Realize Industrial IoT

Transform data into positive business outcomes
Introduction

Ask a dozen manufacturing or industrial specialists to describe the internet of things (IoT), and you will likely get at least a dozen definitions — many of them focused on the granular interests of IT. That’s not surprising, given the still-emerging nature of this complex and technical environment.

Gartner offers a basic IoT definition: “The network of physical objects that contain embedded technology to communicate and sense or interact with their internal states or the external environment.” Others have described it as an informational network of intelligent devices and machines.

From an industrial perspective, a better definition of IoT might be taken from a higher-level business perspective. Industrial organizations have deployed devices and gathered data for decades. However, IoT involves transforming these solutions away from the structured hierarchy to effectively connect “things” to other manufacturing or enterprise systems, which will generate measurable business value.

In this viewpoint paper, DXC examines the forces driving the emerging IoT, its impact on manufacturing and other industrial firms, and how organizations can make the transition to a more connected, data-oriented environment.

A new industrial IoT vision

As with many still-emerging technologies, IoT may still engender a fair degree of uncertainty. Some confusion exists about precisely what it is and what it may promise, but at the most basic level, industrial IoT is about devices, connectivity, data and insights.

The introduction of computers and automation into manufacturing processes is considered the third generation of the industrial revolution. The next industrial revolution connects more devices and machines, creating intelligent networks of “things” that can communicate and cooperate with each other. This fourth industrial revolution is referred to as Industry 4.0. Existing data sources can be combined with other sources of information in real time, enabling quicker decisions and predicting failures before they happen. Tapping into this data is enabled by the industrial internet of things (IIoT).

IIoT enables organizations to generate insights and positive outcomes from that growing IoT ecosystem. IDC states that by 2020, IoT data will account for 10 percent — or 44 zettabytes — of the world’s data. Much of this data is collected, but not retained. Much of what is retained is not used and can provide valuable insights on trends and analytics. Acting on this data can be further automated through control mechanisms.

1 Gartner IT Glossary; The Internet of Things (IoT), http://www.gartner.com/it-glossary/?s=iot

Before you launch a major initiative, ask yourself these logical questions about the industrial internet of things (IIoT).

• What are your business challenges and opportunities — asset tracking, downtime, maintenance, process controls?
• What data do you collect today, and what other data would help improve your business?
• Do you have the infrastructure needed to integrate IIoT devices — including network, WiFi, computing and software?
• Do you have the needed application development and data management skills?
• Can you avoid point solutions that do not integrate or communicate well?
• Have you developed an overall IIoT strategy?
• How will you manage and secure this new IIoT infrastructure?
• Do you have a trusted partner with broad IIoT knowledge and experience?
Connected industry

Industrial automation is perhaps the most common and recognized use of industrial IoT capabilities. In the production- and manufacturing-oriented environment, web-capable technologies are used for process automation and robotics, predictive maintenance, condition monitoring, product testing and safety efforts, as well as the handling and analysis of materials.

Figure 1 illustrates the DXC Technology digital manufacturing model for use in an industrial setting, with information and control flows, and the opportunity for edge computing efficiencies. As shown here, deeper compute and analytic activities, for applications that are less time-sensitive, would typically remain in the traditional data center environment.

By leveraging today’s increasingly advanced analytic and data management technologies, industrial companies are using IoT systems for a number of higher-level business intelligence functions. These may include simulation modeling, inventory management, accelerated diagnostics, and remote plant and equipment diagnostics.

Some industrial companies are now using internet-enabled devices to support inventory management and workforce management, to customize activities across multiple locations, or to connect previously siloed business processes. Beyond the factory floor, networked technologies continue to be deployed across global supply chains and to support fleet and logistics management activities.
The edge advantage

There are significant advantages to be realized by analyzing at least some data closer to the operational centers of an industrial environment. Edge computing can help accelerate insights by shifting analytic capabilities from the data center to a location closer to the “action.”

For example, by processing data streams coming from an electrical turbine or transformer at or near the source, a utility can process and analyze that information in real time — and react more quickly to address an emergency or a developing problem. Thus, edge computing can measurably reduce data obsolescence and improve response-to-alert performance.

Steps to the IIoT

How can organizations best map and undertake the journey toward fully harnessing the power of the industrial IoT? DXC recommends a logical progression based on knowledge, transformation and long-term management.

Seek expertise

The first step, for most organizations, is to gain the specific knowledge needed to support a successful IIoT environment.

This process might begin with facilitated exercises designed to identify issues related to data, connectivity and analytics in the industrial setting. It may help to investigate and document specific processes, infrastructure challenges or application workloads in greater detail. During this exploratory phase, special attention should be given to aligning any eventual IIoT approach across functions and organizations.

The objective of this discovery phase should be to formulate what might be called an “IIoT roadmap” — a detailed set of policies, skills requirements and processes needed to monitor and manage an internet-enabled industrial environment.

*Purdue Enterprise Reference Architecture (PERA) 1990s reference model for enterprise architecture, developed by Theodore J. Williams and members of the Industry Purdue University Consortium
Start the journey

The digital transformation and the ability to harness this information (via integration) are creating a new class of business solutions. Legacy applications and structures that are running the plants today are the basis for IIoT-enabled solutions. The second, very important step involves understanding and aligning to initial scope, which will enable the application development and infrastructure planning needed. However, having the right building blocks (i.e., open standards, industry support, etc.) will be key for long-term success across the enterprise.

Application development and iteration efforts should focus on data acquisition, reporting and dashboard systems, edge analytics and mobile user solutions. The internet-driven industrial world also calls for new methods of managing and modeling data.

Infrastructure planning should address the need for new kinds of connectivity (including wireless, LAN and WAN systems), cloud computing and data centers. Hardware will quite often need to be resized, relocated or reconfigured. New types of web- and cloud-enabled monitoring and management tools may be needed in an IIoT setting.

Manage the future

The third step addresses the new kinds of infrastructure support needed to manage a more connected industrial operation.

Next-generation digital manufacturing applications will require next-generation methods for monitoring both information technologies and operational technologies — including sensors, networks and connectivity, and edge-oriented computing. Operating models for network support and security management will need to be updated and strengthened to ensure end-to-end integration.

The IIoT presents unique technical support demands, so organizations should consider the need for customer service desks, alert management and more complete field support requests. The management and reporting of SLAs may differ somewhat with the greater reliance on sensors, data and analytics in a production environment.

Conclusion

Sensors and data are now ubiquitous in the industrial setting, providing real-time information on processes, efficiency and safety-related activities. Yet all too few organizations are able to fully capture, manage and analyze those torrents of data — let alone translate that information into real insights or bottom-line business value.

To survive and prosper in the emerging digital economy, industrial firms must embrace and master the internet of things.
About DXC Technology

As a trusted partner for many organizations in the industrial sectors, DXC specializes in providing a broad spectrum of support for IIoT infrastructures. We offer expert advisory services, including data discovery workshops, security assessments and IIoT-specific planning.

DXC provides extensive transformational services, including application development and integration, analytics and data management, and network, edge and data transformational support. We also offer long-term management support, including security, applications support, and management of traditional and hybrid IT environments.

As the largest pure-play integrator, DXC has forged the partnerships needed in the digital future. We work with customers and solution providers to decide which functionality is available for a site, region, enterprise or external marketplace. Our domain expertise and ability to introduce new capabilities are key to the client’s success.

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