# 2019 Planning Guide Overview: Architecting Your Digital Ecosystem

**Published:** 5 October 2018 **ID:** G00361489

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Technical professionals are confronting increasingly complex technology ecosystems. They must overcome this complexity to create solutions that will transform their organization into a digital business. This report provides a summary of the most important trends across 10 key technology areas.

## Opportunities and Challenges

- Machine learning (ML) and artificial intelligence (AI) will impact virtually every aspect of IT, creating a challenge for technical professionals to quickly understand, integrate and operationalize this technology.
- Gartner clients will continue to face the challenge of adopting public cloud services, along with migrating applications and data to the cloud, while maintaining existing IT responsibilities for on-premises infrastructure and enterprise applications.
- Digital transformation means decentralization and distribution, resulting in a higher degree of complexity. However, because systems are made up of discrete components, they can change, expand, evolve and be replaced independently, enabling an unprecedented degree of agility and velocity.

## What You Need to Know

- Organizations must implement a cloud-first strategy with an emphasis on multicloud architecture. They must also advance the use of public cloud services to become the primary, prioritized and promoted deployment model.
- Technical professionals should design software-defined architectures to enable hybrid IT initiatives. Doing so will deliver operational agility and contain costs.
- Organizations must leverage a combination of disparate technologies — such as cloud, analytics, AI and automation — to drive digital business transformation.
- Technical professionals must deliver solutions with an unprecedented degree of agility.

- Organizations must invest in automation to effectively manage the complexity of decentralized and distributed systems.

## Insight From the Analyst

### Thriving in an Era of Exponential Technology Change


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We live in an era of exponential change, driven not only by advances in *specific* technologies like AI, but also by the way those technologies are *combined* (e.g., marketing analytics powered by AI). It is the combination of these disparate technologies into holistic solutions that forms the foundation of your digital technology ecosystem.

Today, keeping up with the trends in your core discipline isn't enough — you must also understand what's happening in adjacent disciplines. And therein lies the challenge: How can you learn about the most important trends for a variety of technologies while immersed in your day-to-day activities?

Gartner for Technical Professionals' (GTP's) 2019 Planning Guides can help. Our research team has created a portfolio of 10 Planning Guides to inform you of the latest trends and to arm you with specific action plans. Each Planning Guide analyzes a single research area, such as cloud computing, Internet of Things, or data and analytics. These guides provide actionable advice to help you:

- Analyze key technical trends, by offering the latest insight from GTP analysts
- Create an action plan, by specifying detailed technical planning considerations
- Assess architectural options, by analyzing design decisions and their implications
- Expand staff knowledge, by explaining the most important trends, issues and analysis

This overview provides research highlights and key trends from each of the 2019 Planning Guides. After you read this overview, we encourage you to read the specific Planning Guides that align to your own technology initiatives so that they can inform, inspire and empower you.

Sincerely,

Paul DeBeasi and Kirk Knoernschild

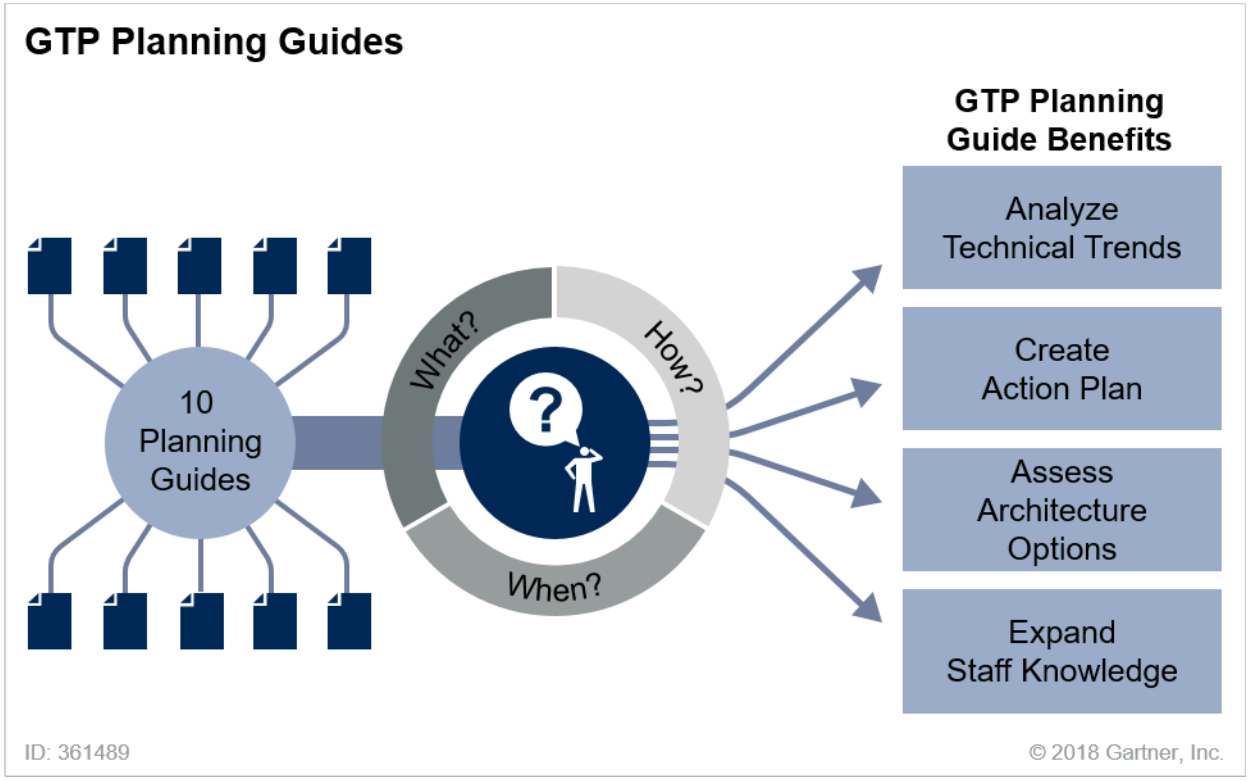
# Executive Overview

## Definition

The Planning Guides are the most highly anticipated and widely read research reports that GTP publishes. These guides cover a broad set of technologies, services and infrastructure. Each Planning Guide focuses on a specific research area, and is designed to help you quickly assimilate and act on the most important trends in that area (see Figure 1).

> Technical professionals must not only stay abreast of the trends in their core discipline, but also understand the trends developing in adjacent disciplines.

Figure 1. GTP Planning Guides




Source: Gartner (October 2018)

Each guide is written for the technical professional, and includes the following sections:

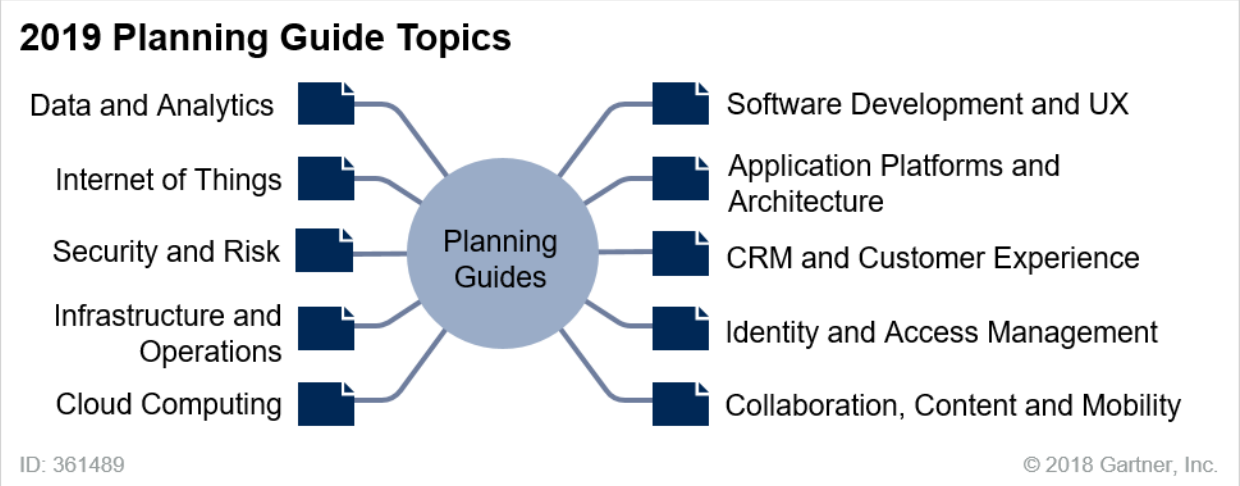
- **Technical Planning Trends:** Analysis of the most important technical trends for a specific research area for the upcoming year

- **Planning Considerations:** A series of technical action plans for each of the trends
- **Setting Priorities:** Guidance to help you set priorities among the various competing trends
- **Gartner Recommended Reading:** A reference of the most relevant and impactful research for the topic area

## Research Highlights

The sections below feature key highlights and technology trends from the 10 GTP 2019 Planning Guides (see Figure 2).

Figure 2. 2019 Planning Guide Topics




CRM = customer relationship management; UX = user experience

Source: Gartner (October 2018)

In this overview, these research highlights and trends are organized into the following five categories:

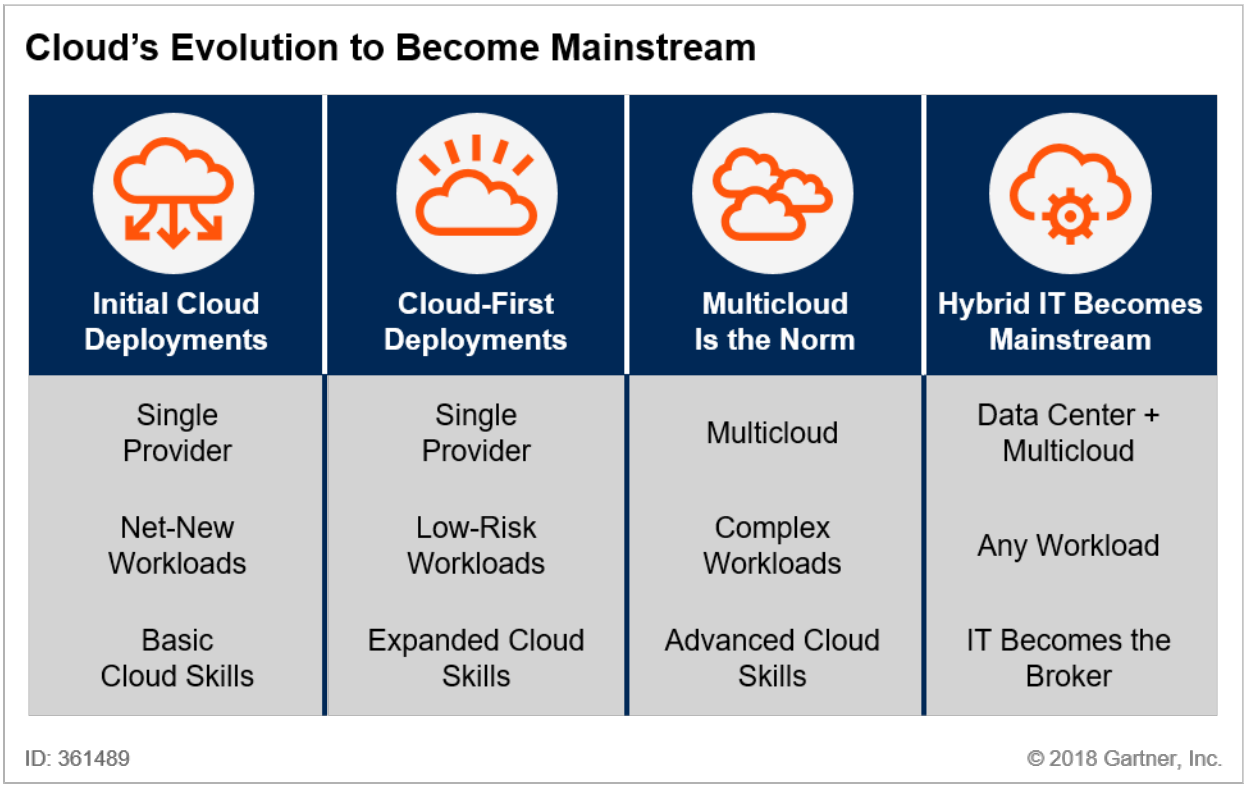
- Cloud computing, infrastructure and operations
- Data, analytics and the Internet of Things (IoT)
- Software development, application platforms and architecture, and CRM
- Security, risk management, and identity and access management (IAM)
- Collaboration, content and mobility (CCM)

## Cloud Computing, Infrastructure and Operations

**Cloud Computing:** Cloud is the platform for innovation that the digital business demands. Cloud has become the foundation that enables businesses to transform, differentiate and gain a competitive advantage. In fact, cloud strategies are now quickly evolving into data and analytics, IoT, and application architecture strategies as well. Many organizations are now focused on cloud-first strategies as they turn their attention to advancing the use of cloud services across the business. Given this context, organizations must continue to invest in and mature their cloud competency to ensure it becomes the mainstream computing platform in the organization (see Figure 3).

Cloud initiatives are often delayed by internal politics, with some in the business hesitant to relinquish control. Other parts of the organization may think they can build and protect their applications better through the use of internal resources. However, most organizations can't compete with the pace of innovation and the economies of scale of the cloud providers. Most of these providers are developing value-added services on top of this faster, less expensive infrastructure with massive automation and standardization of commodity hardware.

Figure 3. Cloud's Evolution to Become Mainstream




Source: Gartner (October 2018)

The "2019 Planning Guide for Cloud Computing" outlines important considerations for developing successful cloud strategies, in light of the following key trends:

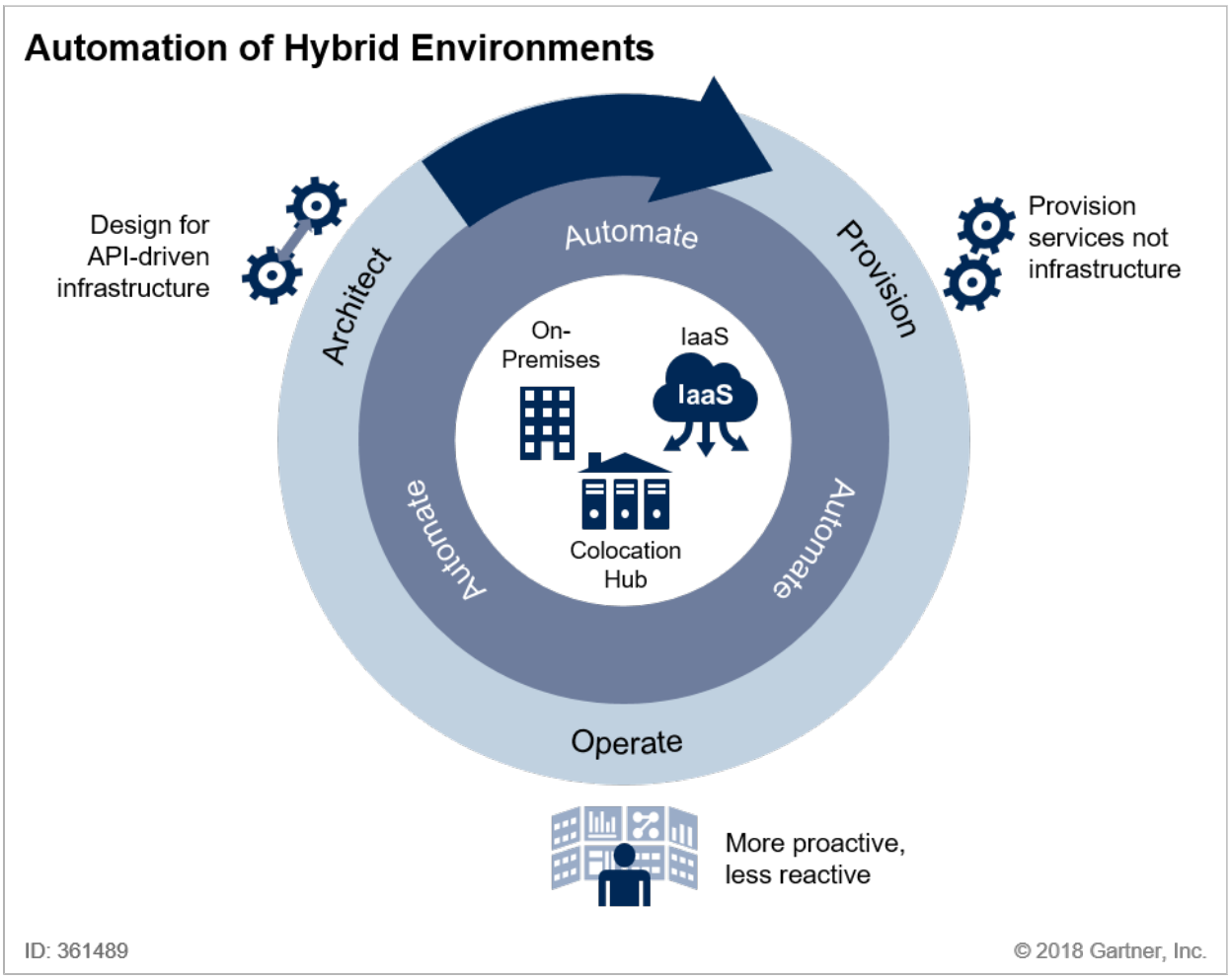
- Organizations will advance cloud-first strategies with multicloud adoption.
- Optimizing workloads for IaaS, PaaS and SaaS will be an increasingly critical priority.
- Hybrid IT strategies will continue to mature across organizations.
- Organizations will invest in developing cloud skills across disciplines.

**Infrastructure and Operations (I&O):** The cloud will be the dominant driver of change for I&O in 2019. This doesn't mean that all new applications will be cloud-based. Rather, it means that most applications will run in the data center only when the cloud can't support their requirements. For workloads that remain in IT-owned environments, organizations must improve delivery speed, and strike a balance between speed and control across all components of the hybrid environment. The combination of hybrid infrastructure, hybrid orchestration, hybrid applications and multicloud management establishes the domains where I&O organizations can drive the following:

- Agility into on-premises systems
- Governance into the cloud
- A set of automation components that unify operations across provider silos

Creating an effective and efficient hybrid environment is one of the biggest challenges facing modern I&O organizations. On-premises assets must become more readily accessible, which will require automated, self-service hardware provisioning and configuration (see Figure 4). For hybrid orchestration, I&O teams will need to weave native provider tools, third-party packages and internal development into an operational framework. Hybrid applications will require proficiency in DevOps and container orchestration. Operating applications and assets across these environments at scale will challenge I&O to establish governance and brokering processes that don't slow progress.

Figure 4. Automation of Hybrid Environments




Source: Gartner (October 2018)

As 2019 proceeds, the next wave of I&O innovation will be driven by ML and AI. A greater focus on operational data will influence monitoring strategies, resulting in more proactive and automated operations.

The “2019 Planning Guide for Infrastructure and Operations” examines four major technology trends:

- Cloud-first strategies will result in pervasive hybrid environments.
- Infrastructure automation and orchestration will be required to achieve agility across hybrid environments.
- DevOps will become key to supporting agile development.
- Machine learning and AI will establish predictive and proactive operations.

## Related Research

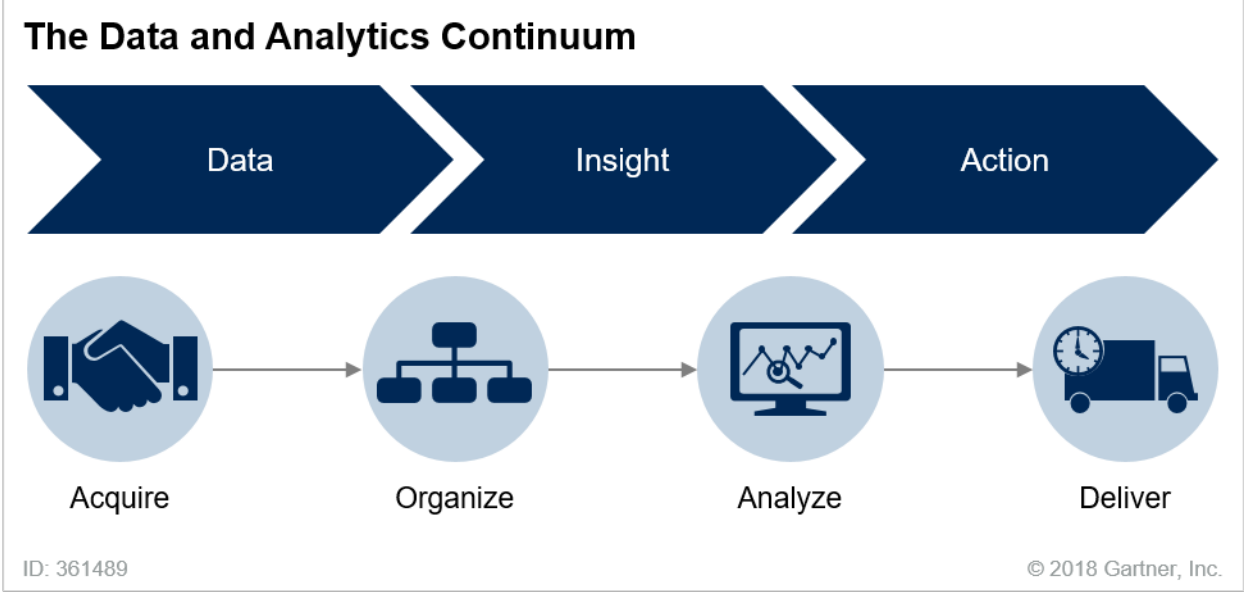
- "2019 Planning Guide for Cloud Computing": In 2019, hybrid IT will be the standard. Technical professionals focused on cloud must continue to advance cloud-first strategies, embrace multicloud and maintain on-premises environments, with a focus on integration and brokering. This Planning Guide analyzes trends for successful cloud adoption.
- "2019 Planning Guide for Infrastructure and Operations": Public cloud has increased the pace of business. I&O must automate across hybrid environments, accelerate application delivery, embrace cultural change and prepare for data-driven operations. This Planning Guide highlights the trends that will help technical professionals drive I&O agility in 2019.

## Data, Analytics and the Internet of Things

**Data and Analytics:** Data volume, variety and velocity continue to increase. To help organizations capitalize on the opportunities this information can reveal, data and analytics are taking on a bigger role in powering the activities of the organization — not just reflecting where it's been.

Data and analytics technologies continue to expand their role as the "brain" of the intelligent enterprise. They will increasingly coordinate a host of decisions, interactions and processes in support of business and IT outcomes. These changes will force IT to envision a revitalized data and analytics continuum that incorporates diverse data and that can deliver "analytics everywhere" (see Figure 5). Some enterprises are capturing all data in hopes of uncovering new insights and spurring possible actions. Others are starting with the end goals in mind, and capturing only the data that has been generated for a specific purpose. This focused approach allows organizations to streamline the process and manage an end-to-end architecture that supports specific desired outcomes.

Figure 5. The Data and Analytics Continuum




Source: Gartner (October 2018)

Technical professionals must manage the data and analytics process holistically. Key business benefits can be achieved by applying advanced analytics to enterprises' vast sources of data — and by providing business users with more self-service data analysis capabilities.

The "2019 Planning Guide for Data and Analytics" examines the following key trends, along with important related planning considerations:

- Pervasive data and analytics will continue to demand a comprehensive end-to-end architecture using a portfolio-based approach.
- Organizations will invest to make analytics ubiquitous.
- AI and ML will generate new synergies in information management.
- Analytics services in the cloud will continue to accelerate to deliver greater performance at scale.
- Revolutionary changes in analytics will drive IT to adopt new technologies and roles.

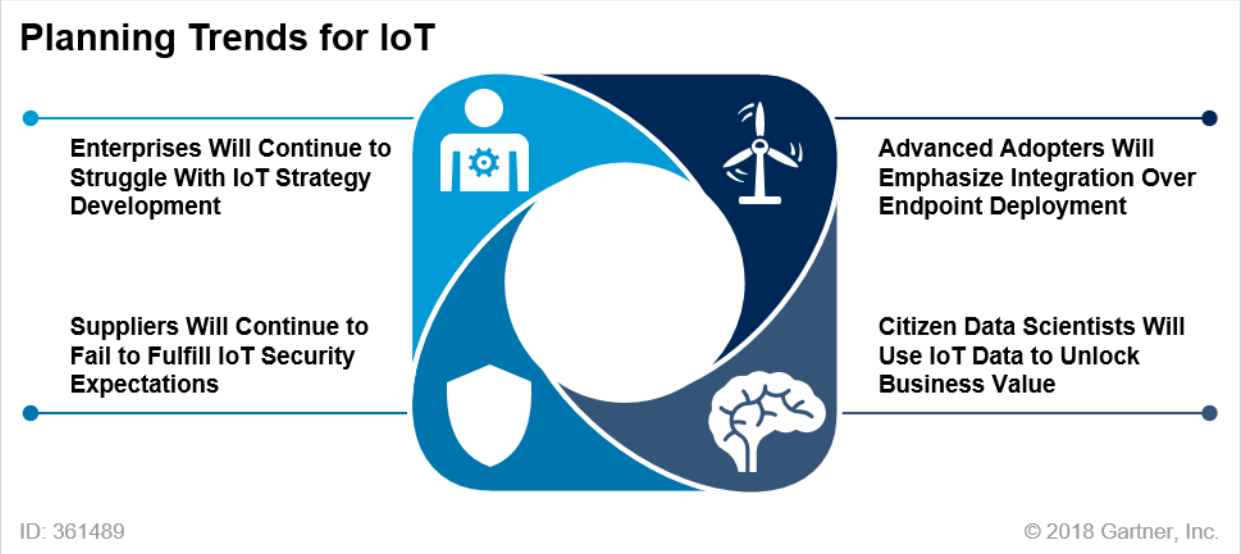
**IoT:** In 2019, organizations will continue in their struggle to establish clear business and technical strategies for their IoT initiatives. Many IoT innovations are proofs of concept with little focus on business outcomes. A more structured approach to IoT will enable organizations to design an infrastructure that supports the delivery of innovative solutions that provide measurable business outcomes.

In addition, supplier solutions for addressing IoT security issues will continue to be slow to market in 2019. Organizations must act on their own to overcome their security challenges. The tools required to manage many IoT security problems exist within most organizations. However, organizations must focus on deploying and managing these tools at scale.

IoT is being transformed by the increasing availability of sophisticated advanced analytics and ML technologies. A feature race among IoT platform providers is placing powerful and inexpensive tools within everyone's reach. Suppliers are focused on making these tools easy to use, thereby enabling the rise of the "citizen data scientist." IoT innovators should exploit this trend by making greater use of these analytics technologies in their IoT initiatives.

Figure 6 summarizes these trends.

Figure 6. Planning Trends for the Internet of Things




Source: Gartner (October 2018)

The “2019 Planning Guide for the Internet of Things” examines the following key trends, along with important related planning considerations:

- Enterprises will continue to struggle with IoT strategy development.
- Advanced adopters will emphasize integration over endpoint deployment.
- Suppliers will continue to fail to fulfill IoT security expectations.
- Citizen data scientists will use IoT data to unlock business value.

### Related Research

- “2019 Planning Guide for Data and Analytics”: New data and analytics strategies promise to accelerate digital transformation, but success will depend on the variety of complementary architectures. Technical professionals must shift from fixed, rigid architectures to flexible data and analytics portfolios to better adapt to future demand.
- “2019 Planning Guide for the Internet of Things”: New IoT architectures and capabilities will emerge in 2019, continuing to address adoption challenges and accelerating value. Technical professionals need to understand these trends and prepare for them to exploit their value and minimize their disruption.

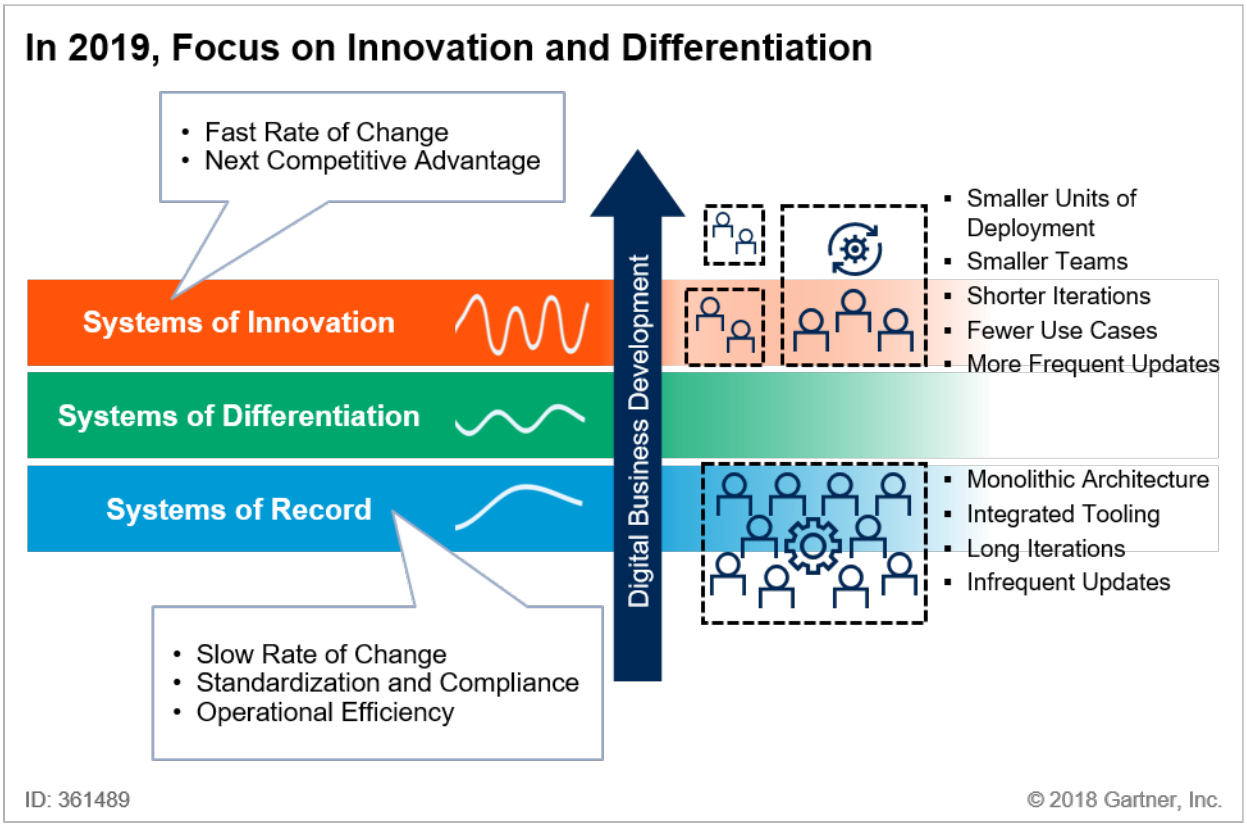
## Software Development, Application Platforms and Architecture, and CRM

**Software Development and UX:** Digital disruption is reinventing business models, and this trend will impact every industry. Organizations must focus their developers on innovation and

differentiation — e.g., experimenting with new solutions, discovering new use cases and creating better user experiences (see Figure 7).

In the modern era of development, productivity and agility are key. However, due to the commoditization of systems of record (such as CRM and ERP), there is little developers can contribute to these systems beyond straightforward integrations and maintenance. Yet, organizations continue to implement many custom systems of record, believing their needs are unsolvable through out-of-the-box offerings. Systems of record will not advance an organization to a digital business, and wasting developer time on these systems makes an organization susceptible to severe digital disruption.

Figure 7. 2019 Trends in Software Development Require That Developers Focus Entirely on Innovation and Differentiation




Source: Gartner (October 2018)

The “2019 Planning Guide for Software Development and UX” analyzes the planning implications of the following trends:

- Great development talent will be scarce.
- Urgency will grow for participation in broader digital ecosystems.

- DevOps and extreme automation will be necessary to enable true quality and speed of delivery.
- Advancement of web application development technologies will reduce the framework footprint.
- Quality of UX in consumer applications will continue to rise, and applications with poor UX will fail.

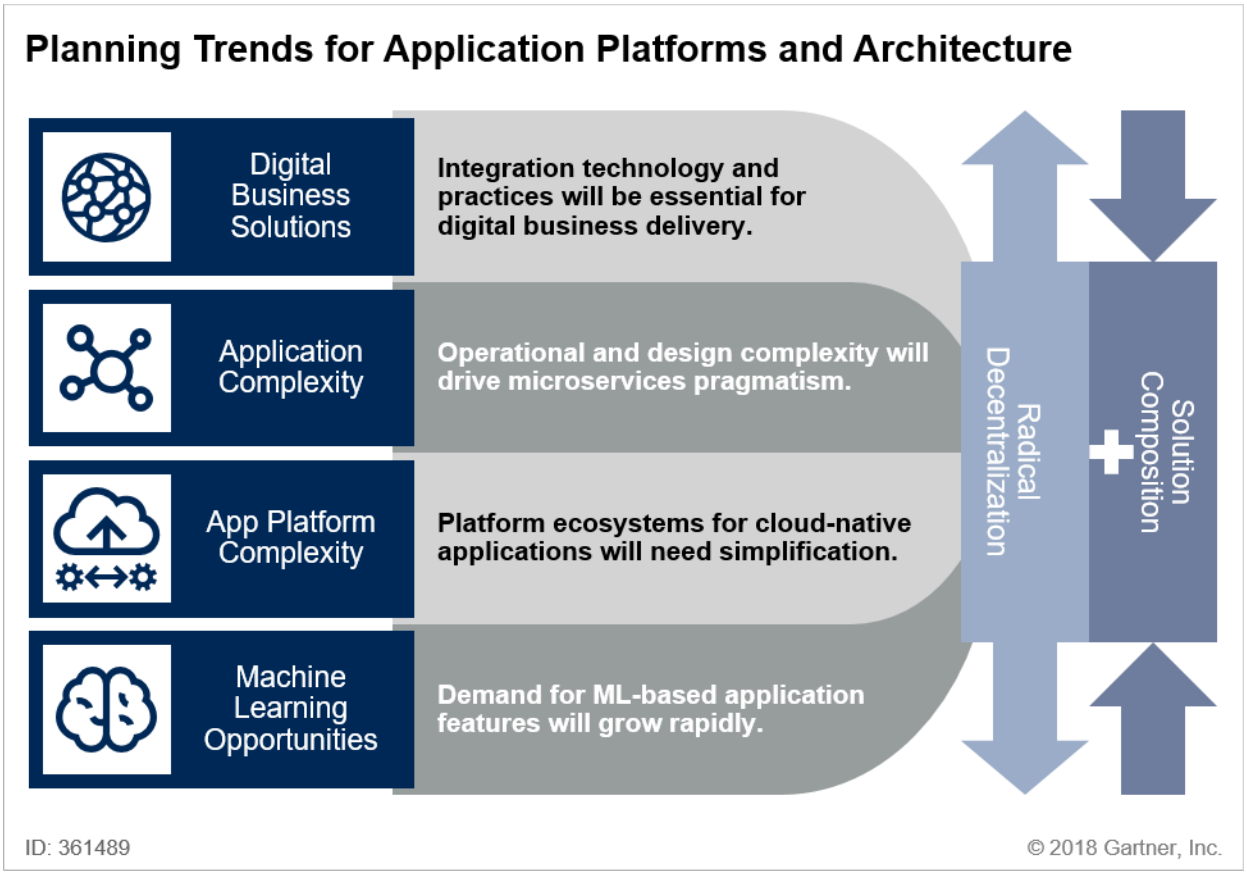
**Application Platforms and Architecture:** Digital business is turning the traditional enterprise inside out, transforming business processes, models and ecosystems. One common factor in all of this change is radical decentralization:

- Business processes are distributed across enterprise boundaries.
- Workforces are distributed geographically.
- Compute infrastructure is distributed across cloud, data centers and “the edge.”
- Data is distributed across these systems.
- Application components are distributed across servers, containers and functions.

For these decentralized and distributed assets to deliver value, they must be composed and integrated into useful systems. They must be connected, the enterprise must understand and trust the connections, and the enterprise must be able to change them to allow the systems to adapt and evolve.

Figure 8 shows Gartner’s four planning trends for application platforms and architecture in 2019. They are based on our interactions with clients, on the opportunities and challenges they face, and on analysis of the technology markets and ecosystems that support and influence them.

Figure 8. Planning Trends for Application Platforms and Architecture




Source: Gartner (October 2018)

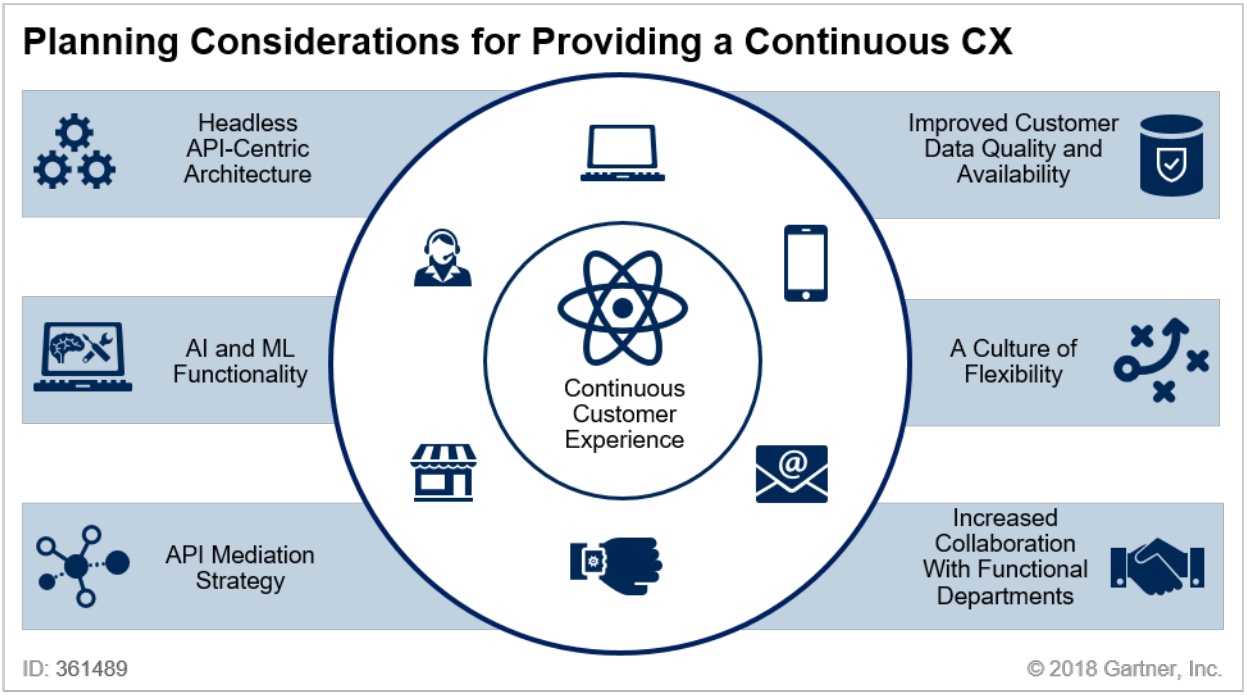
The “2019 Planning Guide for Application Platforms and Architecture” analyzes the planning implications of the following trends:

- Integration technology and practices will be essential for successful digital business delivery.
- Operational and design complexity will drive microservices pragmatism.
- Platform ecosystems for cloud-native applications will need simplification.
- Demand for ML-based application features will grow rapidly.

**CRM and Customer Experience (CX):** Customers now demand a continuous experience as they interact with organizations’ products, departments and technology across channels (see Figure 9). “Continuous experience” is a philosophy for preserving continuity of user experience across traditional boundaries of devices, time and space. Customers want to seamlessly interact with your enterprise across multiple devices and channels to fulfill their journey. A lack of, or gap in, continuity will end in frustration, and can lead to customers leaving to a competitor.

Along with this demand, organizations will need to adhere to new privacy constraints, and build customers' trust regarding how their data is used to produce a continuous and personalized experience. While these can be seen as competing forces, both are critical to an organization's success in converting prospects to repeat customers, building customer loyalty and lifetime value, and providing points of differentiation against competitors.

Figure 9. Planning Considerations for Providing a Continuous Customer Experience




Source: Gartner (October 2018)

The "2019 Planning Guide for CRM and Customer Experience" examines the following key trends and their planning implications:

- Customer application and data silos will challenge enterprise delivery of continuous experiences.
- Organizations will adopt AI and ML functionality to provide more personalized customer experiences.
- Organizations' adoption of cloud-based CRM applications will continue to increase.

## Related Research

- "2019 Planning Guide for Software Development and UX": Developing software with a high-quality user experience has never been easier. Technical professionals responsible for software development must embrace agile DevOps practices and modern technologies to compete and stay relevant.

- "2019 Planning Guide for Application Platforms and Architecture": Digital transformations, cloud adoption and insatiable demand for agility are shaping your applications. In 2019, technical professionals responsible for application platforms and architecture must plan for ever-more-complex distributed systems delivery and integrations that change at pace.
- "2019 Planning Guide for CRM and Customer Experience": Customers demand a continuous experience across all channels. The fragmented nature of customer applications and data dulls the ability of enterprises to deliver on this demand. This report provides technical professionals with CRM and CX planning guidance for 2019.

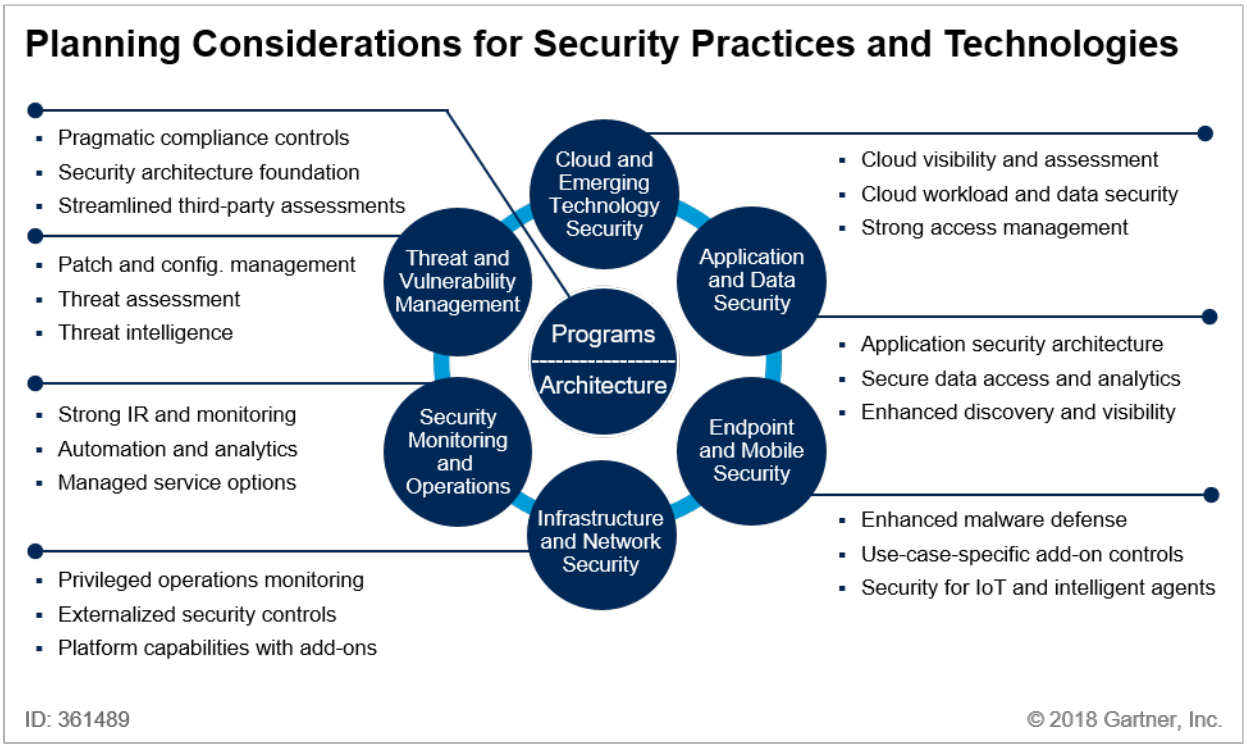
## Security, Risk Management, and Identity and Access Management

**Security and Risk Management:** Cybersecurity has long been a challenge for organizations, and security teams have struggled to keep up with the changing risk, compliance, business and IT landscapes. Data is leveraged for more business purposes. Applications and APIs are expanding to enable greater business functionality. The cloud makes critical applications, such as email and content sharing, accessible to a wide range of attackers. In addition to data breaches and ransomware, abuse and fraud are increasing threats.

Organizations require a steady foundation of practices to build their security competency (see Figure 10). Recent trends illustrate that many security teams will need to adjust their focus to keep up with attacks and changes in the security solution landscape. New or significantly enhanced trend areas for 2019 include:

- Focusing on high-exposure risk areas — such as email and cloud file shares — as a prominent component of security hygiene.
- Reintroducing security architecture as a key practice. Security teams find it increasingly challenging to navigate a confusing landscape of security solutions.
- Adding new security technology categories for container security, secrets management, breach and attack simulation tools, software-defined perimeter, and cloud security platforms.

Figure 10. Key Planning Considerations for Security Practices and Technologies




Config. = configuration

Source: Gartner (October 2018)

The “2019 Planning Guide for Security and Risk Management” examines the following key trends and their related planning considerations:

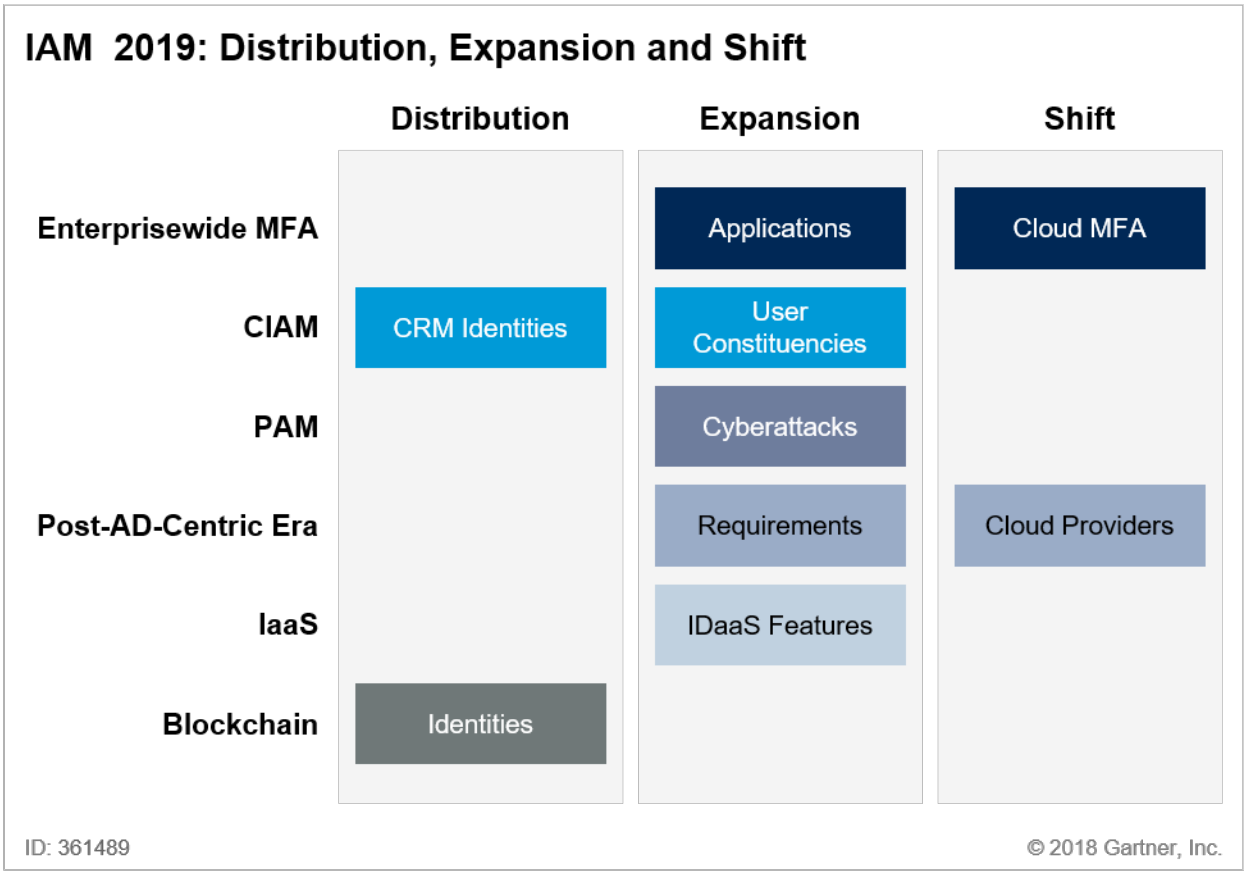
- Major changes in the global compliance and risk landscapes will continue to impact security program and roadmap planning.
- The re-emergence of security platforms and unique niche products will drive a renewed need for well-defined architecture practices.
- Effective security monitoring and response will require automation and analytics delivered through internal skills and managed services.
- Containers and DevSecOps, combined with hybrid cloud and multicloud, will transform infrastructure security architecture and management.
- Expanded data, analytics and application service ecosystems — and their APIs — will cement the need for adaptive application and data security approaches.
- Diversity in the use of mobile devices, things, intelligent agents and SaaS will drive greater native security capabilities and use of tailored security add-ons.

**IAM:** The distribution, expansion and shift megatrends are fueling key IAM trends (see Figure 11). Organizations are also migrating core IAM services to the cloud for increased features, better performance, cost reduction and simpler management. Examples of this migration include the movement to cloud-based multifactor authentication (MFA) offerings and the de-emphasis of Active Directory (AD) in lieu of cloud-based offerings. In addition, Amazon Web Services (AWS) and Google have introduced cloud IAM functionality, which raises new opportunities for organizations to evaluate a single technology stack for IaaS and IAM.

While B2B IAM is not a new concept, consumer IAM (CIAM) is evolving due to deeper integration with CRM and inventory systems, resulting in broader and deeper access for nonemployee users. External privacy initiatives also heavily impact CIAM. 2018 saw the rise of the EU General Data Protection Regulation (GDPR) and the passing of the California Consumer Privacy Act. These regulations force organizations to think differently about CIAM.

Finally, while blockchain for IAM is still nascent and few production deployments exist, adoption will increase in coming years, resulting in a decentralization of identities.

Figure 11. IAM 2019: Distribution, Expansion and Shift




Source: Gartner (October 2018)

The “2019 Planning Guide for Identity and Access Management” explores key priorities to address these challenges. Trends examined include:

- Organizations will advance enterprisewide multifactor authentication.
- CIAM will evolve to support CRM best practices and GDPR.
- Cyber defense will drive broader deployment of privileged access management.
- The AD-centric era will pass.
- IaaS providers will take aim at the IDaaS market.
- Blockchain-enabled identities will potentially disrupt authentication.

### Related Research

- “2019 Planning Guide for Security and Risk Management”: Security teams find it difficult to keep up with change, especially because the vendor security solution landscape has become hard to decipher. Technical professionals must understand these trends in order to continue practicing strong planning and execution of security initiatives in 2019.
- “2019 Planning Guide for Identity and Access Management”: In 2019, IT organizations must advance IAM in the accelerated era of distribution, expansion and shift. Key trends include privileged access management, MFA, consumer IAM, IDaaS and blockchain. Here, we examine these trends and related design considerations for technical professionals.

## Collaboration, Content and Mobility

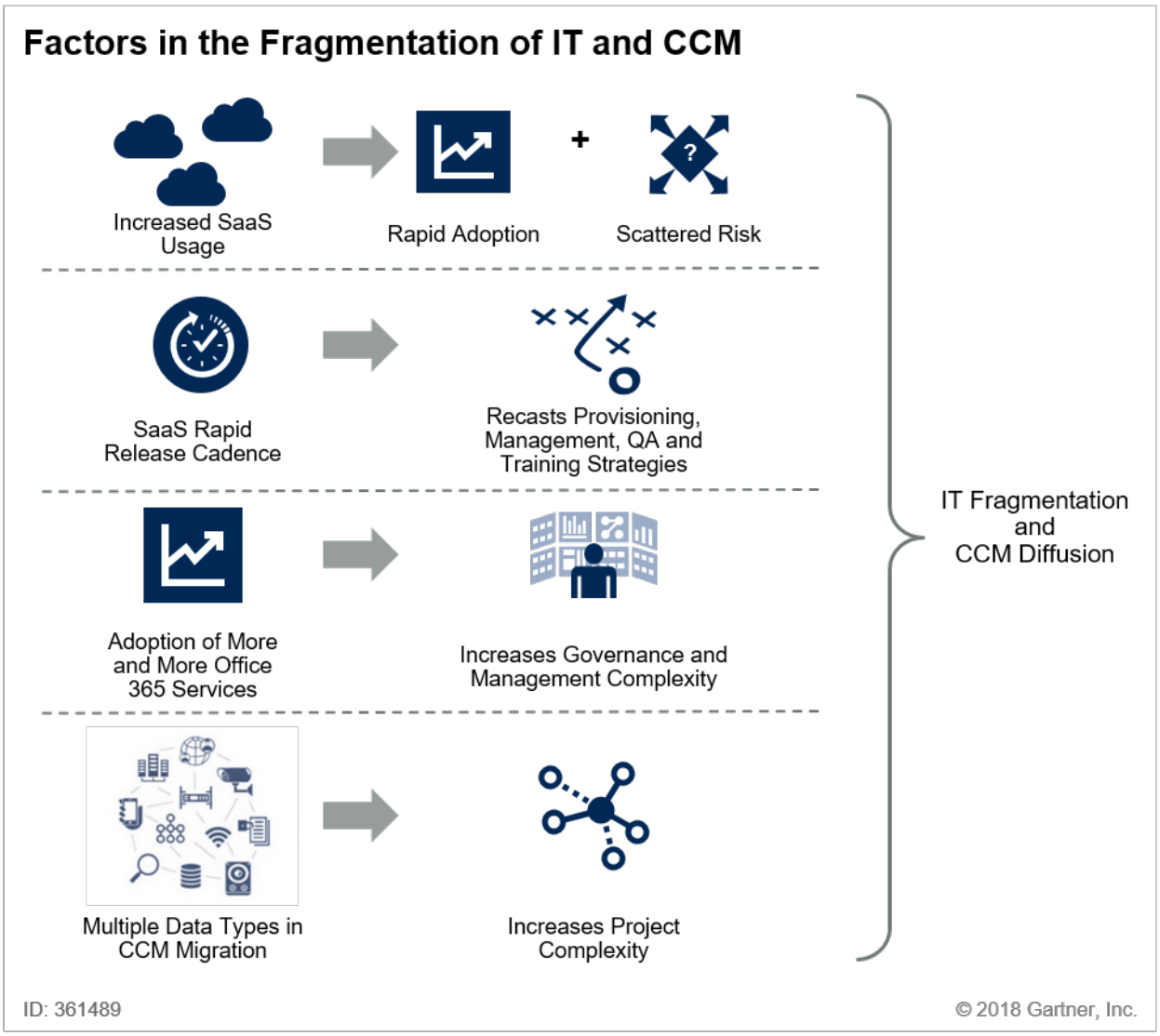
Enterprise IT is fragmenting. Capability is moving to the cloud. Administration is shifting to the business unit (BU). Even the boundaries between application, operating system and information are blurring. This fragmentation can provide great opportunities for the enterprise if managed properly. It can also be disastrous if allowed to happen without strategy and governance.

Email and file sharing are usually the first application capabilities moved to the cloud. CIOs often start out with a vision of simply lifting and shifting the supporting applications and legacy content to SaaS-based services. This rarely works out as planned. Integrations and system dependencies are too entrenched, and content migration too overwhelming, to fully relocate to the cloud with an acceptable level of cost, risk and disruption. As a result, most enterprises end up with hybrid architectures, in which some critical functionality remains in the data center while lower-risk areas move to SaaS solutions. These hybrid environments are invariably more complicated and longer-lived than anticipated.

Many organizations hope that Microsoft’s Office 365 will simplify both the implementation and adoption process, because it is a single, comprehensive CCM solution. The trouble is, Office 365 isn’t really a single solution. It is a platform offering a complex suite of loosely coupled offerings, many with independent administration mechanisms. Add to this the many third-party solutions and SaaS microservices that find their way into the mix, and Office 365 becomes a much more complicated beast to master than expected.

Moreover, “shadow IT” solutions will crop up throughout the enterprise. Consumer-oriented CCM offerings are common, and IT must account for them in in a manner that balances enterprise priorities with end-user demands. This requires governance that is strong, but not oppressive or overbearing (see Figure 12).

Figure 12. Factors in the Fragmentation of IT and CCM




Source: Gartner (October 2018)

In addition to these challenges, IT fragmentation brings opportunities as well. SaaS point solutions and microservices enable IT to provide targeted capabilities to specific end-user groups that would otherwise be too small and specific to support. Responsibilities that were once the exclusive domain of IT can now be shared with BU-level administrators and citizen developers. This new paradigm helps IT scale its capabilities without necessarily expanding its staffing. It also enables

end users and BUs to be more self-sufficient, freeing IT to focus on providing the guidance, oversight and infrastructure that knits all CCM elements, on-premises and in the cloud, into a cohesive and coherent digital workplace.

These digital workplace dynamics are driving four key trends in CCM, which will impact IT planning in 2019:

- SaaS will blur IT solution boundaries, spreading capability, information and risk wider and faster.
- Accelerated SaaS release cadences will force enterprises to recast operations strategies.
- Office 365 expansion will complicate service administration and governance.
- New forms of content and capability will increase CCM migration complexity and risk.

### Related Research

- "2019 Planning Guide for Collaboration, Content and Mobility": Technical professionals supporting collaboration, content and mobility face a fragmenting IT environment of emerging SaaS services and legacy enterprise solutions. This report addresses four major trends driving this dynamic and provides guidance for addressing them in 2019.

## 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

## Related Resources

### Webinars

"Prepare Your Security Operations for Orchestration and Automation Tools"

"Cloud-Based Multi-Factor Authentication Is Ready for Prime Time"

"Why Microsoft Teams Will Soon Be as Common as Outlook"

"The Keys for DevOps Success"

"Beyond the Data Warehouse: New Data Management for Analytics"

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