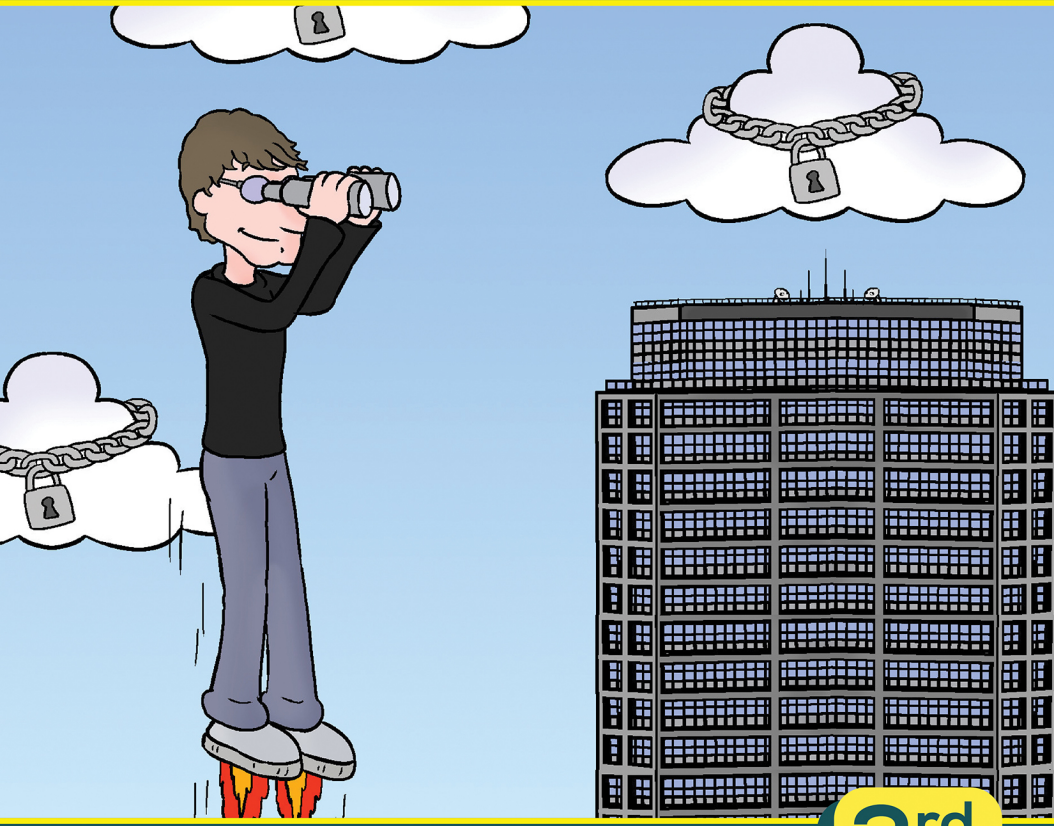
ConversationalGeek®

Conversational Server Access Security

By Derek A. Smith (CCISO, CISSP)



3rd Edition

In this book, you will learn:

- Why privileged access sits at the center of cyberattacks today
- Which common privileged threat vectors are creating the most risk to your servers
- How to establish an entitlement-based server access strategy that includes PAM

Sponsored by Delinea

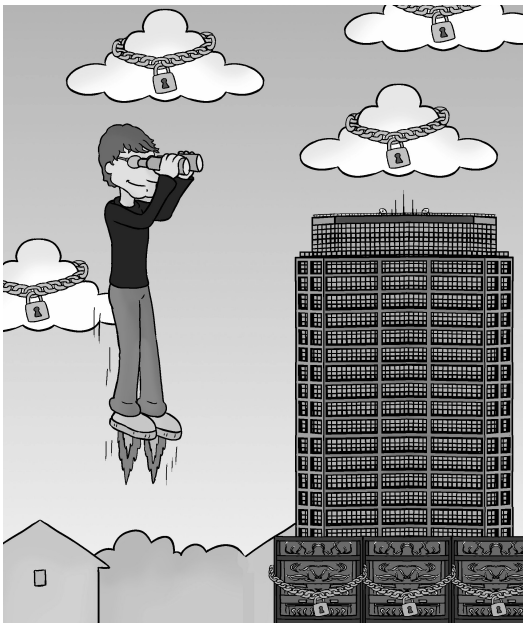
Sponsored by Delinea

Delinea is a leading provider of Privileged Access Management (PAM) solutions for the modern, hybrid enterprise. The Delinea Platform seamlessly extends PAM by providing authorization for all identities, controlling access to an organization's most critical hybrid cloud infrastructure and sensitive data to help reduce risk, ensure compliance, and simplify security. Delinea removes complexity and defines the boundaries of access for thousands of customers worldwide. Our customers range from small businesses to the world's largest financial institutions, intelligence agencies, and critical infrastructure companies.

For more details visit
delinea.com

Conversational Server Access Security (3rd Edition)

By Derek A. Smith



ConversationalGeek®

Conversational Server Access Security

Published by Conversational Geek® Inc.

www.conversationalgeek.com

Trademarks

Warning and Disclaimer

Additional Information

For general information on our other products and services, or how to create a custom Conversational Geek book for your business or organization, please visit our website at ConversationalGeek.com

Publisher Acknowledgments

All of the folks responsible for the creation of this guide:

Author:	Derek A. Smith
Project/Copy Editor:	Ian Whiteling
Content Reviewer(s):	Rob Sawyer
	Jeff Carpenter

Note from the Author

Thank you for choosing to download this eBook on Server Access Security! Protecting your business from the ever-evolving threat of cybercriminals can seem overwhelming, especially when running your organization demands so much of your attention.

Today, organizations like yours continue to embrace cloud infrastructure – and the speed of this change has only accelerated as requirements for digital transformation have increased. One of the most challenging side-effects of this is that companies' attack surfaces have increased vastly, and the traditional perimeter no longer exists.

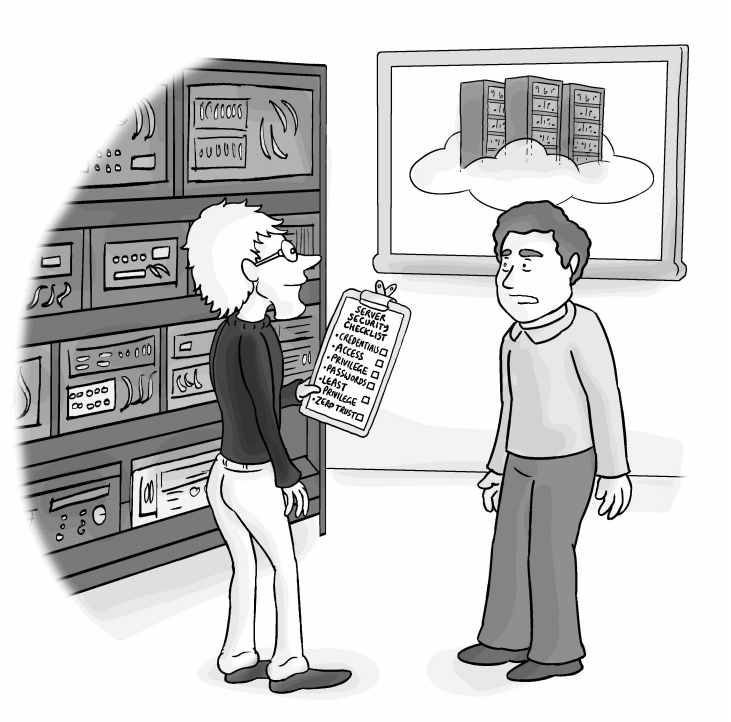
The bad guys know your most critical data resides on servers located on-premises and in the cloud. So, protecting access to those servers has never been more important. But, at the same time, it has never been harder to achieve.

I'm assuming that if you're reading this book, you may already realize quite a lot of this. So, over the following pages, I'm going to take a look at how things have changed and provide you with critical insights and recommendations that will help you protect access to your data assets.

Hopefully, this will help make your journey, whether on-premise or in the cloud, as secure as it possibly can be.

Derek A. Smith

Protecting Your Servers in the Age of the Cloud



"How are we going to secure all this?"

Today, organizations like yours are reinventing themselves and adjusting business imperatives to support growth. To accomplish this, they are rapidly embracing cloud infrastructure. With this migration to the cloud, your extended enterprise, resulting from cloud transformation and a shift to hybrid cloud infrastructure, increases the risk of cyberattacks because your attack surface is also vastly increasing. Cybercriminals know that your most critical resources and data reside on servers located on-premises and in the cloud. As more organizations moved to the cloud for digitization and

business continuity, cybercriminals quickly took advantage of the inherent complexities in securing cloud environments.

Tactics such as privilege escalation on servers and lateral movement between servers are often employed by these cyber attackers and bots to infiltrate and extract valuable data. According to the MITRE ATT&CK framework, a globally recognized and widely adopted resource for understanding adversary tactics and techniques, lateral movement is indeed a key tactic that is frequently exploited. Therefore, securing access to servers and only granting appropriate privileges becomes a critical aspect of any robust privileged access management (PAM) strategy. PAM is part of an important and emerging category called 'identity security.'

Identity security ensures the right users have the right access to the right digital resources at the right time. It protects identities by detecting threats and implementing appropriate responses. Not only do identity security solutions mitigate the risk of data breaches, they can also contribute to better employee productivity and a more personalized customer experience.

Your Privileged Access Management journey is unique to your organization, but it's vital, as it enables you to reduce your risk of security breaches to servers by minimizing your attack surface.

As IT environments evolve, it's rare for your infrastructure only to be on-premises or in the cloud. In fact, it expands across on-premises and one or multiple clouds. Today, much of your staff is likely remote, adding to the distributed nature of where the infrastructure is and where access is needed. This continues to challenge your IT operations teams to ensure security across

this infrastructure. It has become harder to distinguish who is friend or foe by simply examining what's "inside" vs. what's "outside" your perimeter. Why? Because your modern perimeter is now spread across multiple locations and vendors.

Your IT teams are still responsible for SLAs on server maintenance, break-fix, and meeting compliance requirements. They have/had good processes and controls on-prem, but the cloud is different. Your existing security tools and processes may not be designed to accommodate this hybrid cloud model.

To safeguard your organization from potential cyber threats, it is essential to allocate a substantial portion of your security strategy and budget to the protection of your servers. Regardless of their location, servers can become prime targets for cybercriminals aiming to infiltrate and acquire sensitive data such as financial records, intellectual property, and more. Failing to prioritize the security of your servers could lead to severe consequences, including widespread data loss, ransomware attacks, and other detrimental outcomes. By dedicating a meaningful and significant part of your security strategy and budget to fortifying your servers, you can effectively mitigate the risks associated with compromised data, safeguard valuable resources such as time, money, and user productivity, and ultimately safeguard your organization's reputation.

Relying solely on native operating system security controls is an ineffective approach that exposes you to significant risks. In today's digital landscape, information holds immense value, and hackers are constantly seeking to exploit vulnerabilities. When your servers lack proper security measures, they become susceptible to various threats, and the consequences of data breaches can be devastating for your entire organization. Neglecting to secure your servers puts you on a perilous path, risking the compromise of sensitive information. Fortunately, this guide is designed to equip you with valuable information and practical tips that will empower you to make

well-informed decisions and enhance your security posture. By understanding the necessary steps to secure access to your servers effectively, you can proactively mitigate the dangers associated with inadequate protection.

First, some numbers you should know! I love throwing numbers at you because they really make a point, scare the heck out of you, and stick with you long after you put down this eBook.

2023 continued the trend of being another watermark year for high-profile cyberattacks, encompassing some of the most daring and costly breaches in data history, with many of these breaches being identity- and credential-based. Most notable among these was the Uber breach (despite MFA protections) due to unencrypted admin privileges and the Okta attack through a third-party identity compromise.

In both cases, the protections in place could not account for human error and the lack of comprehensive security across all identity surfaces. The pattern that emerged (shown in the stats below[1]) was a concerted targeting of identities and identity systems by malicious actors:

- The misuse of credentials was both the number one method of gaining initial access in data breaches and the top threat action taken during data breaches.

- In social engineering attacks, credentials were the compromised data set in 50% of cases.

---

[1] Verizon, *Data Breach Investigations Report* (2024)

- 68% of all breaches include the human element, with people being involved either via *Error*, *Privilege Misuse*, *Use of Stolen Credentials* or *Social Engineering*.

- Approximately 65% of breaches involved external actors, and the primary motivation for attacks continues to be overwhelmingly financially driven, at 95% of breaches.

- The three primary ways in which attackers accessed an organization were stolen credentials, phishing and exploitation of vulnerabilities.

According to the Identity Theft Resource Center's 2023 Data Breach Report (released in January of 2024), there were **3,122 data breaches last year**, with 349,221,481 victims.

But here is what is even more vital for you to understand: the potential for misuse or abuse of privilege by insiders, malware, and external threat actors presents considerable cyber risk that is inadequately managed across many organizations. This is also why understanding identity security is more important than ever.

How Cyberattacks Impact Your Organization

So, you have seen the stats and know how devastating cyberattacks can be to your bottom line. But maybe you are not sure about how they can impact your organization. The problems caused by cyberattacks can range from minor disruptions in operations to significant financial losses.

Regardless of the type of cyberattack, every consequence has monetary or other costs. These attacks may continue to impact your business for weeks, if not months, after the actual event. Here are some of the key areas where your business may suffer:

- Financial losses
- Loss of productivity
- Operational disruption
- Reputation damage
- Decline in stock value
- Loss of intellectual property
- Loss or compromise of customer data
- Legal liability
- Business continuity problems
- Regulatory fines
- Sanctions
- Employee morale
- Cyber insurance denial or premium raise

These attacks are costly, too, the threat of being attacked is genuine, and the stakes are very high. Reaching an all-time high, the cost of a data breach averaged USD $4.88 million in 2024, and in data breaches where stolen or compromised

credentials are involved, the average cost was $4.81 million.[2] Besides the direct financial loss, a security breach can also result in negative publicity for your company, damaging your brand and your reputation.

Cyberattacks can damage your business's reputation and erode the trust your customers have for you. This, in turn, could potentially lead to a loss of customers and of course sales.

Even if you are a small business, you are not immune to the devastation of a cyber breach. While Marriott International, AT&T, MGM, and other big-name companies have been at the center of substantial data-breach scandals, small businesses have also suffered, with 36% of cyberattacks aimed at SMBs[3].

The genuine threat of a cyberattack has caused organizations to realize the need for an average increase in cybersecurity budget of 48%[4].

Your credentials are hot commodities for hackers, with stolen credentials being the top threat variety in breaches[1]. Once a credential is compromised, privileged access management solutions become most beneficial because you can use them to do such things as rotating your credentials to stop the breach or limit your privileges so that even if compromised, access can be prevented or limited for the compromised credential. In

---

[2] IBM Security, *Cost of a Data Breach* (2024)
[3] Hiscox, Cyber Readiness Report (2023)
[4] Extrahop, *Global Cyber Confidence Index* (2024)

situations such as these, minimizing the privileged access attack surface enables you to reduce the risk of breaches.

Privileged access has historically been delivered in the form of group memberships or device-level permissions. Even if a user is not explicitly given access to a server or workstation, that user's domain or group-level permissions often allow access whenever that person needs or wants it. This methodology of granting *standing access* (where permissions are granted in a "set it and forget it" manner) only provides threat actors with a wealth of user account targets that have the desired elevated privileges. This creates a huge amount of risk, as nearly every organization has literally decades of standing access that *no one remembers or knows about!*

The reason our industry has failed miserably at addressing standing privilege is that we struggle to answer three simple questions:

1. What identities exist and have standing privileged access (visibility)?

2. How do you eliminate them (to reduce your attack surface) while still providing privileged access when actually needed?

3. How do you protect those you can't eliminate (e.g., "root", "local administrator")?

I will address how to deal with standing privileges later in this eBook. For now, let's check out some of the ways cybercriminals can get to your servers and privileged accounts.

Common Privileged Threat Vectors

You have seen the stats, know the risk your privileged user accounts pose to your organization, and how costly their compromise would be, so you *must* afford them extra

attention. You should now be thinking about how you can get ahead of the game so that your organization won't be among the statistics. Well, when it comes to securing server access, it's important to understand the various threat vectors that lead to server breaches so you can take proactive steps to avoid becoming a statistic.

An attack vector is a potential pathway into your sensitive server resources that could facilitate a data breach if exploited.

Here's a comprehensive overview of the common problem areas-turned-threat vectors associated with server access:

- Over-provisioned privileges: Over-provisioning privileges on servers can result in a larger attack surface, making it easier for unauthorized users to gain access to sensitive data. By carefully managing user privileges on servers, organizations can reduce the risk of unauthorized access and limit the potential damage caused by compromised accounts.

- Utilizing a large and complicated DevOps toolchain: This is crucial for maintaining robust server security. DevOps toolchains encompass a wide range of interconnected tools and processes, making them attractive targets for cyber attackers seeking to exploit vulnerabilities and gain unauthorized access to servers.

- Lack of awareness of privileged accounts: Unmanaged privileged accounts on servers can create significant security vulnerabilities. It is crucial to identify and monitor all privileged accounts on servers, ensuring that they are properly managed, regularly audited, and granted only to authorized individuals. This helps prevent unauthorized access and enhances server security.

- Using hardcoded and embedded credentials: Servers often contain hardcoded or embedded credentials, such as default usernames and passwords. These credentials can be easily exploited by attackers to gain unauthorized access. It is essential to regularly review server configurations, remove any hardcoded credentials, and enforce strong multi-factor password policies to prevent unauthorized entry.

- DevOps vulnerabilities: In the DevOps environment, servers can be exposed to vulnerabilities if plaintext credentials and sensitive data are embedded within code or configuration files. Implementing secure coding practices, such as properly encrypting sensitive data, utilizing secure credential management systems, and conducting regular code reviews, helps mitigate these vulnerabilities and ensures robust server security.

- Shared admin accounts: Sharing privileged credentials across IT teams increases the difficulty of tracking activities and maintaining accountability. It is essential to enforce the use of individualized accounts for server access, ensuring that each user has a unique identity.

This practice enhances server security by enabling better auditing, monitoring, and control over privileged activities.

- Inadequate enterprise password management practices: Weak password management practices on servers can expose organizations to a number of risks, including credential theft and unauthorized access. Implementing strong password policies, enforcing password rotation, vaulting credentials and using password management tools can help improve server security by reducing the risk of compromised credentials.

- Reliance on unsupported tools like sudo: Depending solely on unsupported tools like sudo for server administration can introduce security vulnerabilities. Upgrading to more robust privilege management solutions that offer centralized management, strong access controls, and comprehensive logging and monitoring capabilities strengthens server security and reduces the risk of unauthorized access.

- Third-party vendor/remote access: Granting remote access to servers, whether by employees or third-party vendors, requires careful management to prevent unauthorized access and data breaches. Implementing secure remote access protocols, such as multi-factor authentication and VPN-less connections, along with strict access controls and regular monitoring, helps ensure that only authorized individuals can access servers remotely, minimizing the risk of security incidents. Why VPN-less? Popular remote access

solutions like VPNs are prime targets for attackers, who exploit them to move laterally, escalate privileges, and achieve malicious objectives. VPNs grant excessive access, increasing data breach risks and enabling lateral movement for attackers, while also incurring additional costs, lacking granular control, and delaying provisioning. Poorly managed remote access for third-party vendors exposes organizations to cyberattacks and inefficiencies, with inadequate access controls and password management leading to unauthorized access and lack of accountability.

- Workstation security: Workstation security is a critical aspect of overall server access security. Neglecting to secure workstations can create entry points for attackers to exploit and gain unauthorized access to servers. It is essential to implement robust security measures such as endpoint protection, strong authentication mechanisms, regular patching and updates, and user awareness training to mitigate the risk of workstation-related vulnerabilities compromising server security.

- Managing API Keys in software repositories like GitHub: API keys play a crucial role in authenticating and authorizing access to server resources. However, if not properly managed, API keys stored in software repositories like GitHub can be exposed to unauthorized individuals. It is essential to follow best practices for API key management, including encrypting and securely storing keys, implementing access controls to limit their exposure, and regularly

reviewing and rotating keys to prevent unauthorized access and potential data breaches.

- Focusing on server-related vulnerabilities: Servers are high-value targets for attackers due to the sensitive data and resources they store. To enhance server access security, it is important to prioritize vulnerability management. This includes regularly scanning servers for known vulnerabilities, promptly applying security patches and updates, implementing strong access controls, configuring proper network segmentation, and conducting regular security audits and assessments. Additionally, employing intrusion detection and prevention systems, robust logging and monitoring mechanisms, and implementing secure coding practices for server applications can significantly reduce the risk of successful attacks on servers.

What makes these aspects of identity security a threat vector is the manner in which they are used today; the decades-old idea of using a username and password combination – specifically in the context of privileged access – only aids the efforts of threat actors who know they just need to obtain that credential and… BAM! *Instant Privileged Access*.

The addition of multi-factor authentication (MFA) has certainly helped bolster the state of an organization's security by working to ensure the *user* of a privileged credential is the *owner* of it. But with the evolution of advanced cybercriminal platforms designed to proxy MFA requests, as well as significant improvements in social engineering to fool users into providing MFA specifics during a compromised login, it may be time to consider ways to provide privileged access that

keep both the privileged access itself, and the user requesting it more secure.

To meet this challenge head-on, organizations must adopt comprehensive security strategies that specifically focus on privileged server access. These strategies should encompass robust privileged access management protocols, continuous monitoring mechanisms, and adherence to industry best practices for how privileged server access is provided.

How Organizations are Addressing Server Access Security Challenges

As organizations navigate their cloud roadmap, they are undergoing innovation, modernization, and re-engineering efforts. Amid these transformations, it becomes crucial to prioritize certain key areas. One fundamental shift for many organizations is rethinking their approach to security – specifically shifting away from the age-old model of *resource-based security* (where a user or group was provided access to a file/share/printer/database/application) toward *entitlement-based security* (where access is granted based on roles and job responsibilities) using just-in-time access to the privileges required and only for the duration of time they are needed. This conveyance and assertion of privileges through entitlements via identities and accounts should take center stage, highlighting the critical importance of privilege management.

To advance data security in this evolving landscape, organizations are focusing on several critical measures. These include privileged access management (PAM), security awareness training, implementing an identity-centric security strategy, MFA, enforcing strict cloud permissions, and establishing a robust patch management strategy.

While some vendors argue that identity is the new perimeter, organizations must go beyond mere *identity verification* and

ensure proper authorization levels. This is where privilege management becomes paramount. In fact, privilege itself emerges as the new perimeter, as organizations recognize the need to implement best practices such as Zero Trust – an identity-centric security approach grounded in the principle of least privilege and eliminating implicit trust in users.

Having explored the challenges that can arise from inadequate server security and privileged account management, let's shift our focus to the ways organizations are *addressing* these concerns. The annual Security and Risk Management Summit by Gartner has consistently identified Privileged Access Management (PAM) as the most significant security project for Chief Information Security Officers (CISOs) to prioritize. This recognition highlights the critical role of PAM in mitigating security risks.

So, let's first delve into some of the cybersecurity methodologies organizations are using to address server access security challenges and explore how PAM (as part of an overall server access security strategy) comes into play to enable them.

Methodologies for Enabling Entitlement-Based Server Access Security

With the goal being to move away from standing privilege and toward entitlement-based security, there are methodologies that will come into play that you must first understand:

- Zero Trust: Zero Trust assumes that no user or device should be inherently trusted, even if they are within the organization's network perimeter. This methodology advocates for strict authentication, authorization, and continuous monitoring of all users and their access requests. Organizations can enforce Zero Trust principles by ensuring that privileged access

is granted on an as-needed basis, with strong authentication and strict access controls in place to validate the requestor of the privileged access.

- Just-in-Time (JIT) Access: JIT access grants temporary and precisely timed access to privileged accounts, reducing the attack surface and minimizing the exposure of privileged credentials. Organizations that leverage PAM capabilities can establish JIT access mechanisms at the time of the access request, ensuring that privileged access is only granted for the required duration when specific tasks need to be performed. This methodology enhances security by reducing the window of opportunity for unauthorized access and limiting the potential for privilege misuse.

- Just Enough Access (JEA) or Just Enough Privilege (JEP): JEA (sometimes referred to as JEP) limits the permissions granted to a user during their privileged session, allowing them to perform only the necessary tasks and actions required to fulfill their responsibilities. Organizations seeking to implement JEA use fine-grained access controls, defining the specific privileges and commands that users can execute during privileged sessions. This minimizes the dangers of accidental or intentional misuse of privileges and helps organizations maintain a least privilege approach, reducing the potential impact of security incidents.

- Privilege Escalation Protection: PAM capabilities play a vital role here in protecting against unauthorized privilege escalation attempts. By implementing robust

access controls, monitoring mechanisms, and regular reviews, organizations can prevent unauthorized users from gaining elevated privileges on servers. This methodology ensures that only authorized individuals with a legitimate need are permitted to escalate privileges, reducing the risk of unauthorized access and potential malicious activities.

- Continuous Monitoring and Analytics: Organizations require the ability to continuously monitor privileged activities and leverage analytics to detect anomalous behaviors or potential security threats. By analyzing privileged access logs and session recordings, organizations can proactively identify suspicious activities, such as unusual access patterns or privileged commands, and respond promptly to mitigate potential risks.

- Compliance and Audit Readiness: By implementing strong access controls, session monitoring, and regular reviews of privileged access, organizations can track privileged activities and ensure accountability while being "audit-ready" and able to demonstrate compliance with regulations and industry standards.

- Zero Standing Privilege: This methodology seeks to minimize standing privileges granted to users, especially for privileged accounts. Instead of providing continuous access, organizations should enforce just-in-time access, granting privileges only when necessary and revoking them promptly afterward. This approach reduces the potential attack surface and limits the exposure of privileged credentials.

- Fine-Grained Access Control: Fine-grained access control is the practice of implementing highly granular permissions and restrictions for privileged accounts. It involves defining precise sets of privileges and commands that users can access based on their roles and responsibilities, minimizing the risk of privilege abuse.

- Temporary Privilege Access: This provides time-limited elevated privileges to users for specific tasks or time periods, reducing the prolonged exposure of privileged credentials and limiting the opportunity for attackers to exploit them. It ensures that users have access to the necessary privileges when required, without continuously maintaining elevated access rights.

- Passwordless Authentication – Standards like FIDO2 (Fast Identity Online) enable organizations to provide access to entitlements where users no longer need to leverage legacy password architectures that can more easily be compromised by threat actors.

The combination of these methodologies creates a secure form of managing, temporarily issuing, monitoring the use of, and removing entitlements that grant users privileged access. And what's key here is that the user of the entitlement only has access to it via the use of PAM (or, more specifically, PEDM and PASM – which I'll talk about in a moment) while having no access to a privileged credential of any kind – further eliminating the possibility of credential misuse.

Ultimately, implementing server access security using these methodologies enhances the overall security posture of server access and strengthens the protection of critical resources.

Server Security within the Context of Privileged Access Management (PAM)

Server security is of paramount importance in today's threat landscape, and organizations are increasingly focusing on privileged access management (PAM) as a crucial aspect of the security strategy. PAM involves implementing comprehensive controls and processes to safeguard privileged accounts and mitigate the risk of unauthorized access to critical server resources.

What is PAM?

Privileged Access Management (PAM) is a set of practices and technologies designed to manage and secure privileged accounts, such as administrator and root accounts, which have extensive access and control over server systems. PAM encompasses various security measures to ensure that privileged access is granted only to authorized individuals, and that activities performed with privileged accounts are closely monitored and controlled.

Within PAM, two important components are Privilege Elevation and Delegation Management (PEDM) and Privileged Account and Session Management (PASM).

PEDM focuses on controlling and monitoring the elevation of privileges for specific tasks or time periods. It ensures that users are granted elevated privileges only when necessary and for the required duration. By implementing PEDM, organizations can enforce a least privilege approach, reducing the risk of unauthorized access and minimizing the potential impact of privilege misuse.

On the other hand, PASM is concerned with managing privileged accounts and sessions comprehensively. It involves controlling and monitoring privileged access to critical systems and resources. PASM solutions provide secure mechanisms to

authenticate privileged users, enforce strong access controls, and log privileged activities for auditing and compliance purposes. By implementing PASM, organizations can effectively protect sensitive data, detect malicious activities, and ensure accountability.

Both PEDM and PASM are integral parts of a robust PAM framework. They contribute to the overall security posture by reducing the attack surface, preventing unauthorized privilege escalation, and enabling organizations to enforce strong access controls for privileged accounts and sessions. By leveraging PEDM and PASM within their PAM strategy, organizations can enhance server security, maintain compliance with regulatory requirements, and safeguard critical assets from unauthorized access and misuse.

Key Elements of Server Security within PAM

- Privileged Account Discovery and Inventory: Organizations need to identify and maintain an inventory of privileged accounts across their server infrastructure. This involves conducting regular audits and assessments to ensure all privileged accounts are accounted for and properly managed.

- Access Control and Authorization: Granular access controls should be implemented to restrict privileged access to authorized individuals and specific tasks. Role-based access control (RBAC) can be used to define and manage the permissions and privileges associated with different roles within the organization.

- Just-in-Time Privilege: Adopting a just-in-time approach to privilege access ensures that privileged accounts are only granted access when needed and for

a limited duration. This reduces the attack surface and minimizes the exposure of privileged credentials.

- Multi-Factor Authentication (MFA): Implementing MFA adds an extra layer of security by requiring multiple forms of authentication, such as a password combined with a unique token or biometric verification, for privileged account logins.

- Session Monitoring and Recording: Monitoring and recording privileged sessions on servers provide visibility into the activities performed by privileged users. This enables the detection of suspicious behavior, facilitates auditing and compliance efforts, and supports forensic investigations in the event of a security incident.

- Privilege Elevation and Delegation: Implementing secure privilege elevation mechanisms allows users to obtain temporary elevated privileges for specific tasks, reducing the need for continuous privileged access while maintaining necessary functionality.

- Continuous Monitoring and Threat Detection: Implementing robust monitoring solutions enables real-time monitoring of privileged activities and the detection of anomalous behavior or potential security threats. Security information and event management (SIEM) tools can aid in aggregating and analyzing privileged access logs for proactive threat detection.

- Regular Reviews and Audits: Conducting regular reviews and audits of privileged access controls, user permissions, and activity logs helps identify and

address any gaps or vulnerabilities in server security. This helps ensure that privileged access remains aligned with business needs and compliance standards.

In the context of moving away from standing privilege towards JIT entitlements, PAM plays a core role in identifying where standing privilege exists, defining JIT privileged access, who can utilize it, and where it can be used within the organization.

Why PAM? Controlling and monitoring privileged user access to your most critical data and server systems is the best way to prevent attacks. PAM can help your organization protect against accidental or deliberate misuse of privileged access by streamlining the authorization and monitoring of your privileged users.

Centralized PAM: Harnessing the Power of a Unified SaaS Platform for Optimal Cybersecurity

A unified Privileged Access Management (PAM) platform provides central control, an essential feature for effective cybersecurity management. With technology environments' increasing complexity, digital assets' sprawl, and cyber threats' sophistication, having a single, centralized PAM system brings numerous benefits.

The most defining features of a unified PAM platform center around three core elements: *comprehensive visibility*, *simplified administration*, and *consistent policy enforcement*. These pillars are what set a robust PAM platform apart, making it a vital tool for effective security management.

At the cornerstone of such a platform is comprehensive visibility. This feature isn't just an additional benefit, but rather forms the fundamental basis of the PAM solution. By tirelessly monitoring privileged activities across an entire organization's infrastructure, such a system offers unparalleled detection capabilities. The quick identification and response to potential threats substantially diminish potential security breaches' impact. Thus, it's not merely about visibility, but about transforming that visibility into actionable intelligence.

The second element that underscores the significance of a PAM platform is simplified administration. Such a platform transcends the clutter and inefficiency associated with managing different systems from various vendors. Here, the need for navigating through multiple interfaces, complex configurations, and vendor-specific quirks is eliminated. Instead, it provides a singular, streamlined administrative experience that enhances efficiency, significantly reduces the risk of misconfigurations, and simplifies the complexity of the security infrastructure. This is not merely a convenience, but a crucial feature that reduces vulnerabilities at the root.

The last but equally essential aspect is the provision for consistent policy enforcement. An effective PAM platform doesn't just manage access policies, it enforces them uniformly across the organization. Where there can be discrepancies, loopholes, or overlaps in policies with different systems, a unified platform eradicates these potential security risks. It ensures all access is governed by the same rules, effectively reducing the attack surface. Hence, it's not just about managing access, it's about maintaining control with unwavering consistency.

A high-performing PAM platform emphasizes these three elements as its most significant aspects, providing a comprehensive, simplified, and consistent security solution.

The 'bolting' approach, using various products from different vendors, often leads to inefficiencies and potential security gaps. Integration between disparate systems can be challenging and time-consuming, often leading to suboptimal results. A single PAM platform, in contrast, provides seamless integration and functionality, designed to work together out of the box, eliminating the challenges associated with the bolt-on approach.

A centralized Software-as-a-Service (SaaS) PAM platform goes a step further, providing all the benefits of a unified platform while also offering the advantages of cloud-based solutions. These can include scalability to meet changing demand, automatic updates for always staying current with the latest features and security updates, and reduced maintenance requirements compared to on-premises solutions.

In addition, a SaaS PAM platform can offer improved accessibility for remote or distributed teams. As more organizations adopt hybrid or fully remote work models, this kind of flexibility becomes increasingly valuable. All these features can enhance the agility and resilience of your organization's security infrastructure.

A single, centralized PAM platform, particularly when delivered as a SaaS solution, offers significant advantages over a bolted-on multi-vendor approach. It provides enhanced visibility, consistency, and efficiency while simplifying administration and improving accessibility, all of which contribute to a more robust and effective cybersecurity posture.

"Cyber insurance and the Cost-Benefit Impact of a PAM Solution"

In today's digital age, cyber insurance has become a necessity for businesses of all sizes. According to the Gartner report, *Reduce Risk Through a Just-in-Time Approach to Privileged Access Management*, "By 2025, 75% of cyber insurance providers will mandate the use of JIT PAM principles."

Cyber insurance helps protect organizations from the financial implications of cyber threats such as data breaches, network damage, and business interruption. However, the premiums for such insurance can be significant, and insurers carefully evaluate an organization's cybersecurity posture when determining these costs – something 50% of insurers expect to expand in the next 12 months[5]. Implementing a PAM solution can play a critical role in this regard.

Insurance providers consider a variety of factors when pricing a policy, including the robustness of a company's cybersecurity infrastructure and the effectiveness of its risk management strategies. With privileged identity sitting firmly in the center of every form of cyberattack that requires lateral movement, a well-implemented PAM solution indicates a strong security posture and a proactive approach to managing cyber risks.

The presence of PAM (as part of a greater identity security strategy) demonstrates to insurance providers that your organization has a system to control, monitor, and manage privileged access, significantly reducing the risk of unauthorized access and data breaches. By effectively implementing the principle of least privilege, minimizing the attack surface, and providing comprehensive audit trails, a

---

[5] Wodruff-Sawyer, *Cyber Insurance Trends for 2024* (2024)

PAM solution can drastically lower the chances of a successful cyberattack, which is a key consideration for insurers.

Furthermore, a centralized PAM platform provides insurers with the visibility they require. It allows for easy demonstration of compliance with best practices and regulatory standards, which is a critical factor that insurance providers consider. Not only can this result in lower premiums for you, but it can also simplify the process of acquiring or renewing a policy.

Additionally, the proactive threat detection and mitigation capabilities of PAM solutions can be beneficial in an insurance claim scenario. Should a cyber incident occur, your effective PAM solution can provide valuable forensic data, enabling you to prove you took all reasonable steps to protect your systems, which can help with successful insurance claims.

Finally, a robust PAM solution can favorably impact your cyber insurance negotiations. By demonstrating strong cybersecurity practices and risk management, you can potentially reduce your cyber insurance premiums and simplify the policy acquisition or renewal process. In this way, investing in a PAM solution not only strengthens your cybersecurity but can also lead to tangible financial benefits.

How to secure your server infrastructure

Step 1: Discover all servers and local privileged accounts

Step 2: Bring servers under centralized PAM management

Step 3: Consolidate identities and vault the rest

Step 4: Enforce least privilege and MFA at the server

Step 5: Manage and record privileged sessions

Strategies and Recommendations for Securing Your Servers

Having discussed the importance and challenges of securing access to servers and examined various protection methods, it is now time to delve into recommended approaches for addressing these challenges. As your organization seeks to proactively protect its distributed server infrastructure, it is crucial to evaluate your business needs and available options, and determine the optimal solution based on best practices. Your server security process should be ongoing, with continuous evaluation and adjustments to enhance security as your business and threat landscape evolve.

It is important to note that there is no single "silver bullet" technical solution that can magically mitigate privileged access risks. Instead, a holistic approach that combines multiple technologies is necessary to safeguard against numerous entry points that attackers may exploit. To achieve comprehensive protection, it is crucial to bring together the right tools for each aspect of the job.

One recommended approach is to adopt a unified threat management (UTM) solution that covers every aspects of your threat landscape. A UTM solution integrates various security functionalities such as firewall, intrusion detection/prevention, antivirus, data loss prevention, and secure web gateways into a cohesive system. This unified approach provides a centralized and streamlined security management experience, enabling efficient monitoring, detection, and response to potential threats.

Additionally, implementing a robust Privileged Access Management (PAM) solution is vital for securing privileged accounts and minimizing the risk of unauthorized access. PAM solutions provide capabilities such as privileged account discovery, access control, session monitoring, and just-in-time access. By implementing PAM, organizations can enforce least

privilege, control privileged access, and detect suspicious activities related to privileged accounts.

Furthermore, it is crucial to prioritize regular patch management and vulnerability assessments for your server infrastructure. Keeping servers up to date with the latest security patches helps protect against known vulnerabilities and reduces the likelihood of successful attacks. Conducting regular vulnerability assessments enables you to proactively identify and address potential weaknesses in your server environment.

Additionally, security awareness training for employees is essential to cultivate a security-conscious culture within your organization. Training should cover topics such as secure password practices, social engineering awareness, and the importance of reporting suspicious activities. By empowering employees with security knowledge, organizations can mitigate the risks posed by human error and insider threats.

Lastly, ongoing monitoring and incident response capabilities are critical for detecting and responding to security incidents in a timely manner. Implementing security information and event management (SIEM) solutions, along with intrusion detection systems (IDS) and intrusion prevention systems (IPS), enables continuous monitoring of server activities, detection of anomalous behavior, and quick response to potential threats.

In summary, securing your servers requires a multifaceted approach. By combining these strategies and continuously adapting your security measures, you can significantly enhance the security of your servers and mitigate risks effectively.

Putting the Right Tools in Place

PAM technology controls elevated (privileged) access and permissions for users, accounts, processes, and systems. So overall, the best solution is to use PAM/PEDM tools to help

reduce risks associated with external attacks, insider threats, and third-party access. While PAM solutions help automate the granting and revoking of privileged access, successful implementation depends on a careful approach that considers the following questions:

- Who (or what kind of user) is appropriate for each type of privileged access in my environment?
- What kind of access is appropriate for my enterprise?
- Where are the boundaries of the access?
- When is the access appropriate for my users?
- Why is access necessary in the first place?

Once you have answered these questions, you can use five key elements to start on the path to successfully secure your privileged access.

1. Establish a solid privileged account discovery process

To prune unnecessary accounts and precisely define which accounts and users have access to vital assets, it is crucial to track every instance of privileged access, be it on-premises or cloud-based. This encompasses both conventional and non-conventional accounts leveraged by individuals – including personal, shared, and administrative accounts such as local administrator and root – as well as by software.

Careful attention must be paid to virtual machines and servers in public cloud service environments. Both human and non-human privileged identities (NHI) in Amazon Web Services (AWS), Google Cloud Platform (GCP), and Microsoft Azure and other cloud providers must be continuously discovered and their privileged credentials secured.

With systems, applications, and accounts undergoing continual updates, the establishment of a persistent discovery process is vital. This process also proves instrumental in identifying unsanctioned "rogue" or "shadow IT" servers. Such elements could pose a potential risk or indicate an ongoing attack, hence their early detection is of paramount importance for preemptive action and risk mitigation.

Integration of discovery tools from PAM vendors with supplementary controls can further enhance this process. It is advisable, at the very least, to utilize an IT Service Management (ITSM), Security Information and Event Management (SIEM), Identity Governance and Administration (IGA), authentication, DevOps tools, and ticketing systems. This approach creates a layered security architecture that fortifies the privileged access landscape while providing a broad overview of potential vulnerabilities and security threats.

2. Develop an automated privileged account password policy

Establishing a clear and comprehensive password policy is an integral component of managing privileged accounts. Such a policy needs to be easily understandable and agreeable to everyone who uses and manages these accounts. The development of a privileged account password protection policy that encompasses both human and non-human accounts is fundamental to prevent unauthorized access and demonstrate regulatory compliance.

However, just having a policy isn't enough. It's equally important to complement this with automated password management. Privileged Access Management (PAM) controls streamline this process while offering robust security. They not only facilitate the automatic randomization, management, and vaulting of passwords but also empower the automatic and simultaneous updating of all privileged account passwords.

Crucial to this mechanism is the ability of a PAM vault to rotate passwords on a schedule. Regular and automated password rotation significantly minimizes the window of opportunity for attackers and keystroke loggers, bolstering overall security.

Equally significant is the creation of unique passwords for each account. By ensuring that no two accounts share the same password, the threat surface is considerably reduced. This diminishes the potential damage from a single compromised password and adds an additional layer of security, making the password management system not only efficient and reliable but also far more resilient to breaches.

3. Implement least privilege

To mitigate the risk of adversaries infiltrating critical systems or accessing sensitive data, it's crucial to bestow users with only the bare minimum privileges required for their roles. This is where the implementation of the principle of least privilege comes in, ensuring that access rights are limited strictly to what is necessary for specific tasks.

When individual accounts necessitate the capability to execute privileged tasks, Privileged Access Management (PAM) solutions can facilitate the process. These tools enable access that is precisely confined to the scope and duration required to accomplish the given activity, subsequently revoking that access once the task is completed.

A critical aspect of this implementation, however, is preventing lateral movement between servers. Even with minimal privileges, users with access to multiple servers can become a potential risk if an attacker compromises their account. It's therefore essential to eliminate full local administrator access to servers, thus limiting the potential for lateral movement and further fortifying the security infrastructure.

To minimize risk, you should enforce two key principles:

1. **Separation of duties** – No employee can perform all privileged actions for a given system or application.

2. **Least privilege** – Employees are granted only the bare minimum privileges needed to perform their jobs.

4. Monitor accounts with analytics

Privileged user behavior analytics solutions can help you gain insight into privileged activity with a behavioral baseline based on machine learning algorithms that consider user activity, account behavior, access behavior, credential sensitivity, and similar user behavior. Your PAM should allow you to analyze user behavior and produce a risk score that it can then use to govern access.

5. Choose the right solution

Numerous PAM technology providers have varying features and deployment options. Before choosing, it's important to define your use cases for privileged access in your environment and preferred solution capabilities, such as service account management, discovery functions, asset and vulnerability management, analytics, file integrity monitoring, SSH key management, and more.

Professional security assessments can help you successfully deploy your selected solution by identifying what your privileged accounts are protecting and objectively detailing current security policies, controls, and processes. Leverage a vendor partner to help you test and evaluate potential solutions and help you implement your PAM solution.

I recommend opting for a single, trusted vendor offering a comprehensive, SaaS-based PAM solution. This type of platform provides the advantage of a holistic approach to privileged access management, combining all necessary components into a seamless, cloud-based service.

With the heritage of building secure technology that businesses can rely on, such a vendor will ensure a high degree of trust and dependability. A SaaS PAM platform also offers the benefits of regular updates, easy scalability, and lower upfront costs, making it an attractive option for organizations of all sizes.

Ultimately, a modern, SaaS PAM platform can enhance your security posture by providing advanced, integrated solutions that adapt to the dynamic nature of cybersecurity threats.

How to Reduce the Risk of Cyberattacks

Finally, I want to provide you with some quick tips you can use as part of your server security program, along with the PAM solution you choose.

- Be familiar with your industry's compliance regulations and best practice frameworks like Zero Trust.
- For strong PAM maturity, adopt a credential vault that works seamlessly with your chosen Server PAM solution. But remember it's only one piece of securing access across your organization.
- Ensure that you can discover and see all the local and server privileged accounts across your environment, no matter where they are (on-premises or in the cloud) or what OS they utilize.

- Understand the security measures you adopt across your servers. Remove excessive privileges from user accounts, enforcing a least privilege model. Eliminate as many local privileged accounts as possible.
  Vault your remaining local privileged credentials, strictly control access to them, and ensure you rotate them regularly.

- Make managing access to resources across your hybrid cloud easier for your team by:

  - Using individual (not shared) enterprise credentials to provide access – whether AD, LDAP, or a cloud identity provider – and even better if you can work with a vendor that can help bridge multiple directories if required in your environment to ensure one consistent set of identities for authentication and authorization.

  - Removing standing privileges wherever possible.

- Establish robust processes for consistent privileged access, including user self-service workflows and third-party integrations. It's crucial to institute comprehensive processes that consistently provide the appropriate access level for necessary activities, irrespective of the server's operating system or location. Self-service workflows allow users to request and receive elevated access when needed, enhancing efficiency while retaining tight access control. Additionally, third-party workflows, such as ServiceNow, can streamline access management and add an extra layer of auditability, fostering greater transparency, efficiency, and security by:

    - Ensuring your PAM solution can integrate with enterprise governance tools that adjust privileges when users are onboarded, offboarded, or when their role changes.

    - Implementing additional security as necessary – like MFA at server login and server elevation.

- Enforce a least privilege policy – but provide as little friction for users as possible by:

    - Providing password-less access using enterprise credentials – this allows IT staff to access systems using their normal account and not have to track multiple credentials or constantly go into the vault.

    - Enabling adaptive authentication that uses context and/or historical behavior to determine the risk to better detect and alert on anomalous activities. For example, if low – permit single sign-on for minimum user friction. If medium – ask for additional proof of identity via MFA. If high – deny access, disable the account, and alert IT security.

    - Using a browser-based portal that enforces RBAC and eliminates the need for local SSH or RDP clients or a VPN for secure remote login to servers – whether on-premises or in multiple VPCs and multiple clouds. Record all remote privileged sessions for future reporting and investigations as needed.

As more servers and workloads are moved to the cloud – different teams may be responsible for on-premises servers vs.

servers hosted within public cloud provider environments – it's critical to collaborate and utilize the same technologies and processes to consistently manage access to resources.

The Big Takeaways

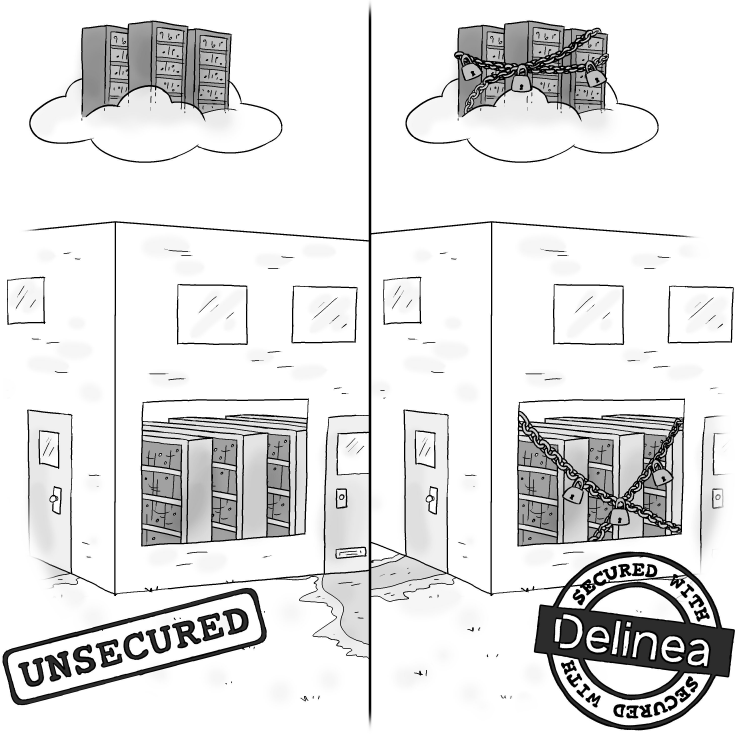
More and more companies are adopting the public cloud quickly because they need their speed and agility to be competitive and innovative in today's fast-paced business landscape. The problem is that many of these companies fail to adopt a holistic approach to security for both their in-cloud and on-premises servers, opening them up to undue risk.

The demonstrated focus on privileged credentials in cyberattacks makes it clear that organizations also must have mitigating controls in place that ensure privileged access remains under control and that the use of privileged credentials is only accessible to sanctioned users within the organization.

The use of a PAM solution helps establish the needed controls around privileged access to effectively protect servers – and the valuable data they contain – from threat actors. Through controls such as removing standing privileged access, securing access to privileged credentials within a vault, and using Just in Time privileged access, PAM creates a hostile environment for threat actors where no accessible credentials have the needed levels of privilege needed to assist in carrying out malicious threat actions.

I hope this guide has provided you with ideas that can help make your choice for the best server and privilege access solutions easier.

Maintaining Server Access Security with Delinea



Protecting your business from the ever-evolving threat of cybercriminals may seem overwhelming, especially when simply running your organization demands so much of your attention. Fortunately, maintaining your server access security can be seamless with Delinea's *Privilege Control for Servers* on the Delinea Platform.

If you are unfamiliar with Delinea, it is a cybersecurity provider created in 2021 via a merger between two cybersecurity industry leaders, Thycotic and Centrify.

Delinea is a pioneer in securing identities through centralized authorization, making organizations more secure by seamlessly governing their interactions across the modern enterprise. Delinea allows organizations to apply context and intelligence throughout the identity lifecycle across cloud and traditional infrastructure, data, and SaaS applications to eliminate identity-related threats.

With intelligent authorization, Delinea provides the only platform that enables you to discover all identities, assign appropriate access levels, detect irregularities, and immediately respond to identity threats in real-time. Delinea accelerates your teams' adoption by deploying in weeks, not months, and makes them more productive by requiring 90% fewer resources to manage than the nearest competitor. With a guaranteed 99.99% uptime, the Delinea Platform is the most reliable identity security solution available.

What makes Delinea unique is that it believes in building secure solutions by design. It understands the user and focus on building tools that make security seamless for the modern, hybrid enterprise. Its solutions empower organizations to secure critical data, devices, code, and cloud infrastructure to help reduce risk, ensure compliance, and make security easy to manage. Its intuitive user interface removes complexity and clearly defines access boundaries for thousands of organizations worldwide.

Your Server Security Challenges Answered

Delinea's answer to your server security challenges is its *Privilege Control for Servers* solution. This modern solution is purpose-built to address privileged access challenges across multiple fronts – risk, cost, productivity, and compliance.

Privilege Control for Servers secures and consolidates identity access to improve productivity; manages privileges and protects against cybersecurity. It controls privileged access to servers in both on-premises and in cloud/multi-cloud environments and allows humans and machines to seamlessly authenticate with passwordless login, enforcing least privilege with just-in-time privilege elevation, preventing lateral movement, increasing accountability, and reducing administrative access risk.

Privilege Control for Servers protects servers by:

Centrally managing identities

Privilege Control for Servers centrally manages and simplifies login, execution, and multifactor authentication (MFA) policies in Active Directory (AD) or from cloud identity providers. All this can be done using a single enterprise identity for user login, eliminating local privileged accounts and the risk they pose to your business.

Minimizing cyber risk with best practices

Privilege Control for Servers removes implicit trust for privileged access by aligning with regulations and best practices such as Zero Trust and zero standing privileges to protect against ransomware and data breach attacks. Privileged activity on each server is captured and tied to an individual for full accountability.

Following least privilege guidelines

Privilege Control for Servers provides role-based access control (RBAC) at the host level for fine-grained control and privilege elevation. System administrators can request access and elevated privileges through built-in self-service workflows.

Enforcing adaptive MFA

Privilege Control for Servers uses Multi-Factor Authentication policies enforced at login and application execution across Windows and Linux to provide stronger identity assurance and cyber risk insurance demands. Multi-Factor Authentication ensures the user is legitimate, blocking bots and malware and preventing lateral movement.

Improving security and compliance

Privilege Control for Servers captures all privileged activity on the server for full accountability, accessing granular audit logs, reports, and visual session recordings to aid compliance and incident response.

A Server-First Approach to PAM

Delinea's Privilege Control for Servers solution can solve all the server access problems mentioned throughout this guide. As a modern enterprise embracing a cloud-first strategy, your organization requires a similar cloud-first approach to PAM. Legacy PAM solutions designed a decade ago for the data center can't adapt to a multi-cloud distributed IT infrastructure. Delinea recognized industry trends and invested to get ahead of the curve. It was the first vendor to offer PAM-as-a-Service, and while other vendors play catch-up, retrofitting legacy technology and focusing their efforts on a subset of PAM, Delinea continues to innovate with comprehensive PAM solutions that cover all the bases enabling privileged access security at scale.

Delivered on the cloud-native Delinea Platform, Privilege Control for Servers enables a clear line of sight across all privileged activity and access to servers with continuous discovery, flexible authentication, host-based insights, and policy management.

Seamlessly manage just-in-time and just enough privileged access across Windows, Linux, and Unix servers while enforcing Multi-Factor Authentication (MFA) at log-in and privilege elevation for additional identity assurance.

Privilege Control for Servers Solution will provide you with the technology you need to manage access to your infrastructure on your journey to the cloud.

Improve your server access security!

FREE Server PAM Resources from Delinea

Secure your on-premises & multi-cloud server environment with modern PAM.

Reduce the risks of security breaches & ransomware attacks while ensuring compliance.

5 Reasons to Turn to Multi-Factor Authentication Everywhere Infographic

Combat data breaches, weak passwords, and phishing attacks with MFA.

Zero Trust Privilege for Dummies eBook

"Trust but verify" is now replaced with "never trust, always verify."

Advanced Active Directory Bridging Whitepaper

Centralize identity, authentication, and access management for Linux and Unix servers within Active Directory.

Critical Controls for Modern Cloud Security Whitepaper

Privileged Access Management (PAM) mitigates risks across the cloud attack surface.

How to Apply Zero Standing Privilege Consistently Across Windows and *NIX Systems Solution Brief

Secure access to modern hybrid cloud infrastructures that include Windows, Linux, and Unix servers.

Delinea **Download now: delinea.com/resources**

With organizations rapidly adopting cloud infrastructure, it's harder to secure access to your systems as you cannot distinguish who is friend or foe by simply examining what's "inside" vs. what's "outside" your perimeter. With your servers sitting at the center of your infrastructure, securing all privileged access to them has become a core part of a mature cybersecurity strategy. This eBook will provide you with information and tips to help increase your server access security.

About Derek A. Smith

With over 30 years in the security industry, Derek A. Smith is a former government agent, cybersecurity SME, holds a variety of certifications (CISSP, CEH, CCISO, Security+, etc.), eight college degrees, is a published author, conference speaker, cybersecurity analyst for several international and local television news stations, government program manager, and more.