



# CLOUD WATCH 2019: TOP 5 APP DEVELOPMENT TRENDS

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## EXECUTIVE SUMMARY

Cloud computing will come of age in 2019, IT industry analysts tell us. 451 Research estimates 90 percent of companies will be in the cloud by the end of the year. Next year, Forrester Research predicts, the biggest cloud providers will get even bigger, containers will reshape virtually every cloud platform, and cloud computing will be firmly established as the foundation of tomorrow's enterprise application platforms.

The advent and evolution of cloud computing has been changing the lives of application developers for more than a decade, but the coming year looks to be a watershed for anyone building applications for the cloud. This white paper looks at five trends that should be on every cloud app developer's radar in 2019.



### 1. CLOUD-NATIVE BECOMES THE "NEW NORMAL"

The mainstreaming of the cloud has been underway for a couple of years now. Most companies have had some kind of cloud strategy in place since 2012, and in 2014, Amazon Web Services (AWS) senior vice president Andy Jassy famously declared, "The cloud is the new normal."

There's certainly no doubt we're getting there. In a 2018 study, the market watchers at [Synergy Research Group](#) found that spending on cloud infrastructure services in the third quarter of 2018 increased 45 percent from the third quarter of 2017.

That study also used the reported earnings data for Q3 2018 from the top cloud providers (Amazon, Microsoft, IBM, Google, and Alibaba led that group) to estimate quarterly cloud infrastructure service revenues (including IaaS, PaaS and hosted private cloud services) to be well over \$17 billion. Industry analyst firm Gartner estimates that 80 percent of internally-developed software is now cloud-enabled or cloud-native.

What makes 2019 the year Jassy's oft-quoted phrase evolves into "cloud native is the new normal" is the increasingly widespread enterprise recognition

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of the competitive value of containers and microservices. In its bi-annual [survey](#) published in August 2018, the Cloud Native Computing Foundation (CNCF) reported that 73 percent of respondents were currently using containers in production, with the remaining 27 percent planning to use them in the future.

effectively a synonym for “container-based development.” A cloud-native strategy, says the CNCF, is about “distributed systems capable of scaling to tens of thousands of self-healing multi-tenant nodes.” Microservices architectures support flexible deployments, which allows organizations

## THE CLOUD-NATIVE APPROACH REQUIRES CHANGES TO THE WAY AN ORGANIZATION DESIGNS AND DEVELOPS SOFTWARE.

The CNCF defines “cloud native” as computing that uses an open source software stack “to deploy applications as microservices, packaging each part into its own container, and dynamically orchestrating those containers to optimize resource utilization.” [Pivotal](#), the company behind the Spring Framework and a container service, defines “cloud native” a bit more loosely as “an approach to building and running applications that exploits the advantages of the cloud computing model.” One more definition from [Stackify](#) combines the two: “An approach that builds software applications as microservices and runs them on a containerized and dynamically orchestrated platform to utilize the advantages of the cloud computing model.”

Cloud-native apps are, of course, designed to run on cloud infrastructure, and in some circles “cloud native” is

to join the trend toward faster release cycles.

Developers who embrace the mainstream momentum of cloud-native/container-based software development during the coming year will be able to provide the increasingly cloud-centric organizations they work for with applications that support automatic provisioning of resources, include auto-scaling features, and are resilient to failures. And they will go a long way toward future-proofing their careers.

The cloud-native approach requires changes to the way an organization designs and develops software, so there are some challenges associated with it. Cultural changes in the dev team ranked highest in that CNCF survey, followed by complexity, lack of training, and security. But developers who embrace the changes, and ramp up their skill sets to meet these challenges, will almost certainly future-proof their careers.

## 2. CLOUD APP SECURITY SHIFTS LEFT—AND AGAIN LANDS ON THE DEVELOPER

The pressure on developers to create secure cloud apps is likely to increase in the coming year, as a growing number of organizations finally get their DevOps/ Agile act together, the line between developers and operations continues to blur, and key aspects of the application development lifecycle *shift left*.

“Shift left” refers to the Agile practice of moving tasks in the software development cycle associated with finding and preventing problems—essentially, software testing—to a point as early as possible in the process. Defining and configuring security at the beginning of the development process, instead of the end, increases software quality, reduces the amount of time required for testing, and mitigates security problems before they become expensive, after-the-fact fixes.

It’s no wonder cloud-centric companies like Amazon, Ebay, and Netflix have famously shifted left in the past few years, and more and more organizations are following their lead.

And yet it’s clear that concerns about cloud security in the enterprise, though lessening, persist. In a 2018 survey by RightScale ([“State of the Cloud Report”](#)), 77 percent of the IT professionals responding said cloud security is a challenge for their organizations, and 29 percent said it was a significant challenge. In a 2018 survey of cyber security professionals by Crowd Research Partners ([“Cloud Security Report”](#)), 90 percent of respondents said they are

concerned about cloud security, citing worries about data loss and leakage (67 percent), data privacy (61 percent) and breaches of confidentiality (53 percent).

IT security mavens have been admonishing developers to build security into their applications for more than a decade. According to one recent estimate, 30 percent of all breaches result from a vulnerability at the application layer. Security expert and author Gary McGraw made it official in his book *Software Security: Building Security In* (Addison-Wesley Professional, 2006), in which he showed developers what they needed to do at the time to adopt secure coding practices.

The critical problem solved by the discipline McGraw and many others advocate is reduced app vulnerabilities that often become attack vectors. But developing secure applications that run in cloud environments adds some complications to this discipline—things like identity and access management (IAM) that needs to be coded into the app, strategic implementations of data encryption, and dealing with Internet-accessible management APIs, among others. And while the market for robust cloud app security solutions continues to grow, developers will still be expected to create applications that don’t add to the inherent vulnerabilities of the public cloud. Plus, in cloud environments, the responsibility for security is shared between the cloud provider and the organization running its apps on that cloud.

But there’s also an opportunity here for developers who appreciate the

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advantages of shifting left, understand cloud-oriented security approaches, and know how to leverage containers and microservices.

### 3. CONTAINERS—AND KUBERNETES—RULE

2018 saw a serious proliferation of container deployments and a genuine surge in enterprise demand for Kubernetes to enable cloud-native applications and to modernize IT infrastructure. The impact of containers as a standard means of packaging application code, configurations, and dependencies into a single object has been significant; the rise of the Kubernetes open source container orchestration platform has been dazzling. Together, they have emerged as must-haves for an increasingly cloud-focused enterprise.

More than one industry analyst is predicting that Kubernetes will become ubiquitous in the enterprise in 2019. It is widely considered the de facto cloud orchestration layer; some are describing it as the operating system for cloud-native applications. At the very least, it has become an industry standard for the successful management of large container deployments. In a recent [survey](#) conducted by machine data analytics

platform maker Sumo Logic, one in three of the 1,600 enterprise customers queried said they were currently using managed or native Kubernetes orchestration solutions, and 28 percent said they use Docker containers in AWS.

Kubernetes has become the primary enabler of cloud-native applications, and it has proved to be a critical supporting technology for multicloud strategies. The authors of the previously cited RightScale report, found that 81 percent of enterprises are currently pursuing a multicloud strategy. Kubernetes is seen as technology that will increase multicloud adoption. Also keep in mind that orchestration tools like Kubernetes are what make containerization at scale possible.

Enterprises of all sizes will continue to bet big on Kubernetes in the coming year—which is why Microsoft Azure, and Amazon Web Services recently began offering Kubernetes services. Getting up to speed on this technology should be priority one for every cloud app developer.

### 4. THE CLOUD BECOMES AN AI ENabler

When it comes to tech industry hype, nothing came close in 2018 to the hoopla hurricane swirling around artificial intelligence (AI) and machine learning (ML).

Much of it was wind, but there's no doubt that these technologies are having an impact on a host of industries. As we head into 2019, enterprise interest in experimenting with AI is only going to grow.

Of particular interest to cloud app developers looking ahead to the coming year are several trends that combine AI and cloud computing. According to analysts in Deloitte's Technology, Media, and Telecom group, for example, 2019 will see a growing number of organizations accelerating their usage of cloud-based AI software and services. In their [report](#) ("Technology, Media, and Telecommunications Predictions 2019"), they predict that 70 percent of companies using AI will be employing cloud-based AI software and services, which will "accelerate their adoption and spread their benefits" throughout the organization. They also expect 65 percent of those companies to create AI applications using cloud-based development services. And by 2020, the penetration rate of enterprise software with AI built in, and cloud-based AI development services, will reach an estimated 87 percent and 83 percent, respectively.

Two other cloud-plus-AI trends to watch: the major cloud platform providers (AWS, Google Cloud Platform, IBM Cloud, and Microsoft Azure), gearing up for a push to provide AI as a service (AlaaS) in the coming year; and Kubernetes-orchestrated containers becoming key components in the AI pipeline. (Several AI tool vendors already support building and deployment of containerized statistical models within cloud-native computing environments.)

The challenge here for cloud application developers is one that virtually all developers are facing: ramping up their AI and ML programming skills. But this is also the opportunity, because many companies lack AI expertise, so this skill-set is in demand. Consider this: In that Deloitte report, which surveyed 1,900 "cognitive-aware" executives in 10 industries whose companies have begun to use AI, 41 percent reported that a skills gap was inhibiting their AI initiatives—27 percent said their skills gap was "extreme."

## 5. LEGACY TRANSFORMATION RAMPS UP

A number of industry analysts expect application modernization/transformation to take off in 2019 as enterprises ramp up for the migration of their monolithic legacy apps to hybrid clouds. Forrester has [predicted](#) "a major transformation of legacy apps using powerful container-based, cloud-native digital application platforms" in the coming year.

Gartner [defines](#) a legacy application as "an information system that may be based on outdated technologies, but is critical to day-to-day operations." Organizations need to modernize their legacy apps if they want to remain competitive, and they know it. In a recent survey by MuleSoft ("Connectivity Benchmark Report 2018") 42 percent of the responding organizations cited legacy infrastructure and systems among the top three challenges to their digital transformation efforts. Analysts at Gartner [predict](#) that every dollar invested

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in digital business innovation through the end of 2020 will require enterprises to spend at least three times that to continuously modernize the legacy application portfolio.

Digital transformation in general is expected to gain momentum in the coming year. That term, of course, refers to the integration of digital technology into all areas of a company or organization. The publishers of the [i-Scoop website](#) offer a more expansive definition worth noting: “Digital transformation is the profound transformation of business and organizational activities, processes, competencies and models to fully leverage the changes and opportunities of a mix of digital technologies and their accelerating impact across society in a strategic and prioritized way, with present and future shifts in mind.”

Cloud app developers are likely to play a key role in this legacy app transformation, because containers and microservices are going to be critical enablers of the change. The expense and complexity of a rip-and-replace strategy will likely drive companies to use cloud technologies to provide an integration layer among their legacy systems and modern apps and devices.

### CONCLUSION

The industry watchers at Gartner [expect](#) the global public cloud services market to exceed \$200 billion in 2019. Cloud app developers will find serious challenges and compelling opportunities in that massive marketplace. As cloud computing “comes of age” in the coming year amid the trends outlined above, demand for their expertise will increase and almost certainly accelerate.

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