Cloud computing is more than just another IT platform shift—it will transform not only the IT industry, but every sector of society.

Several converging and complementary factors have led to cloud computing’s emergence as a new IT service delivery model that appeals not only to the IT industry but also to individual users, businesses, educational institutions, governments, and community organizations.

This new bimonthly column will examine cloud computing’s impact now and in the future. Contributions from researchers, developers, service providers, adopters, and others will address questions related to technological trends and developments, research opportunities, best practices, standards, and compliance requirements and regulations from various perspectives.

To trigger an ongoing discussion, this inaugural article highlights the cloud’s current status and importance, examines the key questions that cloud adopters and providers face, and explores the new paradigm’s transformational potential.

UP IN THE SKY

Driven by cloud technology, mobile devices such as smartphones and tablets, and applications supported by ubiquitous broadband Internet access, the computing landscape—both personal and enterprise—is changing once again. There’s an accompanying paradigm shift in the way we deliver and use IT.

The cloud computing computational model provides applications, data, computing resources, and IT management functions to clients as a service through the Internet or a dedicated network. It offers many promising benefits including scalability, flexibility, freedom from system maintenance, and lower costs, especially up front—a continuous pricing structure avoids a huge capital expenditure at the time of purchase.

Cloud computing is also helping to close the global digital (information) divide, particularly in developing economies. It might even help save our planet by providing an overall greener computing environment.

This new computing model is drawing interest not only from end users, businesses, and the IT industry but also from governments, researchers, and professional and industry associations. Embracing cloud computing, however, requires a new mindset—a novel way of thinking about data storage and the deployment of software and other computing functions.

In the cloud computing environment, organizations must alter their approach to addressing issues such as information security and privacy, control, and ownership. There are also some perceived—and some real—risks associated with cloud computing, including performance, security, regulatory compliance, outage and service interruptions, and data ownership.

However, for most applications and users, the benefits of cloud computing outweigh the limitations, particularly when the risks are properly assessed and addressed. As a result, cloud computing is
The Cloud Cover column will cover a wide range of questions pertaining to this emerging computing paradigm, including the following:

- What is cloud computing’s real potential? How can we leverage it?
- What have we learned so far from our experience with cloud computing? What are the success factors?
- What opportunities does cloud computing present to businesses, IT developers, and individuals? How can we exploit those opportunities?
- What are the key challenges in embracing cloud computing and how can we address them?
- Is cloud computing viable for business-critical enterprise applications? How compelling are the economics of cloud computing compared to a well-managed enterprise data center or IT system?
- What types of cloud application platforms or frameworks will prove popular in a marketplace?
- How dominant will “private clouds” be within an enterprise, or a group of enterprises? For what sort of enterprises or applications?
- How will vertical clouds, also called community clouds, meet the special needs of the specific groups they target, such as healthcare, finance, law, and education?
- How dependable are current cloud services? How can providers enhance the reliability of their services and gain users’ trust?
- What have we learned from major cloud outages and failures? What can we do to minimize their occurrence and their impact on users?
- How can we manage and secure information and applications in the cloud?

The “Cloud Questions” sidebar provides a list of key queries that arise among the various stakeholders—IT professionals and executives, end users, researchers, and policymakers and regulators.

Questions that support and encourage freedom of choice and integration)?
- What initiatives and developments are shaping the cloud? How can professional societies and industry associations help advance cloud standards, policies, and regulations?
- How will the nexus between cloud computing and big data, analytics, and mobile applications give rise to new kinds of applications that previously weren’t feasible or even imagined?
- How will cloud computing shape the future of the IT industry, business, and society as a whole?

marching toward mainstream adoption and is being offered in many shapes and sizes.

EXPLORING THE CLOUD

As we embrace cloud computing and leverage its features for diverse applications, several questions arise that will have an impact on the cloud’s future. The “Cloud Questions” sidebar provides a list of key queries that arise among the various stakeholders—IT professionals and executives, end users, researchers, and policymakers and regulators.

Depending on their goals and experience with the cloud, different people are likely to give varying, even conflicting, responses to these questions. This column will address these issues and provide a holistic examination of cloud computing in all phases of its evolution.

CLOUD OUTLOOK

Cloud computing is more than just another IT platform shift—it will transform not only the IT industry, but every sector of society.

Advances in cloud computing are occurring at a staggering pace. According to a 2012 report published jointly by the Cloud Security Alliance and the Information Systems Audit and Control Association (Cloud Computing Market Maturity: Study Results, ISACA, 2012), cloud computing is “at the point of advancing from infancy to growth and is reaching a level of maturity at which enterprises can benefit greatly by adopting cloud infrastructure, platform or software service offerings.” The report also provides guidance for understanding cloud market maturity and how we can address the factors that inhibit our ability to leverage cloud computing’s benefits.

Having a cloud strategy is becoming an IT essential in many business sectors, particularly for small- and medium-size businesses (SMBs) and start-ups, as well as emerging economies. SMBs that previously couldn’t afford to invest in IT resources can become competitive by taking advantage of cloud computing services. Having access to a range of high-end IT applications and services on a scalable, as-needed basis gives SMBs tremendous opportunities and offers a significant advantage as they compete with larger businesses.

Corporations are eagerly investing in promising cloud computing technologies and services not only in developed economies but also increasingly in emerging economies—including India, China, Singapore, Taiwan, the Philippines, and South Africa—to
address a region's specific needs (S. Murugesan, “Cloud Computing Gives Emerging Markets a Lift,” IT Professional, Nov./Dec. 2011, pp. 60-62). Companies can leverage the cloud’s flexibility and versatility to enter new markets quickly with little overhead costs and reduced financial risks. Innovations in technology, design, service delivery, and business models are needed to make further inroads and embrace the cloud’s untapped potential.

Within the next five years, individuals and enterprises alike will be computing in one or more clouds, public or private, and cloud computing will become the new normal. Although there are major stumbling blocks to migrating enterprise applications into the cloud—including concerns about reliability, performance, bandwidth requirements, trust, and security issues—they’re gradually being addressed. Government regulations and other compliance requirements, which often lag behind market innovations and demand, will be developed in due course.

But before jumping onto the cloud bandwagon, it’s important to understand exactly what that means. The articles published in this column are intended to motivate researchers, cloud service providers, IT professionals, and industry and professional associations to address the cloud’s limitations and develop solutions to the real problems facing businesses and communities in both developed and emerging regions.

San Murugesan, Cloud Cover column editor, is the director of BRITE Professional Services, Australia, and an adjunct professor at the University of Western Sydney. He’s the coeditor of Harnessing Green IT: Principles and Practices (Wiley-IEEE, 2012), associate editor in chief of IT Professional, and the leader of IEEE CS Cloud Computing STC’s publishing group. Contact him at san1@internode.net or follow him on Twitter @santweets.

**Column contributions**

We welcome short articles (1,500 to 2,000 words) for publication in the Cloud Cover column that address the cloud questions outlined here. Submit your ideas for advancing the technology or share your experiences in harnessing the cloud at cloudcover@computer.org.