

END-TO-END SECURE CLOUD SERVICES



A PERTINO WHITE PAPER

Abstract

Whether companies use the cloud as a conduit to connect remote locations and mobile users or use cloud-based applications, corporations have found that they can reduce costs, complexity, and management by leveraging cloud resources. But for many, cloud security remains a concern. This paper examines how cloud-based services ensure their systems are secure and how any business—large or small—can confidently use the cloud for a variety of services from compute, to storage, and even networking when they add innovative, non-disruptive security measures from Pertino.

CLOUD COMPUTING: A BRIEF HISTORY

The first cloud application according to most experts was the 1999 launch of Salesforce.com. Developed as a service accessed over the Internet to help sales reps track, record, and report on their sales leads, the company has grown to a multibillion dollar company that now offers complete customer relationship management software to millions of users worldwide.

In 2002, Amazon was the first company to “rent” computing and storage resources to corporations on its existing cloud data centers through its Amazon Web Services. It then followed up with its Elastic Compute Cloud (EC2) in 2006, making cloud computing available to the masses with inexpensive and highly flexible computing, storage, and application development tools.

With the advent of Web 2.0, the industry saw a third wave of cloud computing adoption as major companies such as Google and Microsoft and many others offered software services, and social media, and streaming media over the internet to any and all—from corporations to individual users.

The birth and growth of cloud computing depended on three technology breakthroughs:

- High-speed Internet access
- Virtualization of computing resources and storage
- Secure isolation of multiple cloud users (tenants) within one data center

Yes, *security* was the final key to making cloud computing a success.

LEADING CLOUD VENDORS DELIVER SECURITY BEST PRACTICES

The most advanced cloud vendors focus on every facet of security, including comprehensive physical security and leading-edge technical expertise and equipment. In this way, customers can confidently use the cloud in the form of Software as a Service, for hosting their own applications, or as a conduit for network transport.

HARDENED FACILITIES

The first line of defense for cloud providers is hardened data facilities. These measures include the following:

- **Flood, fire, and natural disaster protection:** Cloud providers make certain their facilities are located in buildings that are highly resistant to flood, fire, and other natural disasters, such as earthquakes and severe weather.
- **Redundant systems:** Backup power, cooling, and heating systems ensure that the computing facility is virtually immune to system outages from power disruptions/fluctuations or extreme temperature variations.
- **Physical security:** Guards, security cameras, and biometric access to the facility ensure that no unauthorized personnel come anywhere near the cloud infrastructure.
- **Security access levels and background checks:** Top-flight cloud providers make certain that only the most trusted employees ever gain access to the physical assets in their cloud infrastructure, and all personnel at the facility go through extensive background checks and security assessments. Server and storage cages are locked. Access to data centers is limited to only the most trusted individuals who are electronically logged in and out of the facilities with extensive audit trails of their activities.

LATEST TECHNOLOGY

These world-class cloud providers are continually upgrading and improving the following types of security technology on an aggressive schedule:

- **Continual upgrades:** The most trusted cloud providers make certain that all management software, virtualization software, operating systems, and application tools are upgraded as soon as possible. Security patches and upgrades receive the highest priority.
- **Best-of-breed hardware:** As new and more secure hardware becomes available, such as firewalls, switches, and load balancing appliances, the best cloud providers rip-and-replace the old with the newest and best solutions available. In addition, these cloud vendors only purchase best-of-breed products from trusted sources, eliminating the possibility of any supply-chain compromises or the introduction of inferior equipment.
- **Thoroughly vetted and tested upgrades:** Before *any* upgrade is made to systems, vendors run rigorous tests on all new software and hardware before rolling them out to their global networks. This ensures that the upgrades perform as promised and pose no threat to their customer's computing capabilities.

TECHNICAL EXPERTISE

Well-established, global cloud computing providers expend significant time, money, and research to make their systems as secure as possible. Among their chief assets are experienced network professionals who are continually trained to maintain system security and reliability. These professionals bring a wealth of skills and expertise to cloud security, including the following:

- **Security research:** High-level professionals in cloud organizations continually research evolving threats, mitigation strategies, and new technologies to provide the latest in security measures—both physical and technical.
- **Specialization:** Cloud providers employ specialized teams that focus on specific security and reliability issues, providing a depth of knowledge not possible in many organizations.
- **Continual training:** IT professionals at top-tier cloud providers undergo mandatory, continual training to ensure they are proficient in the latest security mitigation and intrusion prevention technologies and practices.
- **Security audits and best practice evaluations:** Security professionals at top cloud organizations are regularly assessed and evaluated based on their performance and adherence to strict and ever-evolving leading practices in security technology.

THE PERTINO SOLUTION

While world-class cloud vendors provide a secure and reliable platform for business computing, most security vulnerabilities originate at the customer site and with customer end-users. For this reason, companies making the prudent fiscal decision to leverage the cloud for their computing needs should closely examine their internal security postures—especially how they manage and secure network connections from end-to-end. Pertino (Los Gatos, CA) is a provider of cloud-based networking services that delivers an entirely new way to build and manage networks that adds multiple security features to traditional enterprise-class networks. Customers do not sacrifice

visibility or control and, in fact, simplify management while increasing security with Pertino services.. The company was founded by experts in network security, and Pertino’s Cloud Networking platform was architected to exceed the security found in traditional networks.

INNOVATIVE SECURITY

Pertino adds innovative, cost-effective yet easy-to-manage security features to each customer’s existing computing infrastructure. It works with security solutions that companies already have in place, such as standard access controls and permissions. Most importantly, the Pertino Cloud Networking platform integrates the following technologies into a customer’s existing network in one easy-to-deploy package:

- Dynamic, on-demand infrastructure
- Cloaked IP addressing
- Extended authentication and access controls
- Highest implementation of packet encryption
- BYOD secure connectivity
- Hosted on state-of-the-art cloud platforms

In addition, Pertino has recruited and employs top experts in network security who perform the following critical tasks for securing corporate computing from the desktop to the cloud and back:

- Dedicated staff of security specialists
- Continual, 24X7 monitoring of traffic and security measures
- Commitment to evolving leading security practices
- Vulnerability assessments of the Pertino platform

While Pertino maintains, upgrades, and monitors its customer network in the background, personnel have no access to the customer’s data as it traverses the network. Nonetheless, its experts work 24X7 to improve performance, reliability, and security so that its customers are relieved of the costs and management complexities of advanced, multi-layered cloud security.

ADAPTIVE VPN AND PRIVATE IP ADDRESSING

Unlike traditional VPN appliances, Pertino VPNs reside on an ephemeral infrastructure that is allocated and migrated on-demand, appearing as a “moving target” to any would-be attackers. If a node within the network experiences unacceptable performance, such as from a DDoS attack, the monitoring system would detect the outage and abandon the targeted server while maintaining the integrity of the customer’s network. Each network instance is private, not shared, with its own virtual data-plane and address space. Since the majority of network attacks are address-borne, this design effectively “cloaks” Pertino networks and their users.

MULTIPLE AUTHENTICATION

Pertino delivers industry-standard encrypted HTTPS authentication in tandem with the customer’s existing access controls. In addition, as Pertino software is installed at a client site, independent authentication through the Pertino servers adds another level of protection, making certain that only authorized devices are allowed access to

the network. This independent authentication is used in the most security-conscious organizations such as financial and government institutions.

FULL AES256-BIT ENCRYPTION

Pertino deploys AES 256-bit encryption, which is the highest level of AES encryption specified by the National Institute of Science and Technology (NIST). Moreover, this encryption extends not just from the edge of the customer's network, as is the case with many VPN appliances, but all the way to the end-point device or server. And best of all, no password or login IDs are delivered as clear text. This encryption of data-in-motion extends into the cloud as well, as it provides additional isolation from other cloud-based tenants.

SECURE BYOD CONNECTIVITY

The same 256-bit encryption, device authorization, adaptive VPN and IP address cloaking is deployed on mobile devices as well. This elevates mobile device security to the same enterprise level as any other Pertino-protected network device. Pertino currently supports laptops, smartphones, and tablets with simple software-based agents that are unobtrusive and do not interfere with the functionality and flexibility that these devices are designed to offer.

STATE-OF-THE-ART CLOUD HOSTING PLATFORMS

All virtual network operations are hosted in top-tier cloud data centers, taking advantage of their state-of-the-art physical security infrastructure. This includes the operational security afforded by their inherent redundancy and scalability. The Pertino architecture takes advantage of these to deliver the highest level of reliability and availability. The Pertino Cloud Network Engine lies deep within the security infrastructure of top-tier hosting providers and delivers better tenant isolation through process-level segregation, integrated encryption libraries, and certificate authentication. Even when hosted on the best-of-breed cloud providers, the Pertino Networking platform delivers additional protection from data snooping, distributed denial of service (DDoS) attacks, and other persistent attacks or threats.

VULNERABILITY ASSESSMENTS

Pertino has undergone extensive vulnerability assessments of its service by independent, industry-recognized security analysts. In all cases the Pertino has met or surpassed the analyst's rigorous testing. Pertino is committed to continuing this practice to assure its customers that it is delivering the most comprehensive and secure solution on the market today—and in the future.

ADDITIONAL PERTINO BENEFITS

By building on the robust security and reliability of top-tier cloud facilities, the Pertino Cloud Network Engine delivers clear advantages, including the following:

- A global, redundant network of cloud hosted infrastructure for anytime/anywhere connectivity
- Lower maintenance costs and more flexibility than other networking solutions
- Zero modification to existing network infrastructure
- No need for continual hardware/software upgrades as new threats arise

- The ability to decommission any device—such as a lost or stolen laptop—with one click
- An easy way to add or remove end-users and their devices

Because Pertino is a service, it reduces any capital or operating expenses, and it is constantly upgrading its security posture and expanding its global reach. Therefore, customers get best-of-breed security that most could never afford to implement on their own.

SUMMARY

Cloud services are highly secure, even for general network services. Best-of-breed cloud platforms offer an economy of scale that allows customers to implement the most robust network solutions available. Pertino leverages these best-of-breed cloud vendor infrastructures and adds security capabilities that go far beyond what most companies have the expertise or budget to implement on their own. In this way, Pertino augments company security with the latest technology that is non-disruptive, works with security measures already in place, and best of all, is easy to manage. With Pertino, customers get the best of both worlds—the cost-savings of cloud services with the best security possible.

ABOUT PERTINO

FOUNDED IN 2011, PERTINO HAS AN INSPIRED VISION FOR REINVENTING NETWORKING FOR THE CLOUD ERA, AND IN THE PROCESS, BEING A CATALYST FOR DEMOCRATIZING IT FOR SMALL-TO-MEDIUM BUSINESSES. GLOBALIZATION, CLOUD-ENABLED IT, AND GROWING DEMAND FOR ALWAYS-CONNECTED PEOPLE, DEVICES, AND THINGS IS AFFECTING BUSINESSES OF ALL SIZES -- MAKING THE "OUTSIDE NETWORK" AS CRITICAL AS THE INSIDE ONE. HOWEVER, TRADITIONAL WIDE-AREA NETWORKS HAVE NOT KEPT PACE. PERTINO'S REVOLUTIONARY CLOUD NETWORK ENGINE ENABLES AN IT PERSON, REGARDLESS OF SKILL LEVEL, TO BUILD A SECURE AND RELIABLE CLOUD NETWORK IN MINUTES THAT CONNECTS PEOPLE EVERYWHERE TO IT RESOURCES ANYWHERE. TO ACHIEVE THIS BREAKTHROUGH, PERTINO HAS DEVELOPED A SOFTWARE-DRIVEN CLOUD PLATFORM THAT COMBINES THE POWER AND PERVASIVENESS OF THE CLOUD WITH NETWORK VIRTUALIZATION AND SOFTWARE-DEFINED NETWORK (SDN) TECHNOLOGY. THE COMPANY IS VENTURE FUNDED AND HEADQUARTERED IN LOS GATOS, CALIF. FOR MORE INFORMATION:

For more information or to try Pertino free for yourself, please visit pertino.com.