Cloud computing represents a fundamental shift in the delivery of information technology services that has permanently changed the computing landscape.

Over the past few years, cloud computing has rapidly emerged as a widely accepted computing paradigm. The research and development community has quickly reached consensus on core concepts such as on-demand computing resources, elastic scaling, elimination of up-front capital and operational expenses, and establishing a pay-as-you-go business model for computing and information technology services.

With the widespread adoption of virtualization, service-oriented architectures, and utility computing, there’s also consensus on the enabling technologies necessary to support this new consumption and delivery model for information technology services. Additionally, the need to meet quality-of-service requirements and service-level agreements, including security, is well understood.

The origins of cloud computing lie in modern distributed computing infrastructures,1 which emerged after the invisible grid concepts were introduced.2 The telecom industry was perhaps the first to conceptualize the term cloud in the early 1990s as an abstraction of the underlying network infrastructure, offering end-to-end visibility into the network as well as the ability to monitor from the network’s edge to its core, including every hub, router, and switch needed, together with providing assurance that the network was operational when needed. However, the introduction of computing clouds as opposed to earlier communication clouds didn’t happen until 2006, when Eric Schmidt3 first described Google’s software-as-a-service (SaaS) approach.

The term cloud computing became mainstream rapidly after Amazon launched its Elastic Compute Cloud (EC2).4 Although it began with the SaaS connotation, the technology rapidly morphed into different computing levels, with the platform-as-a-service (PaaS) and infrastructure-as-a-service (IaaS) connotations having more to do with managing the infrastructure.

Subsequently, a new discipline rapidly emerged based on cloud computing’s layered architecture with accepted succinct definitions of SaaS, IaaS, and PaaS;5 well-identified technical and nontechnical challenges and opportunities; and clear terms to quantify comparisons between cloud and conventional computing.

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Given the number of publications on this topic, the goal of this special issue is to build on the standard concepts and definitions and to provide a simple conceptual frame-
work within which emerging new technologies, services, and application domains can be mapped onto the cloud computing landscape. We view this landscape as comprising cloud providers, cloud component technologies, and cloud adopters.

We begin with an article from Appirio that provides an insightful analysis of early enterprise cloud adopters and their journey in adopting this technology. This work offers a pragmatic context for the next three articles from leading cloud vendors—Microsoft, Hewlett-Packard, and IBM—which provide services at the IaaS, PaaS, and SaaS levels.

Other major cloud providers include Amazon, Salesforce, Google, VMware, and NetApp. Some of the early workloads that are migrating to the cloud include e-mail and collaboration, development and test, analytics, and vertical industry solutions.

An interesting example of a cloud service is the Sharp Community Medical Organization, a nonprofit group of 5,000 independent physicians in San Diego County, California, who are leveraging a healthcare collaboration cloud where patients can coordinate their care across physicians. With sponsorship from ActiveHealth, the organization is now positioning to reward physicians when patients stay healthy.

Most recently, IBM’s Cloud Service Provider Platform (CSP2) has helped telecom companies that want to become cloud services providers do so efficiently and effectively by offering services to help them market their cloud services to adopters. An important facet for any cloud provider is enabling an ecosystem that can ensure successful service fulfillment.

In the cloud component technology category, an article from Symplified highlights identity management as one of the important component technologies for cloud providers. Other representative technology components include provisioning and management, storage and systems management, development and load testing, data warehousing and analytics, as well as application and WAN acceleration.

Finally, we conclude this special issue with a perspective on disruptive innovation from the venture capital community that highlights the importance of “communities” that attract ecosystems of cloud adopters to a particular cloud provider and technology.

It has taken only a few years for cloud computing to gain momentum within industry and academia alike. Rest assured that this technology is here to stay because of the unprecedented opportunity to realize economies of scale not envisioned before. Over the next decade, cloud platform providers may expand the types of services delivered; new component technologies may create shifts in platform standardization, commoditization, and differentiation; and cloud adopters may gravitate to specific providers for certain workloads. Nevertheless, this fundamental paradigm shift in computing and delivery of information technology services will have changed the computing landscape permanently.

References


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