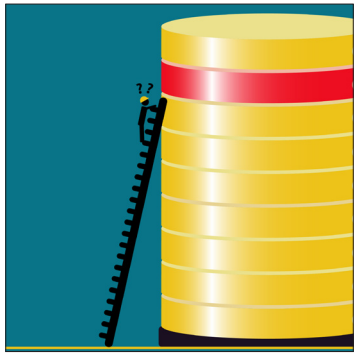


NATIONAL ASSOCIATION OF ELECTRICAL DISTRIBUTORS

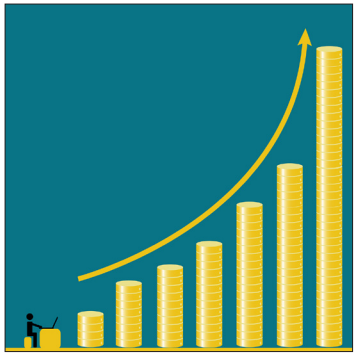
What is Big Data Analytics?

It is the ability or need to process data with:



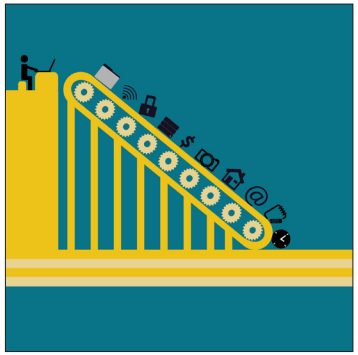
Volume

The quantities of data are significant and require unique approaches.



Velocity

The speed of data processed allows it to be used in real time.



Variety

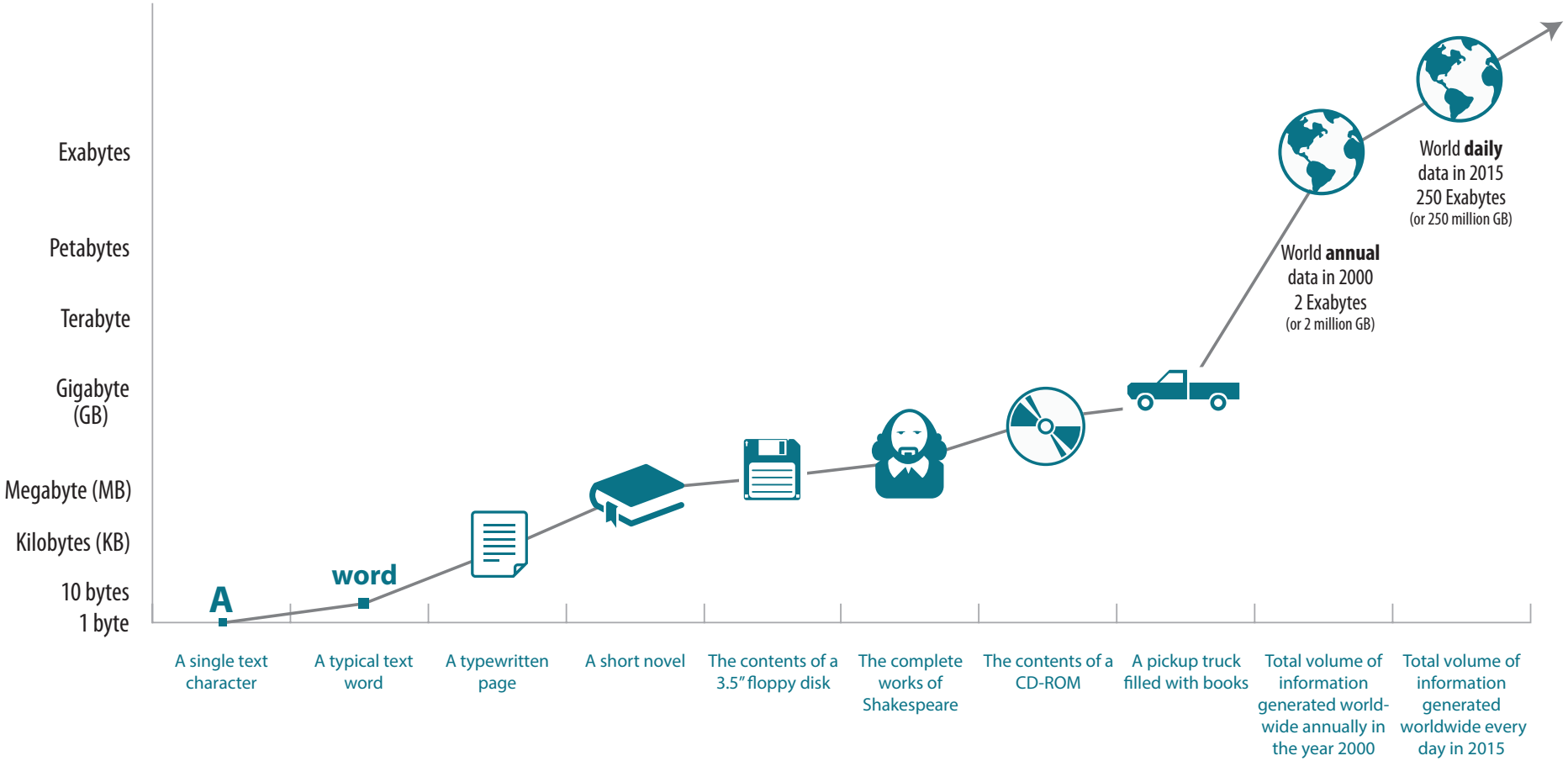
The types of data vary in time and context, and it is not a fixed data model.

Analytics

Many statistical techniques are used simultaneously to gain insight from data helping businesses make better decisions.

(Pearson 2014)

Why is it called Big Data?

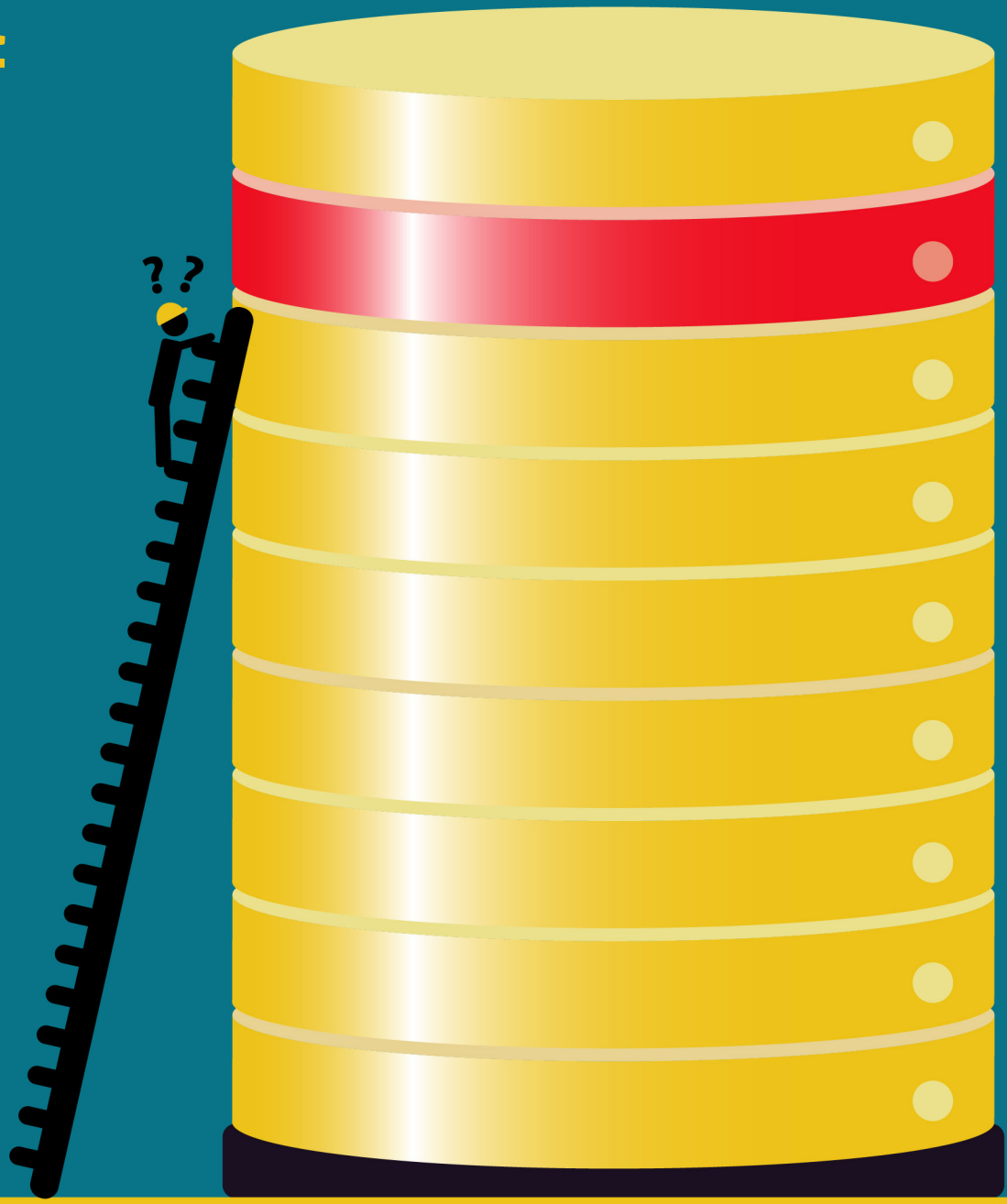


The volume of data stored is significant.

(University of California 2000)

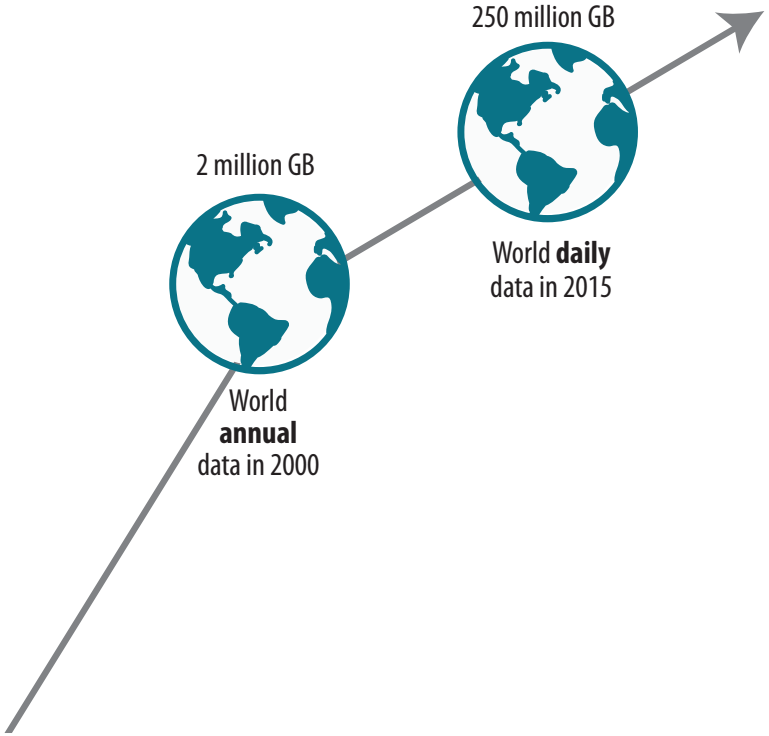
VOLUMES of Opportunity

Sanjay Agarwal, principal of Deloitte Consulting, says "Supply chain analysis is an untapped opportunity for many organizations that have data at their disposal but lack either the tools or the knowledge to exploit it," notes Agarwal. "Our experience shows that manufacturing companies can realize a margin improvement of 2 to 4 percent by applying more analysis to the data they already have." Big data, properly analyzed, says Agarwal, can help companies to employ parametric pricing, predict commodities volatility, and mediate any issues that arise from merger and acquisition integration. (Vasan 2015)



Why is it called Big Data? (cont.)

"Every day, we create 2.5 quintillion (2.5×10^{17}) bytes of data—so much that 90% of the data in the world today has been created in the last two years alone. This data comes from everywhere: sensors used to gather climate information, posts to social media sites, digital pictures and videos, purchase transaction records, and cell phone GPS signals to name a few. This data is big data." – IBM



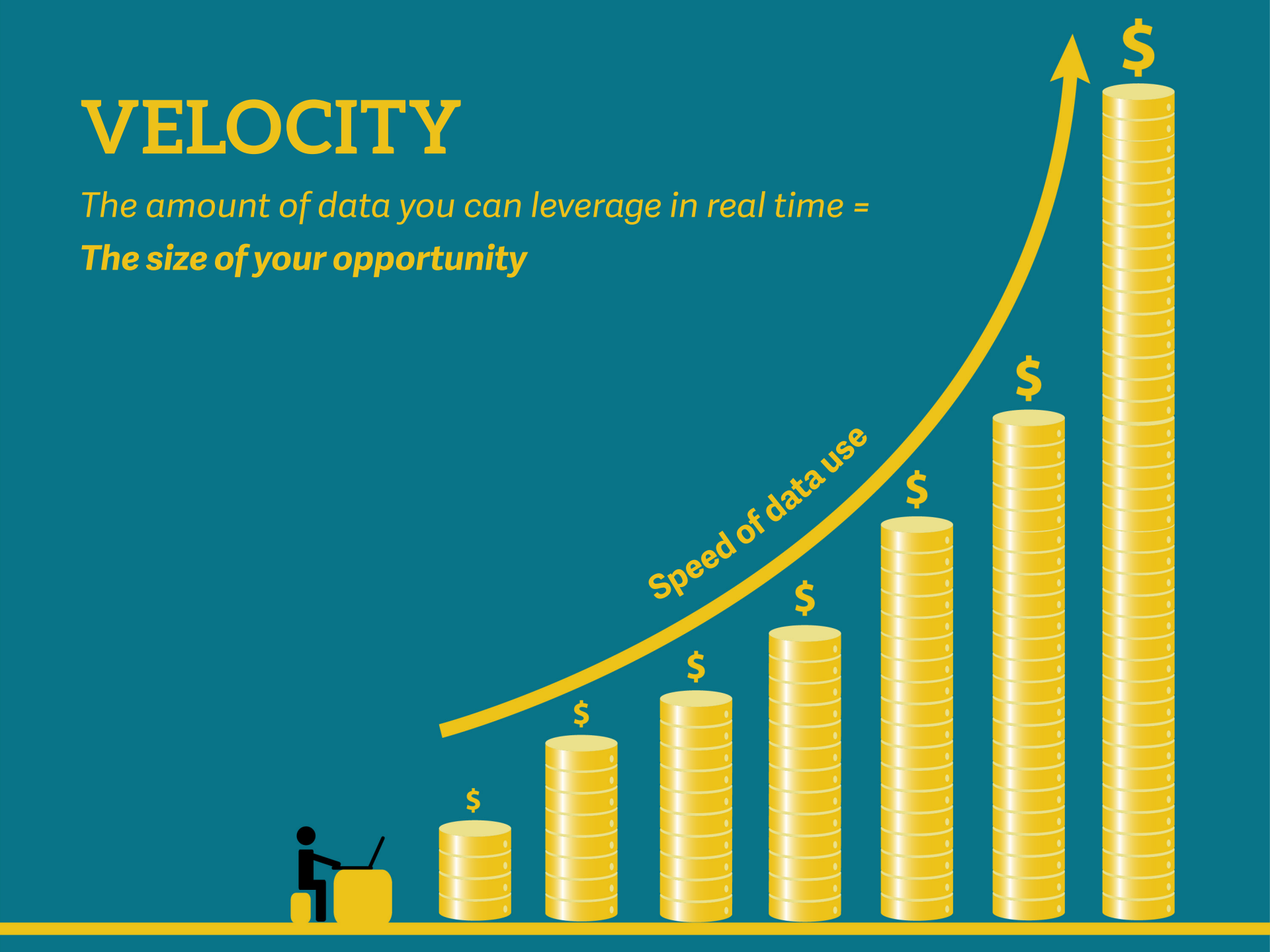
The speed of data generation is increasing.

(University of California 2000)

VELOCITY

The amount of data you can leverage in real time =

The size of your opportunity

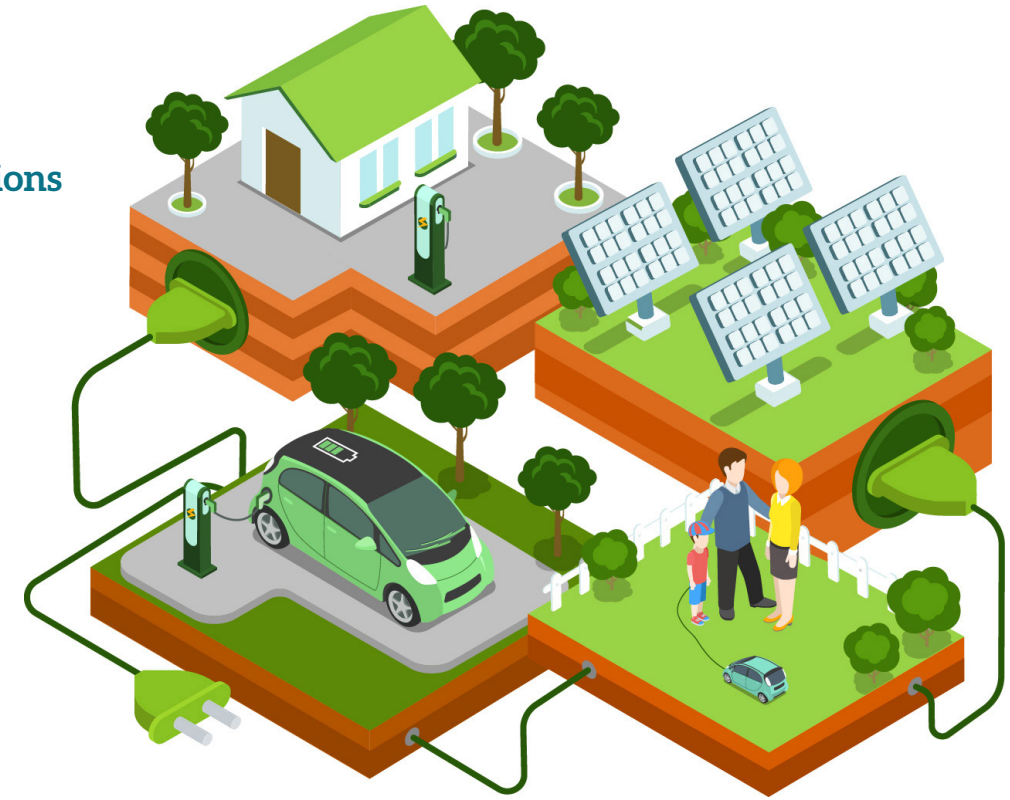


Big Data is collected from a VARIETY of smart sources

Smart Metering Opportunities

Photovoltaic Installations
Monitoring and optimization of performance in solar energy plants.

Energy Use
Energy consumption monitoring to obtain advice on how to save cost and resources.



Smart Grid
Energy consumption monitoring and management.

Remote Control Appliances
Switching on and off remotely appliances to avoid accidents and save energy.

Smart Lighting
Intelligent and weather adaptive lighting in street lights.

Intrusion Detection Systems
Detection of windows and doors openings and violations to prevent intruders.

(Libelium)

Smart Logistics Opportunities

M2M Applications
Machine auto-diagnosis and assets control.

Vehicle Auto-diagnosis
Information collection to send real time alarms in emergencies or to provide advice to drivers.

Smart Roads
Intelligent Highways with warning messages and diversions according to climate conditions and unexpected events like accidents or traffic jams.

Fleet Tracking
Control of routes followed to maximize efficiency or to maintain security.

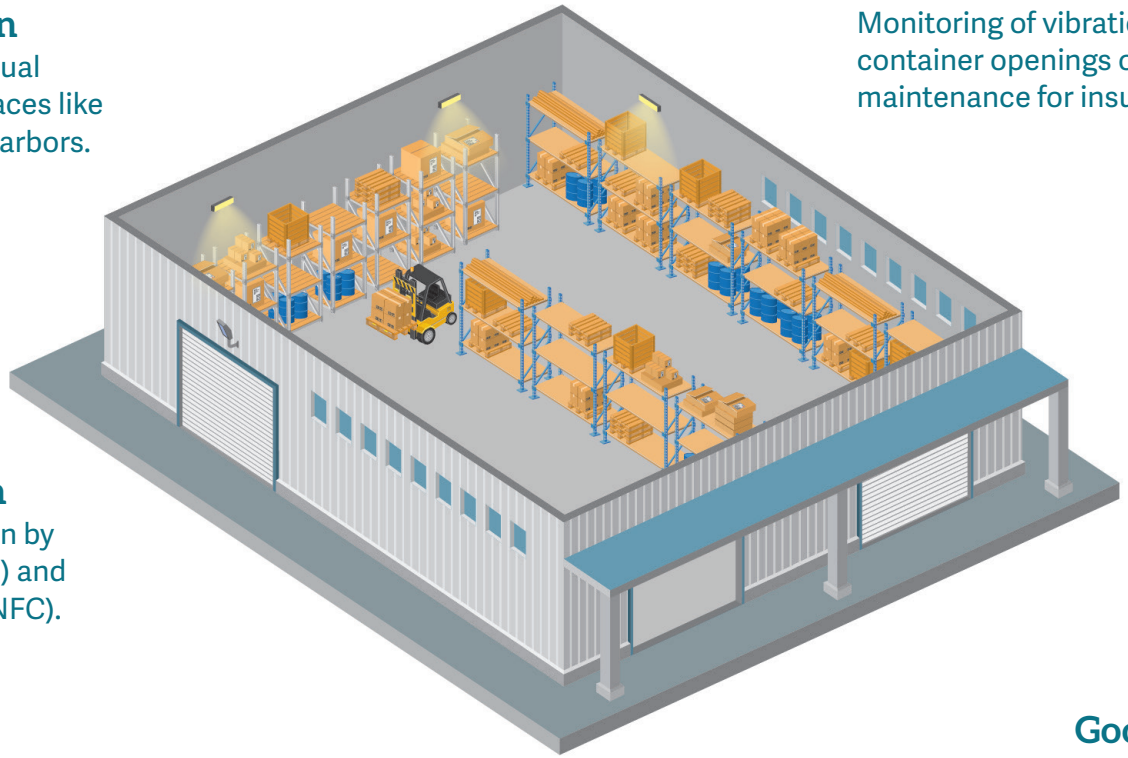
Supply Chain Control
Monitoring of storage conditions along the supply chain and product tracking for traceability purposes.

(Libelium)

Smart Warehouse Opportunities

Item Location
Search of individual items in big surfaces like warehouses or harbors.

Quality of Shipment Conditions
Monitoring of vibrations, strokes, container openings or cold chain maintenance for insurance purposes.



Intelligent Shopping Application
Getting data in the point of sale according to customer habits, preferences, presence of allergic components for them or expiring dates.

Indoor Location
Asset indoor location by using active (ZigBee) and passive tags (RFID/NFC).

Goods Preservation
Monitoring of conditions inside warehouses.

Storage Incompatibility Detection
Warning emission on containers storing flammable goods close to others containing explosive material.

Smart Product Management
Control of rotation of products in shelves and warehouses to automate restocking processes.

(Libelium)

Smart Lighting/Controls Opportunities

GE's intelligent LEDs are a gateway to city-changing technology, with sensors, controls, wireless transmitters and microprocessors built within the LED system.

Predix, GE's software platform for the Industrial Internet, collects and analyzes data from these components, delivering optimized tools that respond to city challenges.

Environmental

Cities can monitor air quality and ground conditions to understand trends better and take action when needed to benefit the lives of citizens.

Smart Parking

Monitoring of parking space availability in the city.

Traffic Congestion

Monitoring of vehicles and pedestrian levels to optimize driving routes.

Emergency Response

Emergency responders can be given data about an incident, maximizing their understanding of a situation and response time.

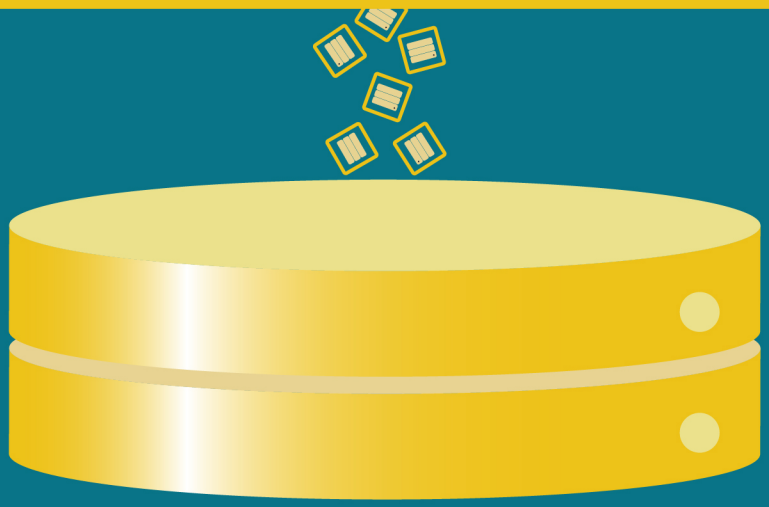
Advanced Lighting Controls

Cities can control maintenance costs and light output to save time and money while optimizing lighting conditions based on each block's needs.

(GE 2005; Libelium)

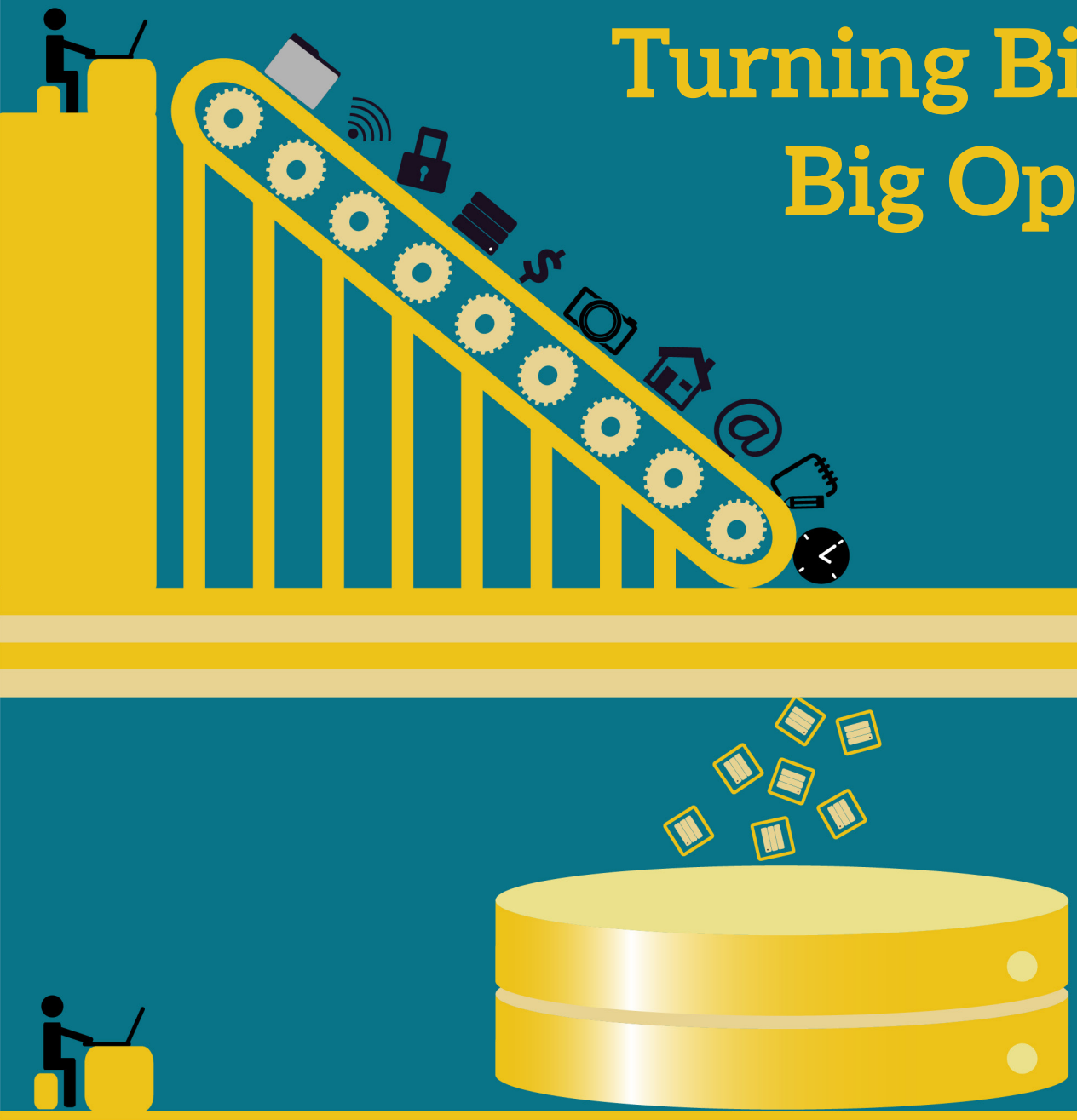
Big Data and ANALYTICS

The process of examining and exploring large amounts and different types of data to uncover any trends or patterns that may help with business decisions and strategies.



The analysis of data can reveal important information about operations, trends, and customers.

Turning Big Data into Big Opportunities



Big Data is Changing the Customer Experience

There is exponential growth in data volumes—that is, "Big Data"— available to companies in almost every industrial sector. For example:

- The ability to add sensors and data collection mechanisms to industrial equipment.
- The Internet of Things, which provides more data about equipment, products, factories, supply chains and more.
- The growing technology capabilities in the area of analytics—the ability to mine and analyze data for insights into the status of equipment as part of Asset Performance Management (APM).
- The ability to predict breakdowns or other kinds of occurrences that impact operations.

The resulting sum of those parts gives you the Industrial Internet—the tight integration of the physical and digital worlds. The Industrial Internet enables companies to use sensors, software, machine-to-machine learning and other technologies to gather and analyze data from physical objects or other large data streams.

Companies are already using these analyses to manage operations and in some cases to offer new, value-added services.

(GE 2015)

Can product-service hybrids be used in the electrical distribution industry?

Begin by asking:

- What product-service hybrids, beyond remote monitoring and predictive asset maintenance, resonate with our customers and our customers' customers?
- What product, service and value can we deliver to clients?
- How prepared are we to accelerate our move toward a services-and-solutions business model?
- How do we develop and add the talent we need to be successful?

Follow up by asking:

- Which companies are also trying to reach my customers and my customers' customers?
- What other products and services will talk to mine, and who will make, operate and service them? What capabilities and information does my company have that they need?
- How can we use this ecosystem to extend the reach and scope of our products and services through the Industrial Internet?

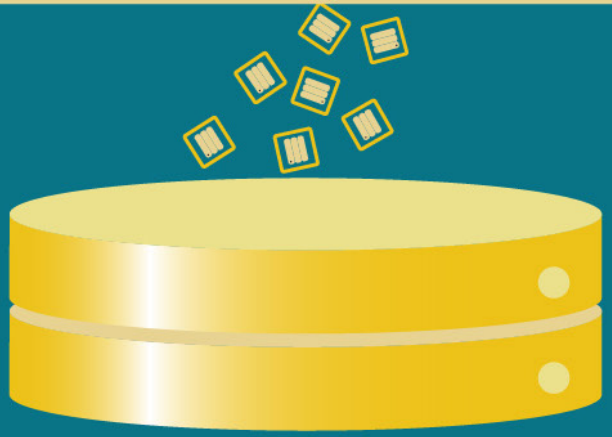
(GE 2015)

Value-Added Services for the 21st Century Distributor

Traditional Products

+

Digital Services



Product-Service Hybrids

What are Product-Service Hybrids?

- Digital services are offerings that combine information, transactional and professional digital services.
- Product-service hybrids are connected, intelligent physical goods capable of producing data for use in digital services.
- When a company sells products, your customers tend to interact with you only when they want to fix or prevent problems.
- You sell services and gain multiple opportunities to create customer touch points, build trust and establish customer loyalty.
- These digital services will also enable firms in resource-extracting and process industries to make better decisions, enjoy better visibility along the value chain and improve productivity in other ways.

Big Data = Big Opportunities

Product-Service Hybrids

- Digital services based on Big Data analytics capabilities represent an important opportunity.
- Some companies are already converting products into product-service hybrids—intelligent physical goods capable of producing data for use in digital services.
- These services enable companies to create hybrid business models, combining the benefits of operational efficiency with recurring income streams from digital services.

(GE 2015)

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MORE ON HOW JACKSONVILLE, FL AND SAN DIEGO, CA WILL UTILIZE THIS TECHNOLOGY

Jacksonville Pilot

- In addition to piloting the intelligent-city enabling solution, the city will also pilot LightGrid™, a wireless controls technology, which will provide significant energy savings to the city. LightGrid allows for more efficient management of streetlights. With remote monitoring and GPS mapping, municipalities are able to instantly identify usage and performance of street lights within specific locations.
- The City of Jacksonville has utilized public-private partnerships under Mayor Brown to leverage public- and private-sector resources to improve the quality of life in Jacksonville. Past projects include redevelopment in the Downtown area, collaborations to activate increased exporting and Downtown investment, and support for resiliency and emergency preparedness.
- Read more about the Jacksonville announcement at www.coj.net.

San Diego Pilot

- The first-in-the-nation pilot in San Diego adds sensor technology to existing GE smart LED streetlights, with a focus on parking solutions in its urban core.
- San Diego Mayor Faulconer said, "San Diego has proven that intelligent infrastructure saves energy and taxpayer dollars. We believe that this collaboration will help us go further in creating truly intelligent infrastructure that helps us improve services to the public."
- In 2014, San Diego became the first U.S. city to widely use GE's LED lighting fixtures with LightGrid™ outdoor wireless controls technology. The technology, deployed on more than 3,000 city street lights, saves the city more than $350,000 annually in energy and maintenance costs.
- Read more about the San Diego announcement at www.sandiego.gov.

http://pressroom.gelighting.com/news/ge-announces-programs-for-intelligent-cities-on-both-u-s-coasts-as-it-pilots-new-connected-led-solution#.VT-RQiFViko

How Big Data and New Technology can Increase Efficiency on City-wide Scale

EXAMPLE FROM GE LIGHTING:

Cities on both U.S. coasts will soon begin piloting new GE technology designed to help them become more intelligent and efficient. San Diego, Calif. and Jacksonville, Fla., will both be trialing a new GE LED solution, which uses LED street lighting installations to connect, collect and analyze data being generated, harnessing the power of the Industrial Internet to help their city run better while providing new services and conveniences for residents and visitors.

- By re-purposing street lights with LEDs containing sensors, controls, wireless transmitters and microprocessors, a city will be able to create new opportunities for reducing cost, optimizing their operations and creating value-added services for residents, making their cities even more livable and workable.
- Driven by Predix*, GE's innovative software platform that connects machines, data and people to help improve asset performance management, the intelligent-cities enabling technology will provide a platform for the future development of intelligent applications that will deliver efficiency for the city and convenience for citizens.
- The potential opportunities are truly endless, giving a city access to real-time data that never existed before.
- For instance, parking downtown may be a pain, but not in the intelligent city of the future. Networked LED street lights will have the ability to direct drivers to available spaces with the help of built-in sensors and wireless transceivers.
- The same streetlight could serve as a sensor and give warnings in the event of a hurricane or other event through a public-address speaker concealed within the light post. In another scenario, microprocessors and other sensors could work together to give emergency responders real-time views of an area as they are responding to a 9-1-1 call before they even arrive on scene.
- These features are examples of what could be driven through this solution in the future.

EAST CLEVELAND, Ohio—April 16, 2015

http://pressroom.gelighting.com/news/ge-announces-programs-for-intelligent-cities-on-both-u-s-coasts-as-it-pilots-new-connected-led-solution#.VT-RQiFViko

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