Implementing and Executing Your Internet of Things Strategy: A Gartner Trend Insight Report

Published: 1 December 2017 **ID:** G00344359

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IoT is the foundation on which digital businesses are built. We examine three challenges that organizations must address early in their IoT transformation: developing stakeholder confidence, choosing the right technical strategy and executing that strategy.

Opportunities and Challenges

- Internet of Things (IoT) solutions are organizationally and technically complex, requiring new partnerships across IT, operational technology, business and support groups. IoT also involves cross-adoption of new technologies into these groups.
- Stakeholder concerns regarding execution and operation of these solutions impact adoption. Establishing IoT leadership requires innovators to identify and proactively address these concerns.
- The majority of IoT innovations involve existing "brownfield" business operations. Thus, instead of being isolated to the innovations themselves, execution failures also disrupt existing core business functions. Effective execution, operation and maintenance must be addressed prior to IoT deployment, and will be costly to address once IoT is in production.

What You Need to Know

- IoT innovations modify or create functions vital to customer service and operations. Such innovations often involve expensive and unique assets for which there are no nonproduction or test versions. Teams must carefully manage these changes to the organization's processes, products and services.
- IoT projects pierce organizational silos. They involve new partnerships spanning IT, business groups and operational technology teams. Therefore, these projects require a center of excellence (COE) to align the organization and to drive realistic IoT expectations.
- In order to operate effectively, the IoT COE must have executive sponsorship, a clear mandate and broad organizational representation. Gartner recommends that leadership appoint and empower an IoT architect to develop and drive IoT technical strategy.

Insight From the Analyst

Inspire Stakeholder Confidence in Your Ability to Lead, Execute and Deliver IoT

Erik T. Heidt, Research Vice President

The rise of the IoT places IT in a difficult position. Business units and stakeholders demand IoT solutions, often before understanding the mechanics of IoT value creation. IT is then asked to present both a cogent and an insightful pathway that drives business value, fosters innovation and incurs a low execution risk.

Unlike other new technologies, the adoption of IoT modifies and enhances existing services and products, which are already essential to the organization and its customers.

Previous Gartner research collections have shown how business IoT plans are moving through the early phases of design to reality. However, complexity and lack of organizational experience are making the path to innovation a long one.

In this collection, we feature research that proactively addresses those complexities, to help you accelerate IoT implementation. This set of research focuses on three key themes underlying successful IoT transformation:

- **Establish Leadership:** Inspiring confidence in IT's ability to execute IoT is imperative.
- **Design for Success:** IoT is high-stakes because it both modifies existing business processes and exposes them to new operational and security risks.
- **Execute Effectively:** Planning may increase stakeholder confidence, but value is created only by effective execution.

Regards,

Erik T. Heidt

Executive Overview

Definition

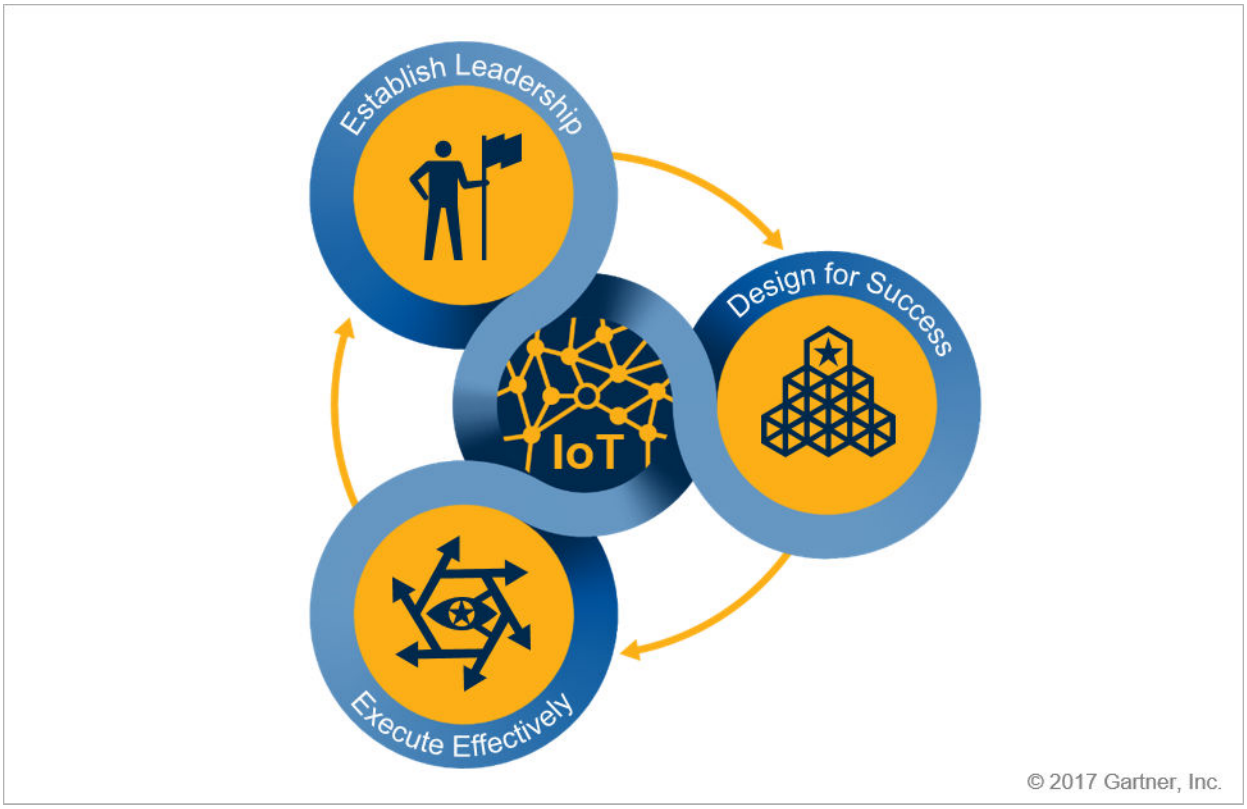
"How can my business generate value from IoT?" is a common question from business leaders trying to understand IoT hype versus opportunity. In response, IT is trying to demonstrate how to deliver IoT.

> The Internet of Things is a network of dedicated physical objects ("things") that contain embedded technology to sense or interact with their internal state or external environment.

The desire for IoT success comes from the prospect of tantalizing new synergies between digital business strategies and the physical world. Data is at the heart of IoT value. Organizations can analyze data from customer or consumer "things" to gain insights into real-world activities. In turn, these insights can inform strategies for improving or adapting the business to meet real-world needs.

Further, IoT can provide benefits through its own ability to communicate and act. IoT can issue alerts to help change plans, reorder stock or initiate physical-world actions. These capabilities align with the primary business needs to improve efficiency and reduce cost, while creating new business services (see Figure 1).

Figure 1. The Three Themes Underlying Successful IoT Transformation



Source: Gartner (December 2017)

Research Highlights

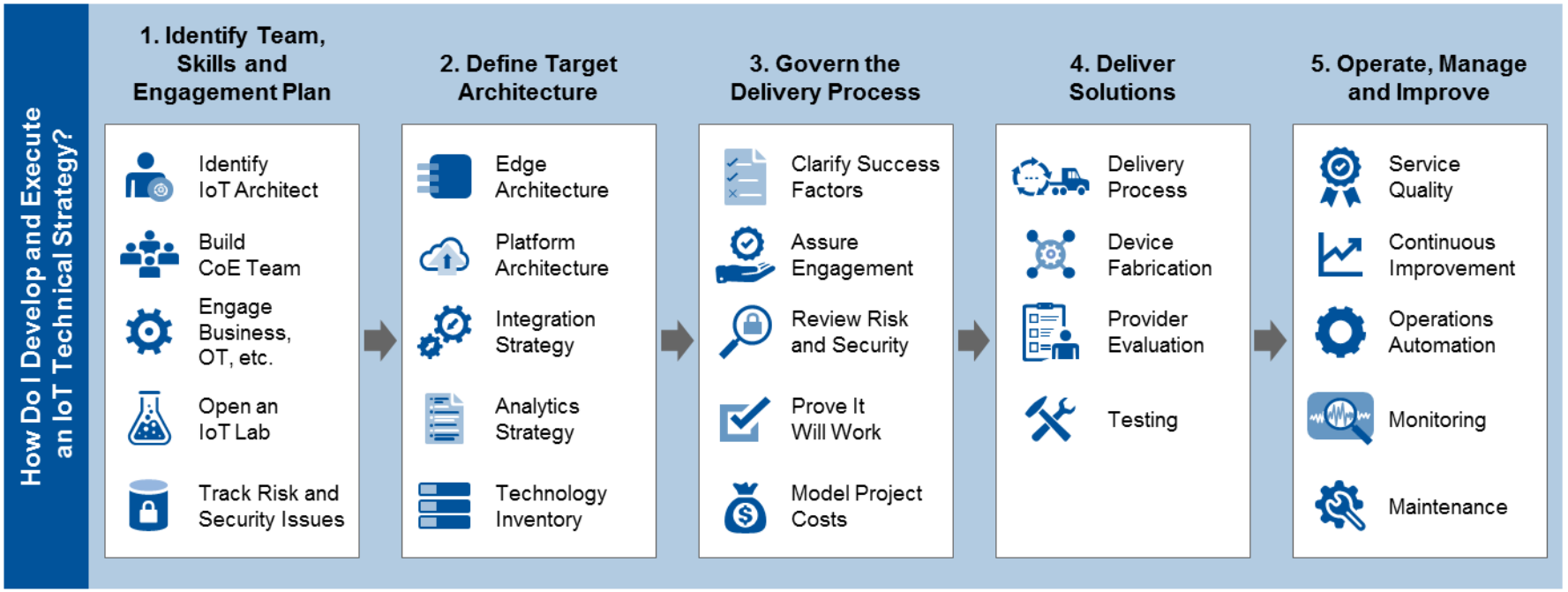
Establish Leadership

IoT solutions modify core processes and critical business functions. When mobile or cloud were adopted, organizations could choose pilot projects that were failure-tolerant and additive to business services. By contrast, IoT solutions often modify uptime-critical assets, such as smart infrastructure, power grids, assembly lines and fleets of vehicles, where outages are not just embarrassing but also costly.

> IoT innovations modify or create functions vital to customer service and operations — often involving expensive and unique assets for which there are no nonproduction or test versions.

IoT innovators must take a proactive approach in addressing stakeholder and executive concerns. Business risks associated with IoT innovation must be firmly addressed. IoT leaders must not only possess a clear understanding of business opportunities and risks, but also articulate how these issues will be addressed in the adoption and implementation strategy. Our recommended process of developing and executing an IoT technical strategy includes the key steps needed to address this priority (see Figure 2).

Figure 2. Five Steps to an IoT Technical Strategy



Source: Gartner (December 2017)

It is vital to understand that IoT projects pierce organizational silos. IoT has organizational change embedded within it. Operational technology, business and IT groups have to work together not only during the creation of IoT solutions, but also throughout the entire operational life of those solutions.

Related Research

"Solution Path for Developing an Internet of Things Strategy" highlights how IoT demands a technical strategy that enables organizations to implement a portfolio of IoT solutions. This report provides technical professionals with the details needed to create long-term, sustainable adoption strategies, develop target architecture, and execute on multiple IoT opportunities.

"How an IoT Center of Excellence Can Help CIOs Deliver Better IoT Solutions" describes how CIOs responsible for IoT can establish a center of excellence. A COE will help grow the organization's capability, improve project success rates, and reduce cost and risk from unsuitable technology. The COE must align with the organization's politics, and its performance must be monitored continuously.

"A Guidance Framework for Developing an IoT Proof of Concept" follows the development of a proof-of-concept project, documenting the challenges encountered along the way.

"Use Individual Adoption Styles to Bust Through Organizational Change Resistance" reveals that one, often ignored, aspect of change is how individuals adapt at different speeds. The individual adoption style framework in this research helps CIOs to focus their energy first on the best-suited employees, who can be influencers of change within the organization.

"Innovation Insight: How CIOs Can Leverage the IoT to Break Down Building Management Silos" focuses on how third-party IoT software companies are breaking down the communication silos between building management systems (BMSs). This integration reduces complexity and enables energy savings of 10% to 30%. CIOs will need to assist with software integration and align with facilities teams to realize optimum performance and energy savings.

"Preserve Privacy When Initiating Your IoT Strategy" shows how IoT devices are generating an unprecedented amount of data, which often includes sensitive personal data. Security and risk management leaders focusing on IoT will need to harness the information gathered for responsible use, and distinguish between consumer and business risk.

Design for Success

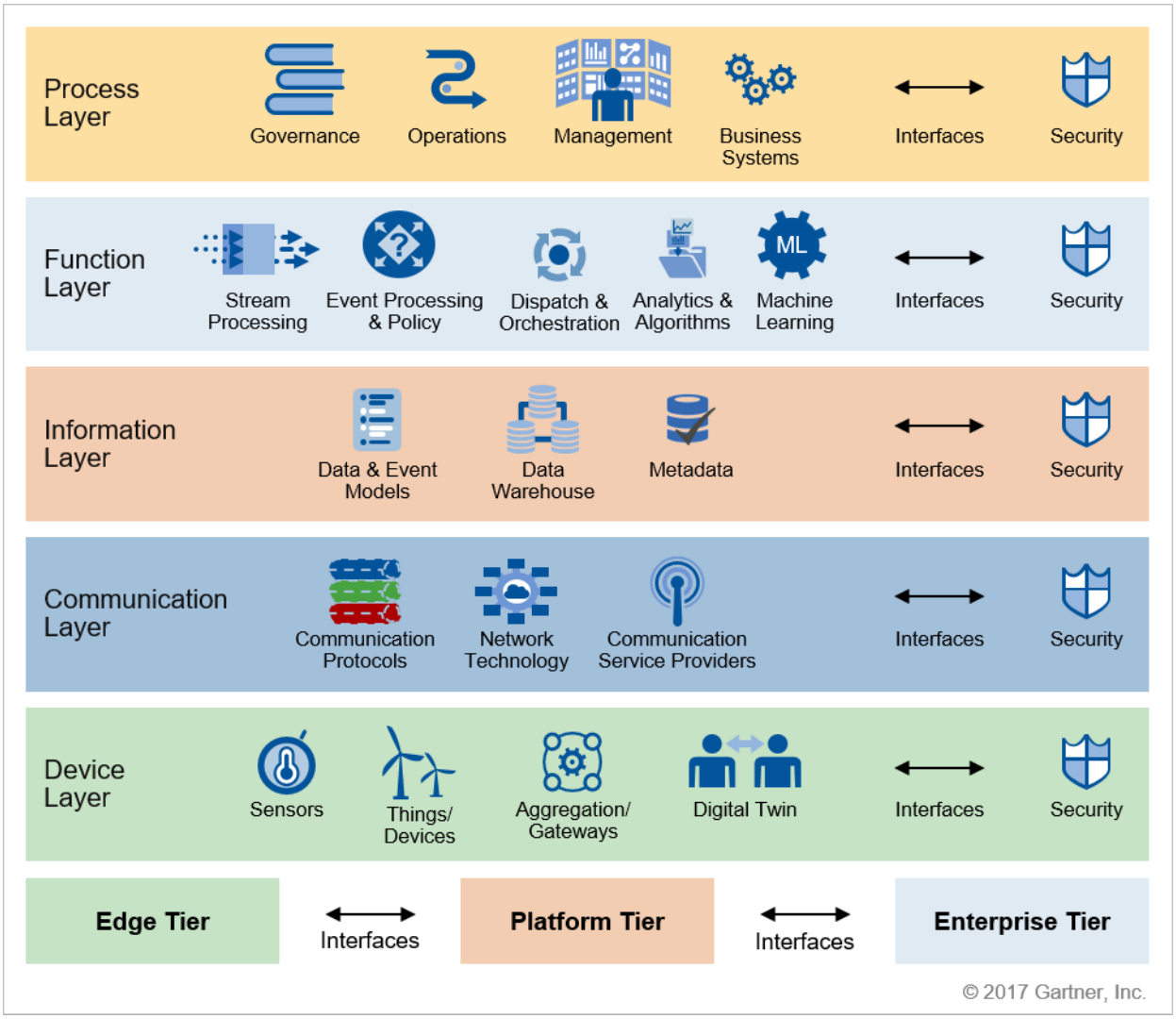
IoT solutions are complex, even during the pilot project phases. Edge environments are composed of large numbers of distributed, heterogeneous and, possibly, unique endpoints. Each endpoint type will have specific communication, data and integration requirements.

IoT solutions are about action, requiring integration with enterprise applications, such as CRM and ERP, for analysis and change. Thus, IoT solutions spawn sophisticated integration, communication, orchestration and data analytics environments.

> Do not underestimate the communication, engagement and facilitation value that an IoT center of excellence can create.

Research is available to help your organization identify an IoT architect and develop an IoT CoE. Gartner provides a specific reference model for driving the architecture and design of IoT solutions (see Figure 3).

Figure 3. Gartner IoT Reference Model at a Glance



Source: Gartner (December 2017)

Many adopters report that their IoT solutions are the most complicated solutions they develop, operate or maintain.

Gartner recommends CIOs appoint and empower an IoT architect to develop and drive IoT technical strategy.

In a recent Gartner survey,[1] 76% of respondents in organizations with an IoT architect felt that their organizations were prepared to address their IoT needs. By contrast, only 31% of respondents in organizations without an IoT architect said the same. CIOs need to create and fill this position with an individual who engages not only technology teams, but also business partners and operational technology groups. Additionally, Gartner recommends the creation of a COE to ensure representation and engagement of this diverse set of stakeholders.

Related Research

"A Guidance Framework for Architecting the Internet of Things Edge" demonstrates that architecting the IoT edge is challenging due to technical diversity and integration complexity. To help technical professionals overcome these challenges, this report provides a step-by-step procedure that focuses on the most important edge design decisions.

"How to Create Privacy, Safety and Reliability Through Internet of Things Security Architecture" explores how the scale and diversity of IoT technology pose a sizable security challenge. Strong practices and architecture, focusing on the IoT edge in particular, are critical to managing digital business risk. This document is a primer for technical professionals who are new to building IoT or IoT security.

"Key IAM Considerations for IoT Platforms" focuses on the intersection of the IoT platform and identity management, exploring architectural design patterns and platform supplier capabilities. IoT platforms are the hub of most IoT deployments and represent a risk aggregation point. Technical professionals implementing identity management for IoT platforms should assess those platforms and implement authentication, access control and life cycle management processes to protect data and devices.

"Four Best Practices to Avoid Digital Twin Failures" cuts through the hype of digital twins. Even though the potential benefits are great, creating and maintaining digital twins can be risky and difficult. When CIOs can minimize those risks, digital twins improve the ability to deliver and maintain products, facilities and systems that delight customers and enhance business.

"Start Moving Data Management Capabilities Toward the Edge" examines how data is growing more distributed via digital platforms, explosion of connecting devices and IoT. As a result, data and analytics leaders must adapt their data management strategy and infrastructure to enable edge capabilities to provide support wherever data resides.

"Architect Your Internet of Things System by Using the Gartner IoT Reference Model" shows how every IoT project needs an architecture that defines what functionality is required, where that functionality will operate, and how data and control will flow. This report describes the Gartner IoT Reference Model and explains how technical professionals can use it to create their IoT architecture.

"Unlock IoT Success by Identifying and Empowering the IoT Architect" demonstrates that reaping business value from the Internet of Things requires a thought leader who can balance technical, operational and business realities. Technical professionals need to understand how the IoT architect role significantly increases organizational readiness for, and capacity to deliver, IoT.

Execute Effectively

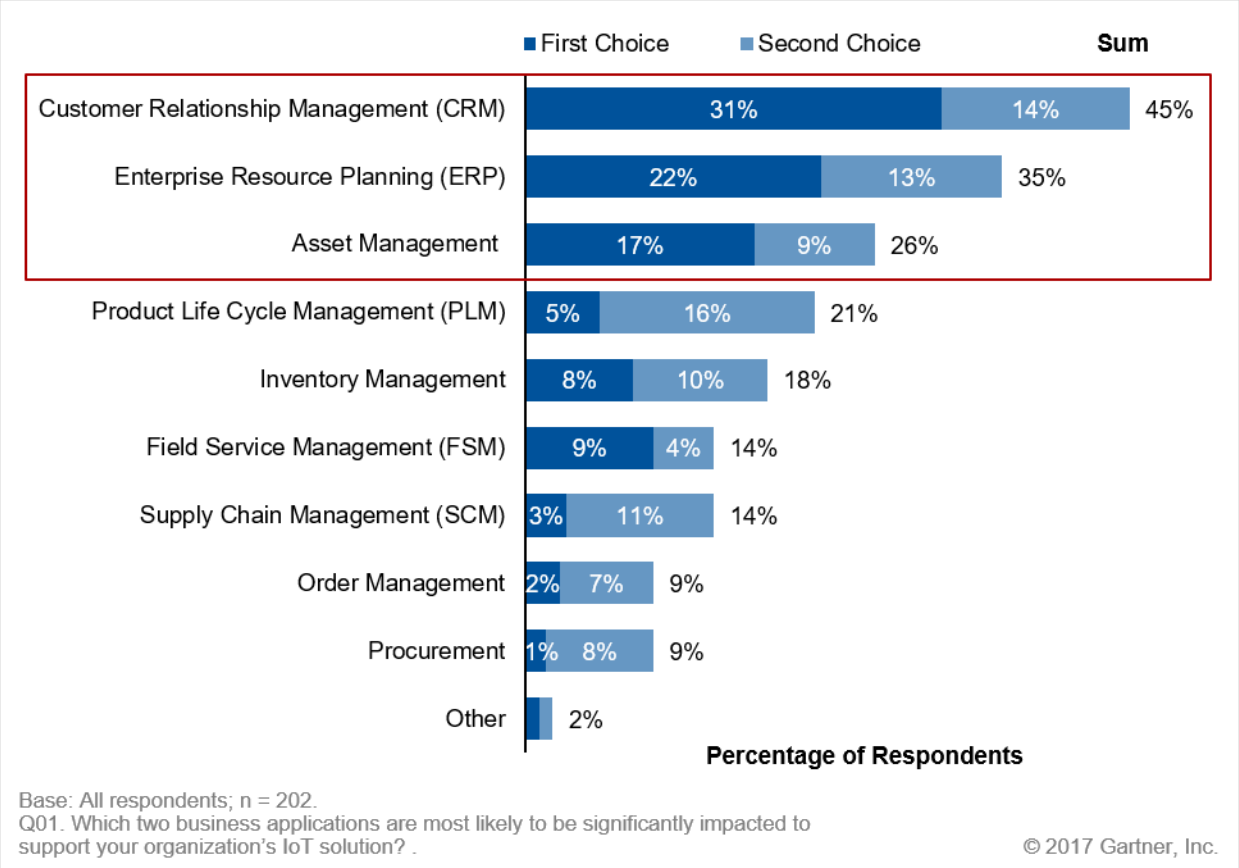
The key to effective execution is not avoiding pitfalls but anticipating and addressing them. Buried within IoT are a number of deployment challenges that must be addressed head-on. Gartner has a growing portfolio of research that illuminates and addresses these issues.

IoT inherits all of the challenges of building and maintaining enterprise systems. IoT is not immune to project execution problems, operating cost issues, service quality or any of the technology pain points your organization is experiencing.

> Do not allow execution concerns to derail your IoT planning or inhibit your ability to act. CIOs need to recognize these issues and utilize IoT delivery as an opportunity for process and execution improvement. CIOs can leverage IoT as a rally point to drive overall excellence in delivery and execution.

Effective execution is not limited to the business function that is enhanced or created by IoT. It also extends to the core enterprise systems that IoT integrates with. A Gartner survey[2] found that the applications most affected by IoT are CRM, ERP and enterprise asset management (see Figure 4). Twenty-six percent to 45% of respondents selected these applications as one of their two most significantly impacted business applications. Other key applications impacted by IoT include product life cycle management (PLM), inventory management, field service management (FSM) and supply chain management (SCM), as reported by 14% to 21% of respondents.

Figure 4. CRM, ERP and Asset Management Applications Are Most Likely to Be Impacted by IoT



Source: Gartner (December 2017)

> IoT solutions impact not only the operations targeted by the innovation, but also core enterprise applications, increasing the challenge of execution without business disruption.

The good news here is that, in the short term, IoT innovators can draw from a broad body of work addressing key application delivery and implementation issues. Specific market and technical issues that are troublesome for IoT include:

- Product submarkets, such as platform and edge computing, have yet to consolidate.
- Emerging architectural patterns will present planning challenges.
- IoT solutions will push the limits of current network and endpoint management systems.

Related Research

"Survey Analysis: Improve Your IT Competencies to Tackle Expanding IoT Projects" highlights survey responses from actual IoT adopters. The findings reveal that most IoT projects are evolving from experimental to early-stage production and are also becoming increasingly complex. Application leaders should use these insights into expanding IoT projects to identify the IT competency investments needed to overcome their challenges.

"2018 Planning Guide for the Internet of Things" identifies key trends and planning considerations that technical professionals must understand to help their IT organizations demonstrate IoT competence and thought leadership. In 2018, IT organizations will continue to receive pressure from business units and operational technology groups to support a variety of IoT-enabled solutions. Technical professionals must address stakeholder concerns about their ability to deliver, operate and maintain IoT systems.

"Survey Analysis: Internet of Things Requires Expanded Data and Analytics Capabilities" explores how organizations are evolving to support IoT in terms of styles of analytics, styles of integration and new data persistence models. IoT represents an opportunity for data and analytics to drive value for the enterprise. Data and analytics leaders must plan where they will apply existing data management and analytics capabilities to support IoT, and where and how they will modernize to meet new requirements.

"Three Strategies to Achieve Better-Than-Planned Outcomes for IoT Projects" identifies best practices for achieving successful IoT business outcomes. Applying these insights, CIOs can make better decisions regarding IoT leadership, IoT project strategy and execution, and involvement of external providers.

"A Primer on Application Cost of Ownership" explores the challenges of software "cost containment." Application leaders need to master the four modeling tools that can be applied to application costs in order to maximize value for money.

"The Top Three Impacts of IoT on Networks" focuses on how IoT implementations affect the design and provisioning of enterprise network connectivity. I&O leaders responsible for network design and provisioning should use this research to identify the critical impacts of IoT projects on enterprise networks.

"Use EMM to Manage IoT, but Do So Sparingly With Today's Specific Use Cases" explores whether using an enterprise mobility management (EMM) suite to manage IoT endpoints may be preferable to using an IoT platform. This research provides endpoint computing leaders pursuing endpoint strategy with a decision framework to help determine when EMM can play a role in managing IoT.

Related Priorities

Table 1. Related Priorities

Priority	Focus
Succeeding With Semiconductor-Based Technology	This initiative enables technology providers to improve their competitiveness by using products and services out of the semiconductor and electronics industry, and investing in emerging technologies.
Delivering Effective Identity and Access Management Capabilities	The delivery of effective IAM capabilities involves tools and best practices that manage identity, privileges, access and trust to facilitate security, risk management and business imperatives.
Building and Expanding a Digital Business	Digital business is the creation of new business designs by blurring the digital and physical worlds. Digital business involves the interaction of people, businesses and intelligent "things."
Supply Chain Strategy, Leadership and Governance	Designing strategy, optimizing networks, developing the organization and managing performance must work interdependently to execute an efficient demand-driven supply chain.

Source: Gartner

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Related Resources

Webinars

"Securing the Internet of Things: An Architectural and Risk-Driven Approach"

"IoT Target Architecture: Your Strategy's Linchpin"

"Rapidly Architect Your IoT System With the IoT Reference Model"

Articles

"The Emergence of the IoT Architect"

"The IoT Effect: Opportunities and Challenges"

"Leading the IoT"

Evidence

[1] Gartner surveyed technical professionals about their organizations' technology objectives, challenges, preparedness and future plans, to provide an overview of how technical professionals are dealing with changes related to digital business.

The research was conducted online from 30 March 2017 to 2 May 2017 among 555 respondents, primarily located in North America. A subset of Gartner for Technical Professionals seatholders were invited to participate.

Respondents were required to be members of their organizations' IT staff or departments (or serve in an IT function). Furthermore, they could not serve as a member of the board, as president, or in an executive-level or IT leadership position.

The survey was developed collaboratively by a team of Gartner analysts who follow technical professionals, and it was reviewed, tested and administered by Gartner's Research Data and Analytics team. The results of this study are representative of the respondent base and not necessarily the market as a whole.

[2] Results presented are based on a Gartner study conducted to collect information on best practices for IoT deployments and on strategies for developing IoT solutions. The research was conducted using a mixed methodology (computer-assisted telephone interviewing [CATI]/online) during June 2017 through July 2017 among 202 respondents in the U.S., Germany, China and Japan.

Participating organizations were screened; they either had already delivered IoT solutions or had working IoT projects in progress. All industries qualified, except technology vendors, business consulting and investment services. The largest industry representation was from manufacturing, with 25% of the sample.

Respondents were required to have IoT implementation involvement/roles in organizations with an annual revenue of greater than $100 million.

The survey was developed collaboratively by a team of Gartner analysts who follow IoT, and it was reviewed, tested and administered by Gartner's Research Data and Analytics team.

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