FEATURE

Five vectors of progress in cloud computing
How companies are looking to get more value from cloud

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SIGNS FOR STRATEGISTS
A LARGE MAJORITY OF enterprises are using cloud computing, but IT directors have committed relatively few resources to the cloud—perhaps because the connection between budget and value can be unclear. The five vectors of progress described here can help drive broader and deeper adoption of cloud computing and enable enterprises to get more value from their shift to the cloud.

**Signals**

- A Deloitte survey found that 49 percent of companies that have deployed artificial intelligence (AI) today are using cloud-based services.¹
- Five industry groups are expected to spend nearly US$45 billion in industry-specific cloud solutions in 2019, up from US$37.5 billion in 2018.³
- Since 2018, tech companies have spent more than US$1.5 billion to acquire more than a dozen startups enabling cloud-native development.⁴
- The market for serverless computing is forecast to grow by 33 percent each year and reach US$7.7 billion by 2021.³
- AWS, Google, and Microsoft are all offering support for hybrid clouds.⁸

While three-quarters of enterprises have adopted the cloud to some degree,⁷ leaders have moved only
20 percent of business processes to the cloud, according to Ovum, a technology market researcher. This suggests that companies have a ways to go in utilizing the cloud as a platform for enterprise digital transformation, not just as a way to lower IT capital expenditure and accelerate service delivery. The vectors of progress discussed below could drive faster adoption of cloud and help companies derive additional value from it.

The adoption of AI

Many enterprises are increasing their AI investments at a fast pace—indeed, IT market researcher IDC projects that spending on AI systems will grow at an annual rate of 38 percent in the coming years, exceeding US$79 billion globally in 2022. AI investment is having a major impact on every aspect of business, from strategy to IT infrastructure—including the adoption of cloud computing.

Cloud vendors are stoking demand for AI technology by offering a growing number of tools and services that make it easier to develop, test, enhance, and operate AI systems without big upfront investments. These include hardware optimized for machine learning, application programming interfaces that automate speech recognition and text analysis, productivity-boosting automated machine learning modeling tools, and AI development workflow platforms. All this is making it easier for enterprises working in AI to adopt cloud-based AI services. For instance, Walgreens plans to use Microsoft’s Azure cloud-based AI platform to develop new health care delivery models, while one of the world’s largest shipbuilders is using AWS to develop and manage autonomous cargo vessels. The American Cancer Society uses Google’s machine learning cloud services for automated tissue image analysis.

The symbiosis between cloud and AI is accelerating the adoption of both. Indeed, Gartner predicts that through 2023, AI will be one of the top workloads that drive IT infrastructure decisions. Technology market research firm Tractica forecasts that AI will account for as much as 50 percent of total public cloud services revenue by 2025: AI adoption means that, “essentially, another public cloud services market will be added on top of the current market.”

Automated data classification

Traditional IT environments employ a perimeter-based approach for security—keeping out bad actors—whereas the cloud relies on authentication and authorization: identifying who should be able to do what with which assets. Hence, an outright lift-and-shift of legacy workloads to a public cloud can result in unwanted data exposure and regulatory noncompliance. A recent IDC survey suggests that security concerns are now the main reason companies are migrating applications and data from a public cloud to an on-premise or private cloud. There are ways to gain finer-grained control over data in the cloud, and automated data classification is making this job easier.

Data classification tools categorize workloads and data to be migrated based on sensitivity and business impact. This makes it possible to adopt a tailored and granular approach to securing the different assets. Amazon, Google, and Microsoft all offer classification capabilities that integrate with their cloud solutions. Security providers have also partnered with cloud providers to support automated data classification. For example, a leading computer security software firm’s solution for AWS automates data classification and the identification of assets that require security audit. Globally, spending on data classification solutions is growing at 25 percent annually, according to one projection.

Increasingly, these tools use machine learning to more effectively classify content such as personally identifiable information or sensitive commercial,
This can expand the range of data and apps that can be migrated to the cloud with confidence. Automated data classification tools allowed US-based car shopping and information platform, Edmunds, to better discover, classify, and protect its data in the cloud; administrators received actionable information about potential threats, including threats otherwise difficult to notice.

All of this can make for a more secure migration of legacy systems to the cloud, facilitating the protection of assets against theft or loss as well as compliance with regulatory standards, such as the Health Insurance Portability and Accountability Act (HIPAA) or General Data Protection Regulation (GDPR). This vector of progress is helping to drive migration to the cloud by lowering the cost of managing risk and protecting data assets in the cloud.

Industry clouds

Some companies may not want to confront the challenges of migrating core legacy applications that have been customized over the years to meet industry-specific requirements. Others may want to upgrade their systems to support modern operating models without necessarily building everything from scratch. Industry clouds can provide an attractive pathway for such organizations to take advantage of the cloud.

Industry clouds—cloud-based applications tailored for a specific industry—are becoming increasingly popular. IDC finds that companies are already demanding industry-specific solutions and expertise from their cloud service providers. In response, many cloud vendors and SaaS players such as AWS, Google, Microsoft, and Salesforce are expanding their portfolio of industry-specific offerings. The industry cloud landscape also includes niche sector-focused players, such as Accela for government, Veeva for life sciences, and Viewpoint for construction. Overall, IDC expects the industry cloud market to expand at accelerating, double-digit rates through 2021. In 2019, five industries alone—health care, finance, manufacturing, public sector, and retail & wholesale—are expected to spend nearly US$45 billion on industry clouds, up from US$37.5 billion in 2018.

Industry clouds can handle data sources, workflows, and compliance with standards that are unique to an industry. And by aggregating the data from multiple clients, an industry cloud vendor may be able to offer additional benefits such as industry insights or benchmarks. For example, an industry-focused cloud by a US-based network-enabled services provider targeting the health care sector helps manage large volumes of EHR data with HIPAA compliance and offers health care–specific services such as handling medical billing and care coordination. The company also claims to enhance workflows with insights drawn from the collective data of nearly 160,000 providers and 100 million patients.

Industry clouds provide a ready-to-use environment with tools and services tailored to a specific sector’s operational requirements, helping to lower the barriers to adoption of the cloud there.

IT operations and software development models

IT organizations are looking to the cloud to reduce costs and increase business agility. But traditional IT operating styles—manual and siloed processes to deliver monolithic applications—can limit these benefits. The growing adoption of new IT operating models such as DevOps and new application development paradigms such as cloud-native development is helping organizations wring more value from the cloud.

DevOps fosters collaboration between the software development (Dev) and IT operations (Ops) teams. It also automates processes, such as for testing
and deploying code, to enhance delivery efficiencies beyond what is achievable with cloud adoption alone. A CA Technologies survey found that cloud adoption improved software delivery performance in terms of speed, predictability, quality, cost control, and customer experience by 53 percent.

Combining DevOps with cloud improved performance by 81 percent. This vast potential for improvement is driving robust DevOps adoption, with IDC forecasting the market for DevOps tools to have a five-year CAGR of 15 percent and reach US$8 billion by 2022.

For some enterprises, IT operating models are evolving further, to “NoOps” and serverless environments in which cloud providers automate many systems administration tasks and take over infrastructure and security management. This can yield substantial cost savings and other benefits.

Meanwhile, new application development models are also helping enterprises get more value from the cloud. Cloud-native development that leverages containers and microservices, though still nascent, is on the rise. In a 2018 survey by platform-as-a-service provider Cloud Foundry, 20 percent of IT decision-makers were focusing primarily on new cloud-native development, up 5 percentage points from 2017. Insights from Deloitte’s Open Source Compass tool reveal that there were more than 29,000 microservices-related GitHub contributors in 2018, a 45 percent annual increase, confirming the progress of cloud-native development.

Cloud-native development can unlock even greater savings, and other benefits, from the cloud. Containerization reduces applications’ compute footprint to reduce costs, while also making apps modular to support extensibility and rapid development. For instance, a leading education services provider’s adoption of microservices and containers for its applications in the cloud reduced the number of virtual machine instances by 70 percent, resulting in 40 percent cost savings per application. Containers also enabled automation of application update deployment, reducing the time taken to minutes from hours.

As enterprises evolve their IT operations and app development models to take fuller advantage of the cloud, they have the opportunity to capture more benefits from it. This vector of progress is creating a stronger business case for migration to the cloud.

Hybrid cloud

Migration to a public cloud can be complex, time-consuming, and expensive because it may necessitate substantial changes to their legacy apps. For many companies, not only are their legacy apps not ready for the cloud now—they may never be ready, for reasons including architectural incompatibility, data ownership, and compliance. This fact can dampen enthusiasm for adoption of the cloud. But hybrid cloud architectures provide a way for enterprises to take advantage of the cloud where appropriate while leaving some legacy applications in place, on-premise.

Hybrid clouds are a mix of on-premise, private cloud and third-party public cloud with a degree of workload portability, integration, orchestration, and unified management, such that workloads can move between the two environments. In a 2018 Microsoft survey, 67 percent of IT professionals and business decision-makers were already using or planning to deploy a hybrid cloud, with 54 percent of users choosing hybrid recently—in the past two years. Recent offerings by vendors such as Google and Microsoft enabling centralized management of workloads across the various environments will likely further encourage more organizations to adopt hybrid clouds.

With a hybrid cloud, enterprises can gain the benefits of public cloud for scalability, business continuity, external collaboration, and access to cutting-edge technologies for innovation while retaining the on-premise option for certain legacy...
apps. For instance, Deutsche Bank has adopted a hybrid cloud infrastructure, with some technologies already in production hosted on-premise, along with “massive-scale [public] cloud resources.” This has enabled the bank to run more than 40 percent of its workload on 5 percent of its total infrastructure, reducing the time taken to go from proof-of-concept to production from months to weeks. Moreover, hybrid cloud can let enterprises retain data within their enterprise boundary and simultaneously leverage AI-powered services delivered exclusively through the cloud.

The improvement and adoption of hybrid cloud management platforms is a vector of progress likely to encourage more enterprises to embrace the cloud as a way to blend new and legacy technologies best suited to their unique requirements.

Capturing more value from the cloud

The evolution of cloud computing has been remarkable. The journey from the “No Software” campaign that Salesforce used in its early days to today has seen not only a rapidly growing market and vibrant innovation but a shift in mindset and practices pointing toward a new IT operating model and software development paradigm. The five vectors of progress in cloud computing discussed here are continuing to propel this evolution.
Endnotes


2. Quid analysis.


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25. IDC, “Worldwide spending on industry cloud by retailers and wholesalers forecast to reach $6.1 billion in 2018, according to IDC.”


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Industry leadership

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