The cloud has quickly become one of the most disruptive forces in recent IT memory. Offering greater reliability, improved flexibility, lower costs, and simpler deployment, the cloud has undeniable potential to benefit all users and businesses. Yet, for all of its promise, the cloud is relatively young. Many enterprises still express concern about adopt­ing the cloud full-scale for critical workloads. The most cited reason for not moving to the cloud is concern about security. In particular, managing user identity and access in the cloud is a tough problem to solve and a big security concern for organizations.

Identity management in the cloud is especially diffi­cult because of the cross-cutting nature of identity and its impact across architectural and organizational do­mains. Many businesses fear that using the cloud exposes them to possible attacks and data breaches. Additionally, many companies are not equipped to manage identities at enterprise-scale and in the cloud because they lack flexible identity management that encompasses both domains.

Identity management must evolve for the cloud to become a trusted computing platform. A revolutionary approach to identity management - a federated *identity fabric* - spans enterprise and cloud boundaries.

**Cloud Computing: Raising the Scalability Bar**

Cloud computing provides convenient, on-demand net­work access to a shared pool of configurable computing resources - networks, servers, storage, applications, and services - that can be rapidly provisioned and released with minimal management effort or service provider interaction ([see this link](http://thecloudtutorial.com/nistcloudcomputingdefinition.html)). It offers organizations a way to increase capacity or add capabilities instantaneously without investing in new infrastructure, training new personnel, or licensing new software.

Cloud computing encompasses any subscription-based service that, in real time over the Internet, extends IT’s existing capabilities[1]. Public clouds generally refer to software-as-a-service (SaaS) apps like those provided by Salesforce.com and infrastructure-as-a-service (IaaS) platforms like Amazon Web Services. Private clouds are apps or platforms dedicated to a specific organization and deployed on-premises, usually behind the firewall.

**Performance scalability**

When they consider scalability, many people immedi­ately think about how a system will handle large volumes of transactions, floating-point operations per second, and so on. A key characteristic of the cloud is its ability to offer elastic scalability by easily increasing or decreasing compute power to meet changing demand. For instance, scaling up an application using a larger virtual machine (VM) on Amazon Elastic Compute Cloud (EC2) can be a quick fix when large-scale computing power is needed right away. Taking this concept further, new cloud apps are architected to scale out linearly with an *N*+1 architec­ture to support almost unlimited expansion.

By being broadly available to developers and delivering impressive results, cloud computing has experienced re­markable growth. For instance, Force.com - the Salesforce.com cloud platform - now processes more than 10 bil­lion transactions per quarter, more than half of which are through its API ([see this link](http://www.salesforce.com/platform/cloud-infrastructure/scalability.jsp)), and Twitter handles more than 3 billion requests daily on its APIs[2]. Further, the In­ternet is expected to grow significantly in the near future: AT&T expects a 50× increase in Internet traffic by 2015[3].

**Integration and management scalability**

A less obvious challenge with scale relates to the speed at which an organization can deploy, integrate, and administer a system over time. As the system incurs friction - in an administrative effort, for instance - this creates a drag on system scalability, particularly with respect to identity management. If infrastructure is defined as common hardware, software, and network­ing services leveraged across the enterprise to deliver IT capabilities, identity management infrastructure includes directory services, identity and access management ser­vices, network proxies, and authentication systems used enterprise-wide. Today, many enterprises are struggling to build an identity infrastructure that can work with the cloud architecture and scale in an elegant, cloud-like way.

In order to scale to meet the cloud’s architectural and growth demands, system architects must focus attention on optimizing the management and integration of identi­ties. Identity management is a key bottleneck to cloud adoption for many enterprises. Architects understand that they must look beyond the basic performance aspect of cloud scalability and devise a strategy to scale the manage­ment and integration of identities as well.

## A Cloud-Scale Identity Fabric

Various technologies, standards, and use cases enable the portability of identity information across otherwise autonomous security domains, letting users of one domain securely access data or systems of another seamlessly, without redundant user administration. Federated identity thus “weaves together” multiple elements and domains, much like a fabric.

In the past, companies stored network identities in directories and databases. With the Internet’s growth and the emergence of cloud apps, they recognized a need to manage identities outside the traditional network. Today, network administrators must manage multiple accounts for enterprise and new cloud apps. This duplication of effort has added to the workload and introduced new security concerns resulting from the many user identities and pass­words that administrators must manage. Collaboration with external partners and contractors has also required companies to open their network borders to outsiders.

With so much IP and data at stake, enterprises must seamlessly adopt identity management to link to the cloud. To achieve a successful identity management solution for the cloud, the industry must ensure that identity meets the cloud’s unique architectural needs; view identity as a fabric that integrates, abstracts, and extends; and deliver identity as an IaaS in the same manner as the cloud platforms it is supporting.