ALTIZON
CONNECT. PROCESS. LEARN FOREVER.

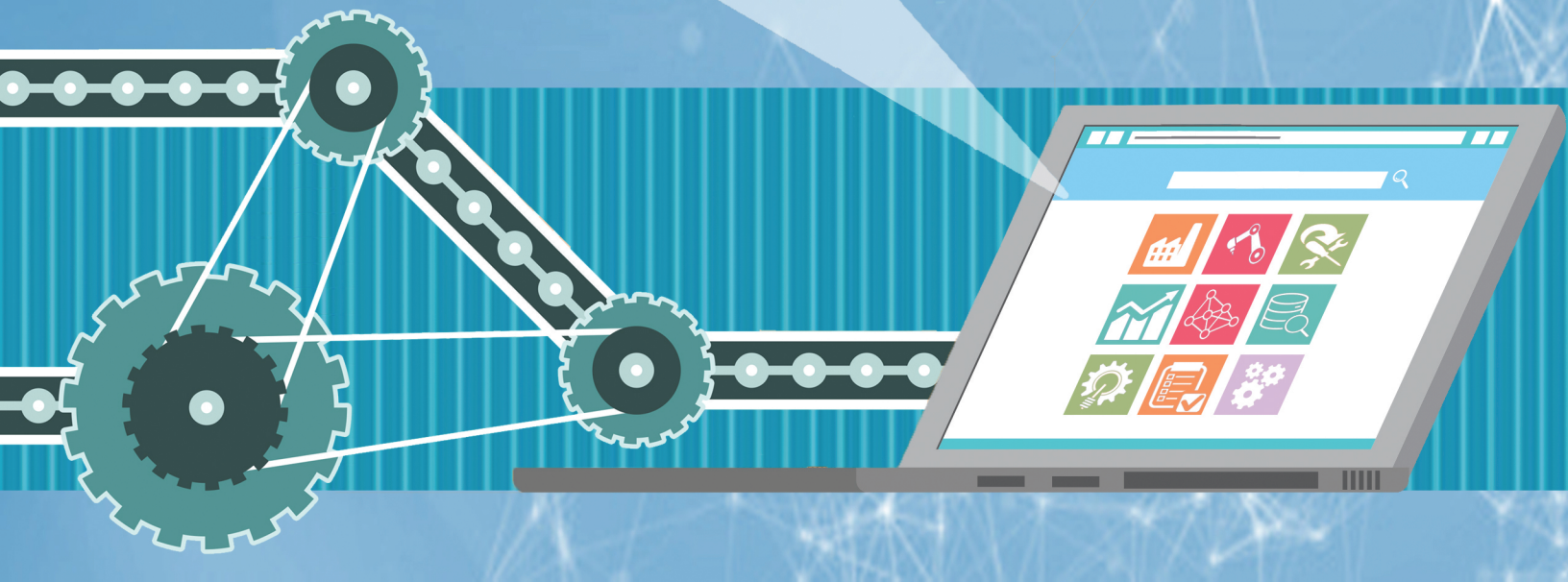
Smart Manufacturing

Smart Grid

Smart City

SMART MANUFACTURING |
Shop-floor Manufacturing Intelligence

Internet of Things (IoT) has emerged as a concept to use existing communication technologies, such as local wireless networks, PLC, DCS, Scada and the Internet to ensure visibility of **any'thing'** from **anywhere** and at **any time**. In the course of journey to **Operational Excellence**, the time for transforming the manufacturing enterprise is now...



How is IoT changing manufacturing?

In order to stay competitive in today's global market, manufacturing companies increasingly need to operate in more efficient and more cost effective ways. Lack of visibility into real time or even near real time shop floor data is a key challenge for manufacturers globally.

To ensure **improved 'Productivity', machine utilization, visibility in shop floor to top floor data**, **predictable production operations, flexible production, shorten processing times**, and **reduce time-to market**, it is critical to understand how to leverage information technologies and integrate it with the existing systems/processes to drive long term efficiency.

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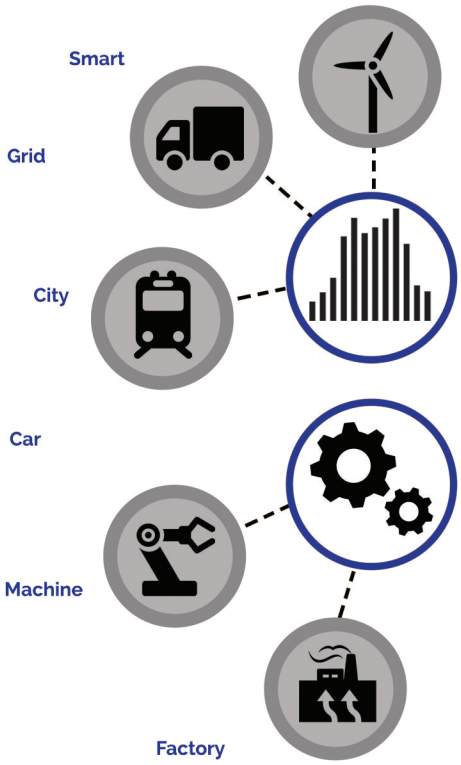
Figure 1.1: Industrial Internet of Things



IoT has opened up a world of possibilities in virtually every Industry - Wearables, Connected Cars, Connected Homes, Connected Cities, Industrial Internet, Transportation, Oil & Gas, and Healthcare & Agriculture.

Given this vast IoT Landscape, the substantial productivity leap with the surge of growth and surge of innovation is with **IIoT** (Industrial IoT).

Industrial IoT – Manufacturing, Oil & Gas

Manufacturing: Real Time Analytics, Factory Automation, Robotics, Supply Chain Efficiency, Customized Solutions for Asset Management, Smart Sensors, and Data Collection.

Utilities: Smart meters-energy and fuel consumption for home, smart grid

According to an **IDC 2015 Report**, the manufacturers will increasingly invest in IoT due to the following:

1. **Complex, dynamic value chains** : Manufacturers participate in and manage complex, overlapping value chains, with frequent change, as they seek new opportunities around the globe.

2. **Emerging market growth** : Manufacturers continue to reshape supply chains and product strategies to support emerging market growth sourced from and manufactured in emerging regions and local markets.

3. **Traceability, transparency, brand and reputation** : Manufactuers will use increased traceability and transparency to strengthen their ability to deliver product quality and protect thei reputations.

4. **Demanding customers** : Manufacturers are compressing business cycles to meet customers' increasing requirements for personalized products and higher levels of service.

5. **Converging technologies for manufacturing** : Technologies —operational technology (OT) and information technology (IT), including IoT — are mandatry for manufacturers to design, manufacture, and deliver their products.

6. **Ubiquitous connectivity** : Connectivity is ubiquitous — in devies, interfaces, processes and extends to the edge, with manufacturers assuming that the communication infrastructure will keep up.

7. **Truth in data** : Manufacturers are looking for the truth in data as they seek more valuable analysis of greater volumes and variety of data and the information that will bring them closer to digital execution.

(Source: IDC Report on 'Transforming Manufacturing with the Internet of Things' May 2015 Issue)

Given the scope, IoT has created an inflection point and is poised off for bigger things. Factories and plants that will be connected to the Internet will be more efficient, productive and smarter than their non-connected counterparts.

The key business objective with this Industrial revolution will be to **maximize operational performance** by connecting machines, autonomous sensor-actuator components and systems/devices to **create intelligent networks**.

Business Challenges

IOT is set to transform the **shop-floor/ factory transaction** reporting and will enable manufacturing companies achieve higher Productivity by connecting Shop-Floor to the Top Floor through Real Time Monitoring and Reporting of Machine Performance, Productivity, Downtimes, Production output, etc.

Today, the Shop-Floor is **still isolated** from the rest of the IT network in the organization. Due to this, the most crucial Shop-Floor data on Production Quantity and Man-machine Utilization, etc. is manually collected and compiled, that is made available the next day, and is **often inaccurate or doctored, resulting in poor decision making**.

Challenge:

CXOs are unable to monitor progress of productivity initiatives and processes. The complexity increases when there are diverse machines with mix of new and legacy technologies that are critical for any IT enablement on the machines.

Solution:

IOT is going to change all of the above, by connecting the machines to capture data in real time and Generate Reports on critical parameters like Hourly Parts Count, Machine Down Time, Total Predictive Maintenance (TPM) parameters like – OEE, Machine Availability, Performance Efficiency, Quality Rate, and Maintenance Reports like – Downtime, Mean Time Between Failures (MTBF), Mean Time to Repair (MTTR), etc.

However, to drive consumer insights and take advantage of the efficiencies and new business opportunities enabled by IoT, the enterprises need to look beyond conventional and traditional human machine interface (HMI) devices and supervisory control and data acquisition (SCADA) systems.

With the existing systems/processes, the key pressures for manufacturers are:

(1) Improving the **Productivity** – to achieve the desired impact **(raised efficiencies and increased output)** and maintain a **productivity leap** corresponding to the potential of IoT enabled systems.

(2) Collecting and handling **myriad variety of data** standards at the shop floor level.

(3) Converting **raw shop floor data** into **meaningful** business information.

(4) Lack of **real time information** at plant level to analyse the parameters that affect the overall manufacturing process (OEE – Overall Equipment Effectiveness in general) and asset performance and in turn the efficiency of the plant.

(5) **Disparate systems** at the enterprise and shop floor, leading to information silos which negatively impacts the decision making and overall operations.

(6) Documentation, tracking and auditing to ensure **quality and regulatory compliance**.

(7) Need to **reduce the operating costs**, lower total cost of ownership, workforce skill gaps and overall enterprise risk management.

As such with the pressing need for a new manufacturing paradigm, these challenges reinforce the solution for the **IoT enabled Smart Manufacturing processes**.

IoT can drive the digital transformation in the current production systems by connecting the shop floor systems and the enterprise systems. With the equipping technologies of minuscule sensors, actuators or transceivers; real time information can be gathered and processed. Further sensors use low power and low data rate connectivity.

With the IoT Platform, the shop floor data can then be directly collected in real time; from Programmable Logic Controllers (PLCs), Supervisory Control & Data Acquisition Sytems (SCADA) and Distributed Control Systems (DCS) across multiple plants with different equipments based on different technology with different controlling parameters expressed in different communication protocols.

And with this real-time sensor data, the manufacturers can:

1. Have the ability to remotely monitor and control manufacturing processes based on immediate or present requirements, thereby eliminating factors like running out of inventory and generating unwanted waste.

2. Access real-time information from the shop floor to monitor production performance, analyse production loss, measure Overall Equipment Efficiency (OEE), increase production throughput and improve manufacturing service levels.

3. Better prepare production systems to balance supply and demand fluctuations.

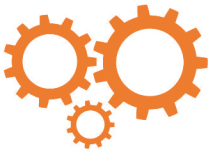
4. Shift from periodic reporting to real-time performance management.

5. Have a single source of truth for all shop floor data with improved visibility.

6. Plan and schedule to realistic equipment capacity and accordingly adjust operations in real-time.

7. Continuously improve through Manufacturing Intelligence - Consistently applying performance metrics across the entire Enterprise for driving long term sustainability.

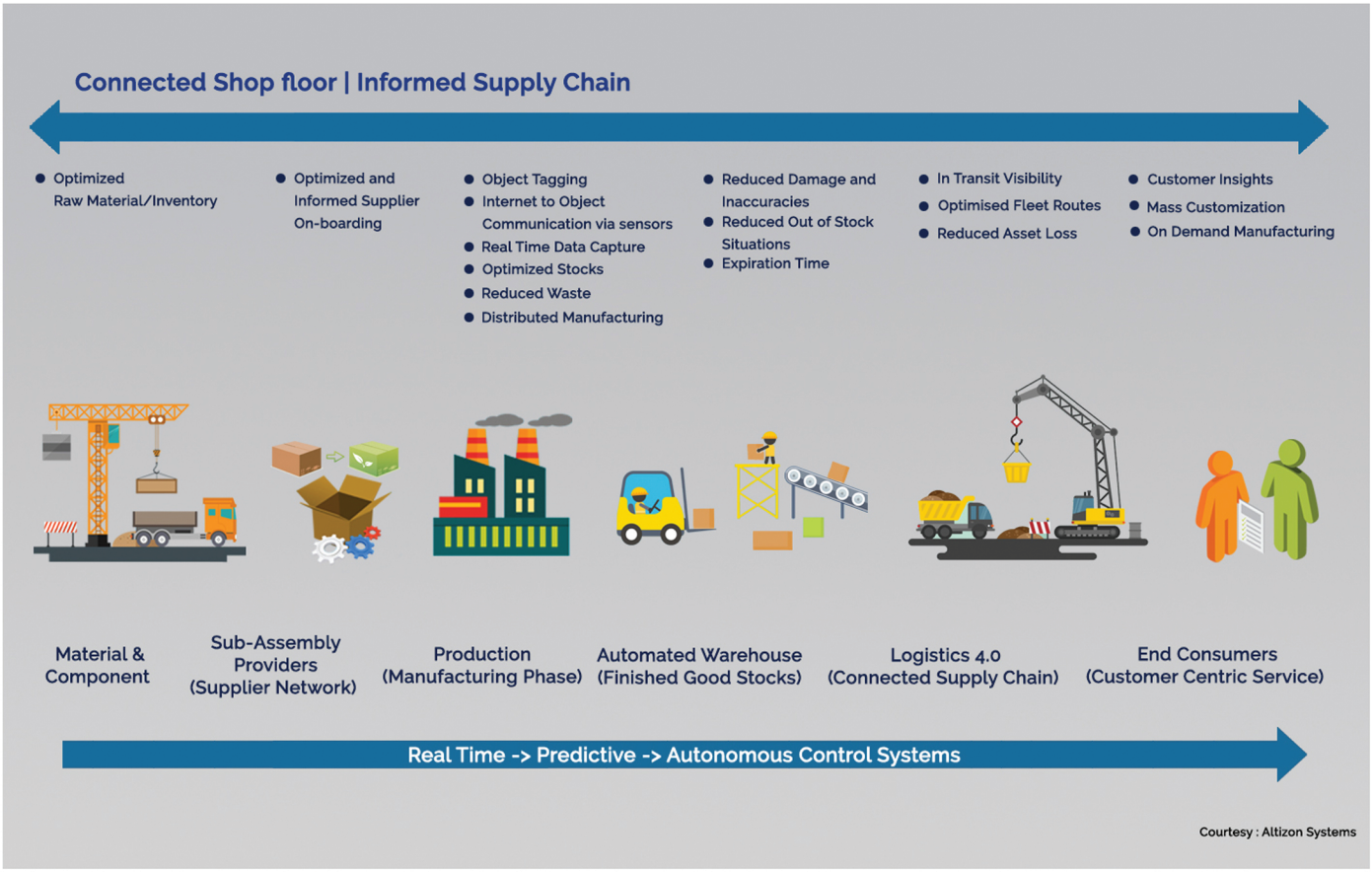
8. Built custom Reports and Dashboards for plant managers and other key stakeholders.



Value Drivers for Smart Manufacturing and Connected Supply Chain

With far greater possibilities for capturing and analysing information, the real value drivers for smart manufacturing (manufacturing 4.0 processes) can be divided into three groups based on information analysis and automation & control.

Figure 1.2 : Look of a Connected Shop floor



(A) Digital Transformation with IoT Driven Analytics

- Digital Democratization of Supply Chain
- Real Time Tracking of Material & Deliveries
- Optimized Pricing & Sourcing
- Predictive Maintenance
- Improved Asset Utilization
- Reduced Security Hazards at Workplace

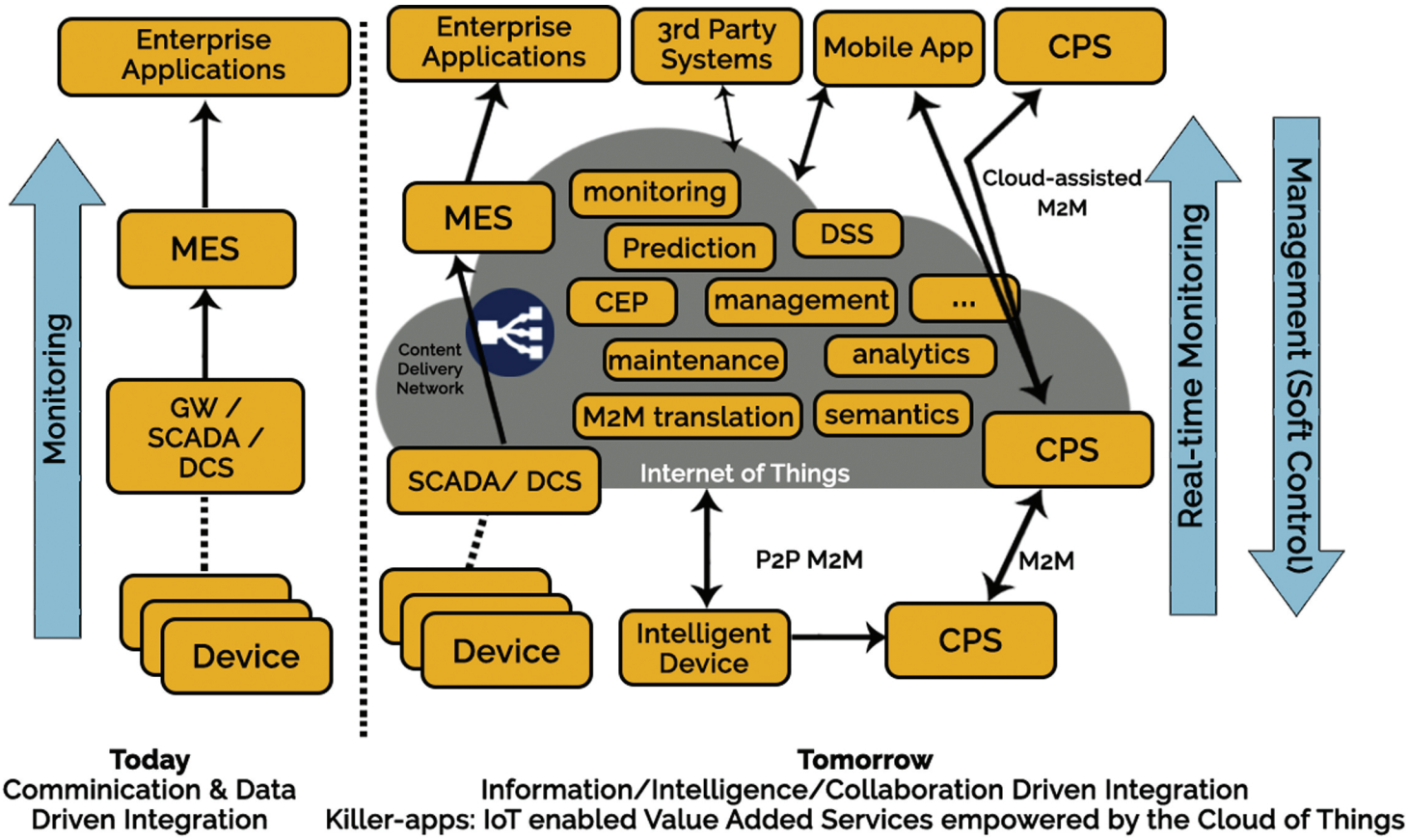
(B) From Forecast to Demand Driven Supply Chain

- Focus on Customer and Market
- Product Customisation
- Inventory Optimization
- Improved Working Capital Ratios

(C) Distributed Manufacturing

- Strategic Outsourcing
- Faster New Product/Service Introduction
- Optimized Logistics
- Virtually Connected Factories

Figure 1.3: The Internet of Things as an enabler for New Value Added Services and Apps



The Internet of Things as an enabler for new value added services & apps.

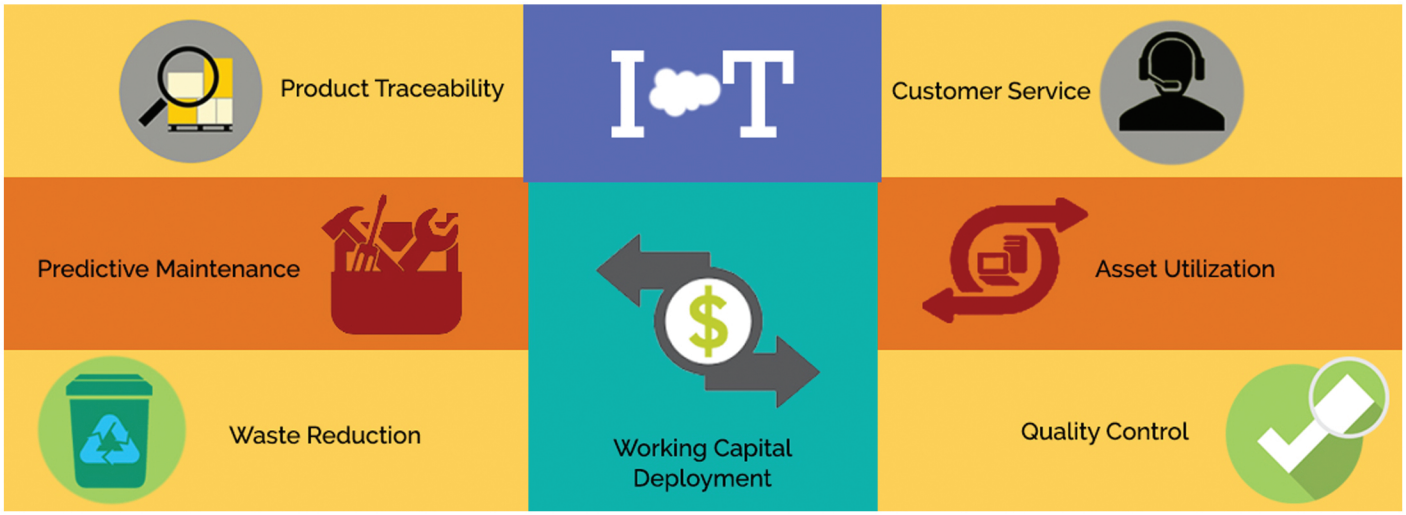
MES (Manufacturing Execution Systems)

(Source: From Machine-to-Machine to the Internet of Things: Introduction to a New Age of Intelligence.)

Real time communication between machines, factories, logistic providers and suppliers will help companies with improved **end-to-end supply chain visibility**

(1) Asset Utilization
(2) Predictive Maintenance
(3) Product Traceability
(4) Customer Service
(5) Working Capital Deployment
(6) Quality Control & Waste Reduction

Figure 1.4 : End-to-End Supply Chain Visibility



Looking Ahead

The adoption of **Industrial IoT (IIoT)** is indeed in its early phase. But with the potential and scope of New Business model enablement, Smart Connected products, Products as a Service, Remote Monitoring services and many more, IIoT will be an integral part of what the factory or production line of the future will look like.

With this future vision, IIoT will enable companies to move from **real-time control, to predictive control, and finally to autonomous control**. And the companies, which will fail to invest in IoT, will likely lose any competitive advantage and long term sustainability in this globally competitive market.

With the projected billion connected devices on the Internet of Things, in this course of journey to **Operational Excellence**, the time for transforming the manufacturing enterprise is now.

ABOUT ALTIZON

Recognized as **Gartner 2015 Cool Vendor** , Altizon is the **world's first Industrial Internet Platform** company focussed on making Enterprises Internet of Things(IoT) ready.

Our flagship product - the **Datonis IoT Platform**, helps you build your IoT product in weeks by providing device connectivity kits, a device management layer, a highly-scalable, real-time, big-data analytics engine and alerting and monitoring services.

Datonis easily integrates with your existing IT systems to provide a seamless transition between your IoT devices and your IT infrastructure management tools. Datonis is available both in a SaaS as well as in a Hosted model.

We help you build your smart connected devices with the

- **Most Comprehensive Support for Industry 4.0**
- **Industry leading Stream Analytics and Event Rule Engines**
- **Best DIY Enterprise Dashboards**
- **Go Mobile, Go Cloud solutions**
- **Enterprise grade Scalability and Security**

CONNECT EVERYTHING

Connect Seamlessly
Collect & Transfer Data Securely
Manage Devices

OWN YOUR DATA

Create visualizations
Build applications using API'S
LOB Integration

PROCESS EVERYTHING

Define structure
Get insights
Generate alerts & notifications
Store data securely

DEPLOY ANYWHERE

SaaS model
Cloud hosting & support
Private cloud/On-premise

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