Cloud Computing Primer for 2019

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Cloud is evolving from a market disruptor to an expected approach for traditional and next-generation IT. Our research offers actionable advice for IT leaders, CIOs and technical professionals as cloud becomes a required foundation to exploit current and future disruptions.

Scope

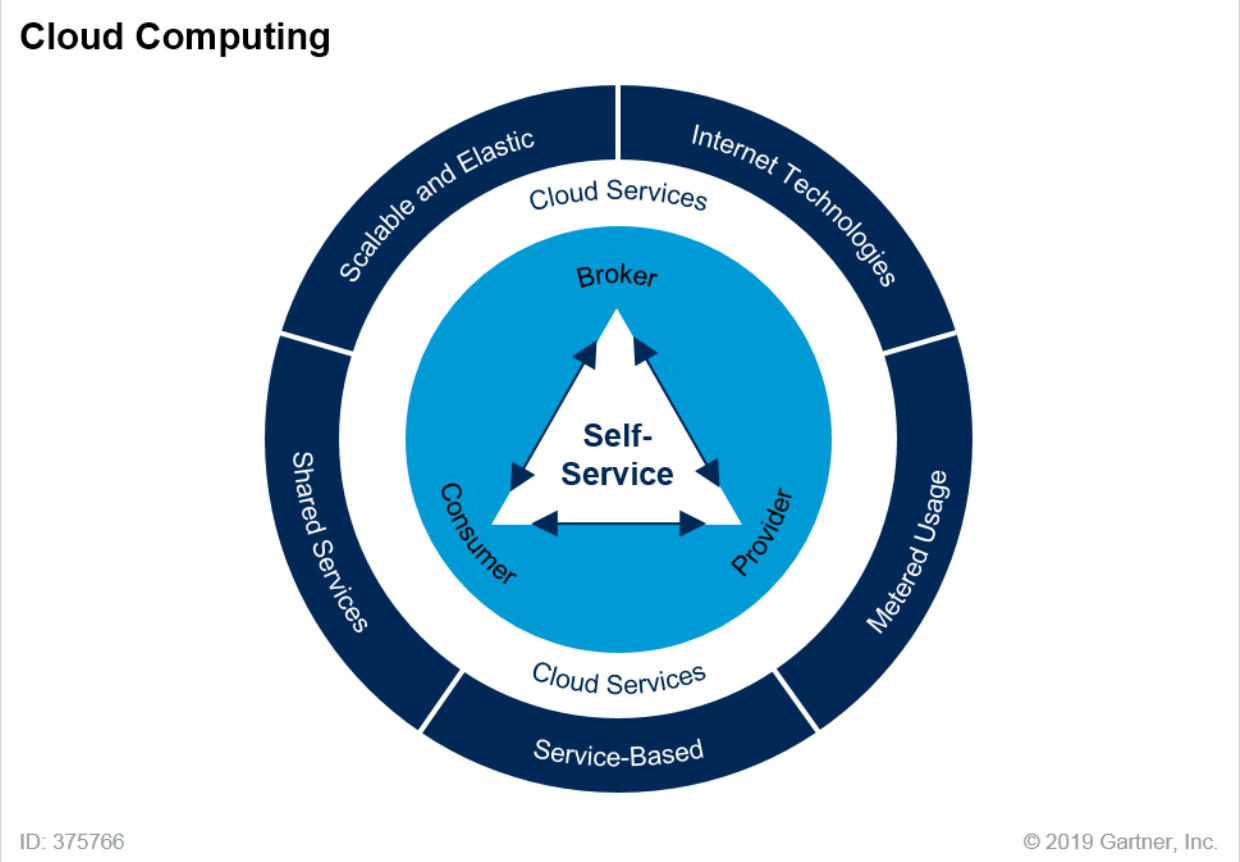
Cloud computing is a critical component of business and IT as next-generation technologies and initiatives (such as digital business, the IoT and artificial intelligence) become reality.

This initiative covers:

- Understanding and tracking cloud trends and identifying opportunities
- Defining and building a cloud strategy to meet enterprise needs
- Consuming, providing and brokering cloud services
- Strategies for exploiting cloud to solve current IT problems and establishing the foundation for the next-generation solutions of tomorrow
- Identifying and leveraging the disruptive nature of cloud computing

Analysis

Figure 1. Cloud Computing Overview



Source: Gartner (January 2019)

Cloud computing has entered its second decade, and its prevalence is increasing as “cloud first” becomes the expected approach to IT. Despite its longevity, cloud computing still suffers from confusion and hype. Also, longstanding nontechnical concerns (for example, cost, security and governance) continue to muddle the opinions and approaches of CIOs, architects and IT leaders. Cloud computing is a broad topic that affects virtually all aspects of IT. Cloud is becoming a vehicle for much of what is considered to be the future of IT — digital business, artificial intelligence (AI) and the Internet of Things (IoT).

Cloud computing is gaining significant investment from end users and vendors as the result of widespread adoption success stories. However, fear and general concerns about relative cost and trust — combined with the confusion caused by “cloudwashing” (using the term “cloud” to obfuscate and make unsubstantiated claims about cloud) — sometimes counteract the enthusiasm and excitement. Balancing value against these concerns is a key part of any cloud strategy.

Enabled and fueled by the consumerization of IT, the SaaS cloud solutions that individuals and business units have brought into the enterprise are shifting the way IT organizations respond to the

immediate and imminent demands of their users. These users also influence the providers from which IT organizations buy and the vendors on which they depend.

Top Challenges and How Gartner Can Help

Crafting a cloud strategy is one of the top issues for Gartner clients. It is often confused with a plan for adopting or migrating to cloud services. Our planned research will guide clients through a pragmatic approach to building a cloud strategy that will empower them to take action now and in the future.

Clients can use the "Cloud Spectrum" found in "Four Types of Cloud Computing Define a Spectrum of Cloud Value" to decide which technologies and characteristics of services are most critical to a cloud strategy. Associated research outlines the different types of offerings in the market today and how to distinguish which offerings can deliver the cloud value proposition. The types within the spectrum include Type 0 (cloud-enabling technologies), to Type 1 (cloud-inspired services), to Type 2 (pure cloud services), to Type 3 (cloud-enhanced capabilities). A cloud-inspired capability might bring more standardization, while a pure cloud type would deliver on the promise of agility and continuous integration. When the proper cloud types are selected, other decisions become easier. "The Top 10 Cloud Myths" highlights how incorrect assumptions about cloud can be damaging.

The topics we cover include these areas:

- **Understanding and tracking cloud trends and identifying opportunities:** Helping infrastructure and operations (I&O) leaders navigate disruptions caused by next-generation trends including digital business, AI and IoT.
- **Defining and building a cloud strategy to meet enterprise needs:** Best practices that I&O leaders can apply to formulate strategy and tactics using cloud and other disruptions.
- **Consuming, providing and brokering cloud services:** Preparing I&O leaders to both consume and deliver cloud services to the organization as part of a hybrid IT strategy.
- **Strategies for exploiting cloud to solve current IT problems and establishing the foundation for the next-generation solutions of tomorrow:** Helping I&O leaders use cloud-based services to address existing and future challenges.
- **Identifying and leveraging the disruptive nature of cloud computing:** Delivering insight into the impact of cloud as a vehicle for disruptive innovations.

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Our research addresses the following client questions:

How should enterprises exploit cloud computing?

Gartner inquiry suggests that cloud strategy represents the single most commonly asked-about cloud topic by clients across all industries, with the exception of cloud security. In trying to craft a

strategy, most businesses and organizations seek a singular path to cloud success. However, in successful cloud deployments, multiple paths to success and cloud strategies must be identified.

The future of IT organizations lies in acting as a type of service broker as part of a broader strategy, which Gartner calls “hybrid IT,” and forming cloud centers of excellence (CCoEs). Forward-looking IT organizations are actively evaluating hybrid IT and assessing how they can leverage this concept. In this model, IT can both consume and provide cloud services to the organization by leveraging cloud-enabled technology.

A common myth is that cloud computing always saves money. And although the potential benefits of cloud include cost savings, agility, innovation, investment protection and improved time to market are often the impetus for using public cloud. These benefits are often less quantifiable, but they are becoming more commonly cited as the true drivers and value of cloud computing as the adoption of cloud computing continues.

Cost issues remain important, and while some organizations save money moving applications into the public cloud, others spend more money running their applications in the public cloud. The key to success is to drive cost transparency and accountability to the business. Cost optimization research spans controlling costs through governance, cloud service expense management (CSEM) and cloud cost reduction.

While enterprises can leverage the cloud in many areas, challenges often exist in adapting an enterprise’s culture and skills, as well as its management, integration and vendor management strategies. These include security, risk management, governance, compliance and disaster recovery. They are sometimes barriers, and these challenges vary by factors such as geography, culture, company size and vertical industry. Some challenges are external (for example, compliance and regulations), but many are internal. Most challenges are nontechnical and related more to attitudes, fears and trust issues.

Cloud computing plays a role in both modes specified in Gartner’s bimodal IT model. Bimodal’s designations of a fast mode of operation, versus a safe mode of operation, are useful in this comparison. Some aspects of the cloud help with efficiency and rock-solid safety, but different aspects can also apply to improving speed, agility and innovation (see “Your Cloud Strategy Needs to Be Bimodal”).

Planned Research

In 2019, we will produce research on:

- Best practices, with advice for formulating a cloud strategy
- Impact Appraisals on emerging trends and structures, including the economics of cloud computing
- Survey Analysis reports on the current state of cloud adoption
- Best-practice analysis for becoming an internal cloud service brokerage and leveraging hybrid IT

- Guidance in identifying and specifying the roles and skills needed to be successful with cloud

How will architectures and techniques evolve to support the many flavors of cloud computing?

There are many ways to leverage cloud computing. The actual cloud services themselves can range from lower-level infrastructure services to high-level business process services, and can span the spectrum from public (shared) to private (dedicated) implementations. Companies can exploit cloud-based services in a variety of ways to develop or source an application or solution (using SaaS).

Hybrid cloud computing is the use of multiple cloud computing services. In most cases, a public source and a private source are involved. Hybrid cloud computing implies significant integration or coordination between internal and external environments. Hybrid cloud computing is different from hybrid IT, but it is often part of the basis for implementing the latter using the broker role. Multicloud computing refers to the use of cloud services from multiple public cloud providers for the same purpose.

Planned Research

In 2019, we will produce research on:

- Survey Analysis documents showing acceptance and plans for cloud-enabling technologies and methodologies (for example, DevOps, cloud-native approaches and microservices)
- Case studies of successful cloud computing development and migration
- Best practices and frameworks for implementing cloud computing architectures, including hybrid and multicloud
- Best practices for establishing hybrid cloud, multicloud and hybrid IT environments
- Best practices for developing multicloud strategies and architectures

How will cloud computing evolve?

With cloud computing well into its second decade, many things are changing. For example, assumptions around security are very different, as the first 10 years saw rampant fear, uncertainty and doubt around security. Cloud computing terms continue to change, and even with the confusion and cloudwashing, the new conventional wisdom is becoming, “cloud is now more secure than on-premises.” This brings new challenges, including keeping it secure.

Categories and definitions continue to evolve, and definitional issues around the cloud persist. Rampant cloudwashing by vendors and users alike continues to confuse those looking to apply the cloud to their IT strategies. The perceived need “to be cloud to be good” continues to drive much of the claims and confusion (see “The Top 10 Cloud Myths”). Even with definitions from Gartner and the National Institute of Standards and Technology (NIST), cloud computing will never have a universally agreed-on view and definition. It means too many different things to different people.

Cloud computing will continue to be a useful term as long as it is meaningful to compare cloud with noncloud offerings. It is best understood by the unique outcomes delivered by cloud services, namely agility, scalability, elastic consumption and payment models, innovation, and cost savings. The continued need for definitional consistency is not academic. Without clarity, organizations embarking on cloud efforts risk failing if expectations are not accurately set as a result of different people meaning different things. This is even more true as newer terms such as cloud native, multicloud and AIOps gain traction.

To compound issues, a natural and continued blurring is occurring in cloud computing. Infrastructure as a service (IaaS) and some platform as a service (PaaS) capabilities are increasingly difficult to discern as separate functions. Leading providers offer both IaaS and PaaS under a common contract and license. Similar blurring occurs between SaaS and PaaS offerings. Pure public cloud and hosted private offerings are becoming increasingly similar, and higher levels of abstraction are masking more of the underlying details. This blurring will continue to challenge cloud clarity.

Planned Research

In 2019, we will produce research on:

- Updated Hype Cycle and Gartner Predicts research, as well as summaries of Gartner's key positions on cloud computing
- Impact Appraisals assessing implications of various aspects of cloud computing
- Survey Analysis reports showing the perception and intent of enterprises toward cloud computing
- Best practices and frameworks for assessing the outcomes related to cloud and "cloudiness"

Which vendors, markets and industries will be transformed by cloud computing?

As a vehicle for next-generation technologies, cloud computing is disruptive by itself. However, it also contributes to the disruptions caused by digital business. Although the impact is formidable for enterprises, it will be just as large, if not larger, for IT vendors. As new business models evolve and become the province of more than just consumer markets, much will change. Consumer-focused vendors are the most mature in delivering global-class offerings from technology and community perspectives. Most investment in recent years has occurred in consumer services.

Although vendors from traditional IT perspectives play roles, many other vendors have come from other backgrounds. Web-centric vendors or vendors from other businesses that have not been technology providers will play an important role in the overall cloud market. Some vendors provide cloud services directly, whereas others provide it intermediately (as cloud service brokers), and still others provide cloud-enabling technologies (whether public or private).

Technologies such as containers and microservices also will affect cloud architectures. The role of open-source approaches is increasing, too, as vendors continue to use potentially disruptive approaches and open source as tools to their competitive advantage.

Cloud computing's impact varies by industry. Some highly regulated industries are somewhat limited in what they can do, whereas other industries are leading the charge in cloud adoption. The impact also varies significantly by the size of the enterprise and by geography.

Planned Research

In 2019, we will produce research on:

- Frameworks and guidelines on how to view and leverage cloud on a spectrum, ranging from enabling technologies to next-generation business that is enabled by cloud
- Updates to appropriate Magic Quadrants, Critical Capabilities and other research for cloud-related markets
- Industry-specific views of Gartner cloud computing survey results
- Cool Vendors in cloud computing, highlighting new offerings in the cloud market
- Innovation Insights highlighting emerging cloud technologies

How can organizations best leverage the disruptive effects that cloud computing creates?

In its first decade, cloud was disruptive primarily to IT itself — fundamentally changing the expectations and capabilities of what IT could provide, thus changing economic models and redefining what was possible. In the second decade, cloud's role is becoming a vehicle for next-generation efforts, a necessary but no longer sufficient catalyst for disruption. Cloud disruptions are moving beyond IT and now impacting business models and the way organizations operate. Revenue growth and competitiveness are increasingly tied to the adoption and incorporation of digital business principles, which rely on the dynamic and innovative foundation established by cloud computing.

While disruptive itself, cloud computing is enabling many disruptions caused by digital business, AI, IoT and other next-generation trends. Most new digital platforms will be cloud-based. Disruption is a huge issue, as vendors are looking for disruptions to take advantage of while protecting themselves from any disruptive forces. They need to assess their cloud (and other) capabilities, and determine their strategies to balance traditional and emerging requirements (see "Digital Disruption Profile: Cloud Computing Disrupts and Enables").

For users, disruption is best approached in multiple ways. Every organization and industry has its own unique issues and opportunities that must be assessed. This should be done within the context of the overall evolution of cloud and other disruptive forces, and their impacts on those industries and organizations.

Planned Research

In 2019, we will produce research on:

- Impact Appraisals looking at the effects of cloud and other disruptions during the next 10 years

- Disruptive ecosystems that require cloud in order to have impact
- Best practices for determining strategy and tactics using cloud and other disruptions
- Frameworks for assessing the disruptive impacts that cloud and other technologies are enabling

Related Priorities

Table 1. Related Priorities

Priority	Focus
Data Center Infrastructure	Data center infrastructure focuses on what is needed to support business-critical infrastructure, applications and operations.
Integration Architecture and Platforms	This integration initiative deals with the architectures, practices and technologies needed to build a pervasive integration capacity that serves as the foundation for digital business.
Cloud and Edge Infrastructure	This initiative guides organizations in the design and implementation of infrastructure that uses cloud computing, edge computing and the networking services that integrate both with existing systems.
Infrastructure, Operations and Cloud Management	This initiative focuses on the infrastructure and operational processes, technologies and human capabilities that enable desired business outcomes.
Application Development and Platforms	Use application development and platform strategies to build and improve internal competencies to create and scale differentiated and innovative digital products that support digital business demand.

Source: Gartner

Suggested First Steps

- “Devise an Effective Cloud Computing Strategy by Answering Five Key Questions” — This report lists how the enterprise architecture team can lead and coordinate efforts to develop a cloud strategy for the enterprise.
- “The Top 10 Cloud Myths” — Learn the list of common misconceptions that organizations should avoid.
- “Hype Cycle for Cloud Computing, 2018” — This research discusses technologies in mainstream use and those that will become the foundation for the future of cloud computing.
- “Hype Cycle for Cloud Security, 2018” — This report examines cloud-security-related terms evaluated on Gartner’s Hype Cycle.
- “Clouds Are Secure: Are You Using Them Securely?” — Learn how to reject unsubstantiated cloud security worries and leverage the benefits of SaaS, PaaS and IaaS.

- “Cool Vendors in Cloud Computing, 2017” — Use this research to evaluate technology trends and anticipate future needs.
- “A High-Level Framework for Planning Your Migration to Public Cloud Services” — Use this framework to bridge the gap between strategy and execution.
- “How to Begin Using Public Cloud Infrastructure as a Service” — This research is a guide for getting started with IaaS.
- “Your Cloud Strategy Needs to Be Bimodal” — This report talks about how bimodal IT helps with cloud strategy.

Essential Reading

- “Market Definitions and Methodology: Public Cloud Services” — This report provides definitions for various cloud service market segments.
- “Magic Quadrant for Cloud Infrastructure as a Service, Worldwide” — This research includes cloud IaaS resources as well as the automated management of those resources, management tools delivered as services and cloud software infrastructure services.
- “Critical Capabilities for Public Cloud Infrastructure as a Service, Worldwide” — Use this research to make both strategic and tactical use-case-specific provider selections.
- “Cloud Strategy Cookbook” — Use this research to review the most important cloud strategies.
- “Four Types of Cloud Computing Define a Spectrum of Cloud Value” — Use this report to examine the value inherent in multiple cloud delivery types to align specific initiatives with purported “cloud” offerings.
- “Selecting a Cloud IaaS Provider for Specialized Scenarios” — This report provides guidance on choosing cloud providers in specific situations.
- “Amazon on the Gartner Cloud Spectrum: Leveraging Pure Cloud Leadership” — Gartner’s cloud spectrum shows Amazon’s intentions in cloud computing.
- “IBM on the Cloud Spectrum: Delivering a Broad Set of Choices to a Wide Audience” — This research shows IBM’s intentions in cloud computing.
- “A Three-Part Approach to Jump-Start Your Cloud Strategy” — Consider these best practices, which can guide cloud adoption.
- “Evolve Your Infrastructure and Operations Organization to Remain Relevant in the Cloud Era” — Use this research to implement changes to ensure cloud strategy success and organizational relevance.
- “Cool Vendors in Cloud Computing, 2017” — Look to these Cool Vendors for inspiration and best practices on the optimization journey.

- "Addressing Lock-In Concerns With Public Cloud Infrastructure as a Service" — Use this research to balance the benefits of strategic cloud IaaS adoption with the risks of vendor lock-in.
- "Technology Insight for Integrated IaaS and PaaS" — Use this report to obtain greater agility and cost-efficiency from public cloud service providers whose capabilities cover the spectrum from IaaS through PaaS.
- "Technology Insight for Multicloud Computing" — This research provides an overview of multicloud computing and its use cases.
- "Digital Disruption Profile: Cloud Computing Disrupts and Enables" — Examine the benefit from cloud disruptions, or fall victim to market changes wrought by cloud disruptions.

Tools and Toolkit

- "Toolkit: How to Create a One-Page Midmarket Cloud Strategy" — This Toolkit offers a customizable template to help midmarket IT organizations determine which IT services are suitable candidates for cloud adoption.
- "Toolkit: Master RFP Template and Sample Content for Business, Digital, Cloud and IT Services" — Use this template and content checklist to populate an RFP for enterprise services deals that follow industry best practices.
- "Toolkit: Evaluate SaaS, Cloud Service and Outsourcing Providers via Objective Selection Scorecard and Risk Management" — This Toolkit provides a pragmatic service provider scoring process and risk identification tool for a variety of deals.

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