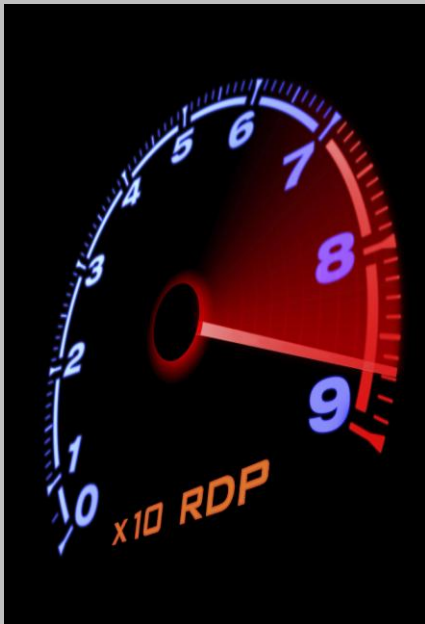


WHITE PAPER



The Business Case for RDP Acceleration:

Resolving the user-experience barrier to Terminal Services & VDI deployments

Ericom Software
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Executive Summary

For many IT organizations, 2012 will be a year of getting back on track to fulfilling pre-recession goals. For some, this will mean simply taking steps toward maximizing the value of existing Terminal Services. For others, 2012 will be about adopting new access strategies based on providing remote, anytime, anywhere access to Windows applications and desktops hosted in Terminal Services and VDI environments.

Either way, the following is true: Providing an RDP end-user experience that closely matches a PC-like experience, from anywhere and from any device —PC, Mac, iPad, smartphone, thin client or remote desktop — is not a nice to have, but rather a necessity. An unacceptable user experience significantly diminishes an organization's ability to enable effective mobility and productive remote working practices, within or beyond the LAN.

Microsoft RDP is the de-facto standard protocol for accessing remote applications and desktops. Despite the significant strides made since introducing RDP more than a decade ago, end-users continue to complain about slow or choppy RDP sessions when using RDP to work with graphics-rich content and applications (e.g., Adobe Acrobat Reader, graphics-rich PDF files, PPTs, Flash, streaming video), especially remotely. In addressing RDP's issues, some organizations are choosing to go with alternative protocols or costly and complex end-to-end network optimization solutions - while others are avoiding Terminal Services (SBC) and Desktop Virtualization (VDI) deployments, altogether.

What if organizations could simply and cost-effectively break through the RDP barriers and provide a better end-user experience?

This Whitepaper identifies some of the RDP performance challenges facing organizations, as well as their potential causes and cures. With that said, this document is not intended to broadly address any one use case scenario, nor the entire scope of RDP alternatives, nor the costlier and complex solutions that deal with network performance as part of a comprehensive network solution.

Addressing RDP User-Experience Challenges

As IT shops strive to provide acceptable LAN-like, local-PC experiences to users working in Terminal Services and VDI environments, they frequently confront issues around RDP performance. This is particularly true when users are working over WAN connections with graphics-heavy PDFs, PowerPoint, Flash, video, and other such applications. Given that Microsoft RDP is the de-facto standard remote display protocol in Terminal Services and VDI environments, it makes sense that a top IT concern is finding a cost-effective and high performance solution to the RDP end-user challenge.

Over the past decade, RDP has made significant strides in terms of performance and capabilities. The latest version of Microsoft RDP Client (Version 7) is much more capable than previous versions in handling limited network resources. However, standard RDP is still often insufficient over high latency and low bandwidth WAN connections, and over congested LANs. Moreover, it does not satisfy end-user requirements over mobile connections such as air-cards. In many of these scenarios, end-users typically experience:

- Lags in response times
- Sluggish and choppy screen updates
- Displays that are painfully slow
- Images rendered in chunks, and
- Low frame rates for videos and animations

Network-related RDP performance could be due to a variety of network issues. Here, it is useful to describe both bandwidth and latency, and their respective relevance to the discussion about scoping RDP performance over WANs and congested LANs, for local and remote users:

Bandwidth - represents the capacity of a network connection. This means how much data can be transmitted over the wire in a given time period. When bandwidth is limited, it takes RDP longer to transmit screen updates. This results in displays that refresh slowly and appear in chunks. In some cases, this can make RDP unusable, especially when used to view graphic intensive applications or animations.

Latency - the amount of time required for information transmitted from one end-point to another, over the network. Often the round-trip time is measured. High latency values can cause RDP to appear unresponsive, for example, by introducing a significant delay between the users pressing a key, and seeing the screen update accordingly.

Bandwidth and latency are measured independently of each other (although they can affect each other because of the way network protocols operate). However, limited bandwidth and high latency often go hand-in-hand. For example, WAN environments have both lower bandwidth and higher latency than LAN.

The key challenge for any remote access protocol is to overcome bandwidth and latency limitations, and provide an end-user experience that mimics that of local-computing as closely as possible. Since many applications were not designed for remote access, achieving this goal can be very difficult.

Note: Organizations looking to improve the RDP end-user experience should consider that poor performance could be a result of any one of several factors. This is a complex issue to resolve. For example, when discussing bandwidth in the context of server-based computing, IT expert Brian Madden once wrote: “Regardless of protocol, regardless of technique, a true “desktop-like” experience is only going to happen

with bandwidth.¹ All the same, an Aberdeen benchmark study revealed² that 47% of all organizations that increased their bandwidth capacity experienced no improvement in application performance. In brief, organizations are warned against automatically acquiring any high-performance solution, which could result in an expensive, complex or unnecessary IT investment.

Common Limitations of RDP

In addition to bandwidth and latency limitations, several factors can affect RDP performance and degrade the end-user experience. This happens especially when accessing graphics-intensive applications and rich media content over WANs and congested LANs. Following is a sample list of some of the more common factors:

- **Graphics Intensive Apps** - Today's applications are much more graphically intensive than applications that existed a decade ago. The current crop of applications often utilizes animations, transition effects and even embedded videos. Display problems will worsen as further demands are placed on enterprise network infrastructures to transmit even higher volumes of media-rich content traffic, at even faster rates.
- **Compression** - RDP compresses transmitted information, especially images, in order to overcome bandwidth limitations. However, currently RDP mostly utilizes lossless compression methods. Though these methods provide picture-perfect quality, they are significantly limited in how much compression they can achieve. RDP has introduced lossy compression, but only to a limited degree.
- **Image Rendering** - RDP was originally developed for dial-up networks - not for modern broadband connections. For example, RDP transmits information as many small pieces (packets). Over dial-up networks, this enables RDP to appear more responsive as images render progressively. However, this method is highly inefficient over broadband connections, resulting in slower display and images rendered in chunks.
- **Application Compatibility** - RDP was also designed to support remote access to applications that were developed for local access, and as a work-around, RDP "tricks" these applications into being accessed remotely. Notwithstanding this, the end-user impact is still less than optimal.

These limitations compel many organizations to choose between:

- Avoiding remote Terminal Services or VDI altogether
- Utilizing Terminal Services and VDI computing environments, but significantly limiting their deployment
- Using higher cost networks, such as dedicated land-lines
- Utilizing alternative remote display approaches are often associated with high costs and complexity
- Purchasing an expensive hardware accelerator, that often doesn't do much for RDP

¹ <http://www.brianmadden.com/blogs/brianmadden/archive/2007/11/05/remote-display-protocols-for-vdi-will-rdp-be-enough.aspx>

² Aberdeen 2007

³ All measurements were made at 256 Kbps bandwidth, with a connection latency of 60 ms

The Promise and Capabilities of RDP 7

With the release of Windows 7 and Windows Server 2008 R2, Microsoft has introduced a new version of RDP —Version 7— with improved capabilities and performance. For example, RDP 7 incorporates lossy compression for higher image compression ratios and multi-media redirection. However, some significant roadblocks remain to using RDP without any enhancements:

- While RDP 7 clients are also available for Windows XP and Vista, the host must be Windows Server 2008 R2 or Windows 7 in order to leverage the new capabilities of the protocol. When connecting to older servers, performance and capabilities will be the same as those in previous versions of RDP.
- RDP 7 introduces lossy image compression, but only to a limited degree. This compression improves RDP significantly, but its performance can still fall short when used over WAN or congested LAN.
- RDP 7 can utilize multi-media redirection to enhance video performance over remote connections. However, RDP multi-media redirection is limited to a few, specific protocols, and does not include common protocols such as Flash and QuickTime. In addition, for multi-media redirection to work, the client must have support for the required media types pre-installed.

What About the Alternatives to RDP?

A number of other remote display protocols such as ICA/HDX, VMware PCoIP and RedHat SPICE offer varying degrees of rich, remote multimedia experiences and broad functionality. Given the breadth of options currently available, one approach may be more suitable than another is. Some organizations will address RDP-based application performance challenges by investing in costly and complex infrastructure upgrades and alternatives to RDP, which can be unnecessary, or at worst, will not yield the required results.

ICA / HDX

From a high-level design perspective, ICA functions similarly to RDP and provides very good acceleration. However, this proprietary protocol is sold only as part of comprehensive and complex Citrix management platforms (XenApp and XenDesktop).

PCoIP

The PCoIP protocol works well over the LAN and fast WAN, but inadequately over very slow connections, such as those with latency below 200 kbit/s. Also, because it's a UDP-based protocol, many firewalls and proxy servers prevent PCoIP from successfully connecting. In addition, PCoIP does not provide access to Terminal Servers; it only supports physical / virtual desktop operating systems, such as Windows XP or Windows 7. PCoIP is available as a 1:1 hardware solution connecting to dedicated remote workstations and blade PCs, and also as part of a software solution for connecting to VMware View virtual desktops.

Red Hat SPICE

SPICE works well only over LAN but poorly over WAN. In addition, SPICE currently provides connections only to virtual desktop operating systems running on a Red Hat KVM hypervisor.

WAN Optimizers

WAN acceleration solutions are hardware-based; they require installation of dedicated hardware on the server-side and generally on the client-side as well. As a result, they are more expensive than software-only solutions, averaging \$100-\$500 per user. In situations when it is not possible to install dedicated hardware on the client-side, for example for people connecting on the road, WAN accelerators may be wholly

inappropriate. In addition, by default RDP is both encrypted and compressed. This prevents WAN accelerators from caching and compressing RDP communication. Even if RDP encryption and compression is disabled, WAN accelerators are not designed to parse and optimize the RDP protocol itself; hence, their algorithms and caching techniques have relatively little impact on RDP performance.

Ericom Blaze RDP Compression & Acceleration Technology

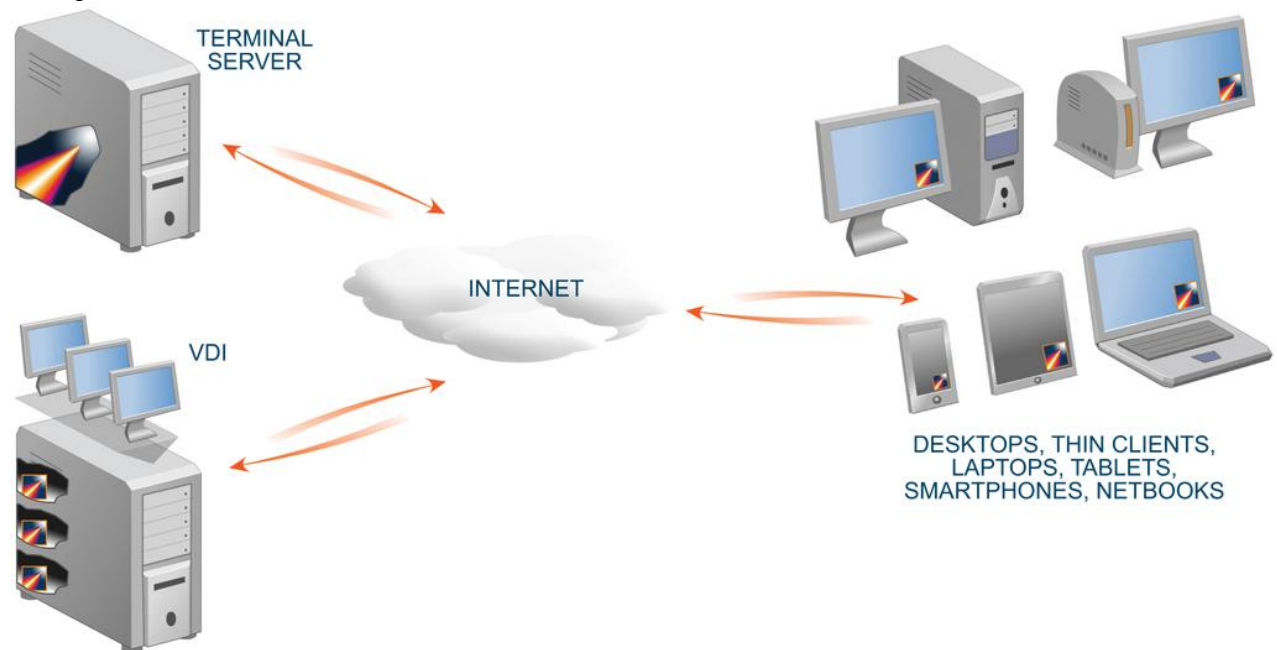
Ericom Blaze is a software breakthrough that transforms RDP into a fast, responsive, and extremely efficient remote display protocol, especially over low bandwidth and high latency WAN connections. Ericom Blaze delivers a significantly improved end-user experience and fast remote desktop connections - while reducing RDP bandwidth consumption by up to 10 times - across LAN, WAN, ADSL, 3G, and GPRS.

How Ericom Blaze Works - Highlights

The most effective way in which Ericom Blaze optimizes RDP is by uniquely compressing images, such as, bitmaps, PDFs, PowerPoint (PPT), Flash, and other animations, including movie clips. The goal of data compression is significantly reduce the amount of data transmitted over the network.

Ericom Blaze's acceleration, compression and packet-shaping methods can achieve extremely high levels of RDP compression - by up to 96% - and it transmits data up to 25 times faster than RDP (see more about Ericom Blaze's 3-way compression in Compression Techniques).

Ericom Blaze works with any standard RDP host and within VDI, Terminal Servers and remote physical machine environments. The Ericom Blaze client (which is small - less than 7MB) supports every version of Windows, from XP, as well as certain Linux, Mac OS X, and CE versions. In addition, the Ericom Blaze Server can be used by organizations to accelerate the performance of Ericom's mobile RDP client (AccessToGo), which supports Apple iOS (iPad, iPhone and iPod Touch) and Android tablets and smartphones.



Use Case Scenarios

Ericom Blaze performs particularly (and equally) well in Terminal Services and VDI environments where RDP performance normally degrades the user experience. Some topologies in which Ericom Blaze provides the greatest impact on RDP performance include connections over low-bandwidth, high latency WANs, or congested LANs. Furthermore, Ericom Blaze has no minimum bandwidth requirements – the slower the connection the more dramatic the improvement vs. the RDP end-user experience (e.g., over 3G, GPRS, and Wi-Fi networks).

Additional common use cases for Ericom Blaze include:

- Connectivity over congested LAN and WiFi (1000 users working with graphical applications across a LAN)
- Remote connectivity over WAN – Remote offices, branch computing and mobile working
- Cloud-hosted virtual desktops
- ASP-hosted Windows applications and Desktop as a Service (DaaS)
- Slow and high latency connections, including modems, WAN wireless, e.g., “Starbucks,” and cross-continent (Asia to US, for example).
- A Terminal Services environment supporting RDP acceleration of graphics-heavy, remote learning, remote training, and other applications
- Remote access to Virtual desktops (VDI)
- VDI shops that support RDP as one of their display options
- Enhancement of Ericom’s VDI connection broker and other 3rd-party VDI connection brokers, such as VMware View v4, as well as Ericom’s enhanced Terminal Services management solution – PowerTerm Web Connect

How Does Ericom Blaze Compare With RDP?

The purpose of Ericom Blaze is to significantly improve end-user experience when working remotely using RDP. Beyond greatly compressing and accelerating RDP, Ericom Blaze provides additional features that enhance the end-user experience and extend RDP capabilities.

Seamless Windows

Microsoft introduced seamless windows in RDP version 6, but only when connecting to Windows Server 2008 or 2008 R2. Ericom Blaze extends this functionality by providing seamless windows when connecting to Windows Server 2003, Windows XP, and Windows 7, as well. Ericom Blaze further supports seamless windows when connecting from Linux, Mac and CE desktop operating systems.

Multi-Monitor Support

Microsoft added multi-monitor functionality to RDP in two steps: First, In RDP version 6 Microsoft introduced multi-monitor spanning, which is the ability to have a single, large virtual monitor that covers all local monitors. This feature is available when connecting to any RDP host, starting from Windows XP. Second, In RDP 7 Microsoft introduced true multi-monitor support, but only when connecting to Windows Server 2008 R2 or Windows 7. Ericom Blaze supports RDP 7’s multi-monitor functionality, and in addition, it enhances multi-monitor spanning with true multi-monitor capabilities such as proper maximize (to single monitor), proper dialog centering and more. This means that you get enhanced multi-monitor capabilities when connecting to any RDP host, from Windows XP, and higher.

Enhanced Security

Ericom Blaze adds strong, end-to-end SSL encryption over the entire traffic.

Compression Techniques

Routinely, a Terminal Server takes a very efficient media-rich content stream, and then expends a significant amount of energy converting it into a very inefficient transmission of these images. In contrast, Ericom Blaze uses 3-way Intelligent Compression to compress the images more significantly and efficiently, and displays them in whole, rather than partial, frames. Ericom Blaze's packet-shaping technique creates significantly smoother visual effects by lowering the appearance of latencies, making them appear lower than they actually are.

Ericom Blaze 3-way Intelligent Compression

- **Compression** – Ericom Blaze performs intelligent introspection AND enhanced bulk compression of the entire RDP protocol; this compounded method compresses the display data by up to 25 times.
- **Acceleration** – Ericom Blaze performs packet shaping that transmits RDP data more efficiently over networks.
- **Intelligent frame presentation** -Standard RDP breaks screen frames into multiple small chunks, and renders them individually on the local display. Ericom Blaze unifies these chunks and displays complete screen frames as single units, whenever possible. While this does not accelerate performance per se, it does enhance the viewing for the user by not breaking screen displays between frames.

Lab Results for RDP vs Ericom Blaze Performance³

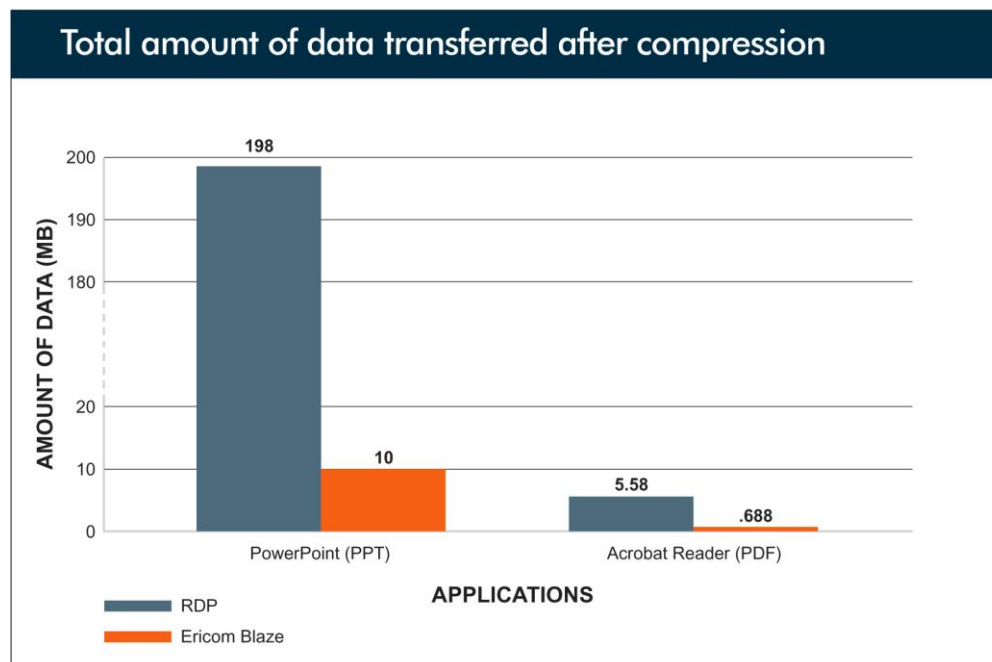


Chart 1: RDP versus Ericom Blaze: The total amount of data that was transferred following compression

³ All measurements were made at 256 Kbps bandwidth, with a connection latency of 60 ms

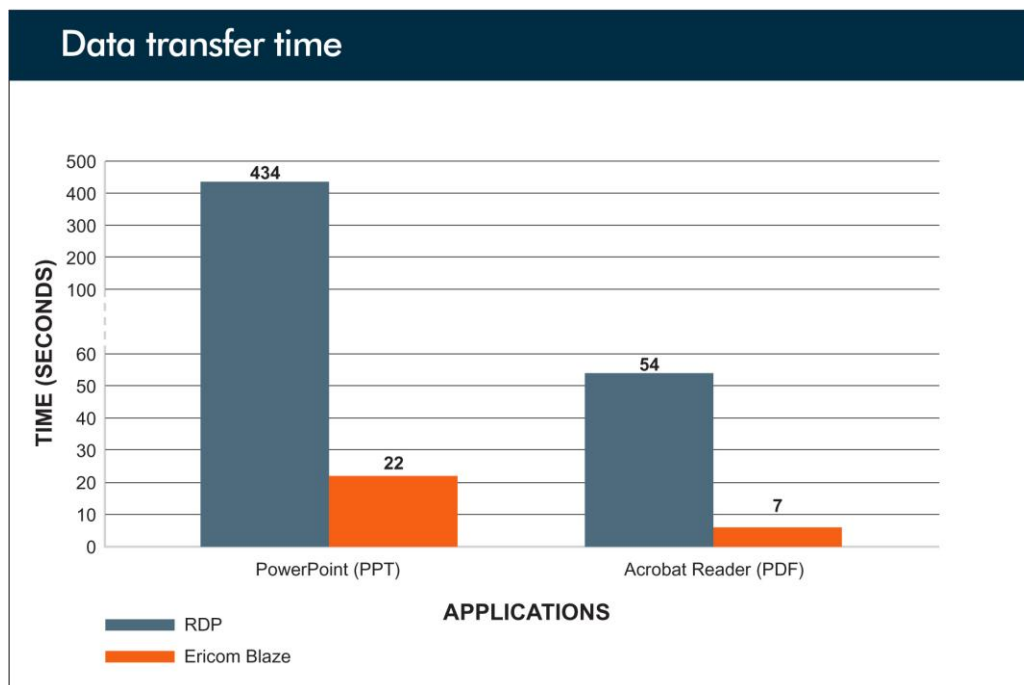


Chart 2: RDP versus Ericom Blaze: Data transfer times following data compression

Server-side Platform Support

Ericom Blaze is compatible with any x86 or x64 based host system that supports RDP, including Windows Terminal Servers, remote physical desktops and VDI based desktops.

Extended Features for Non-Windows Clients

In addition to Windows, Ericom Blaze includes native clients for Linux and Mac, Apple iPad/iPhone and Android tablets and smartphones. Moreover, Ericom Blaze extends RDP features such as those listed below, to non-Windows platforms, when connecting to any RDP host / server:

- Automatic reconnect
- Load balancing for Windows Server (2008 and 2008 R2)
- Enhanced cursor types
- Disk redirection
- SSL-Secure Gateway
- Serial Redirection,
- Multi monitor
- Support for RDP user licensing as well as RDP device licenses, *and more*

How is Ericom Blaze Different from Other RDP Compression & Acceleration Solutions?

- **Ericom Blaze** is the only standalone RDP compression software solution on the market. It does not require specialized hardware on either the client or the host.
- **Performance:** By performing introspection on the RDP client from within, Ericom Blaze surpasses the performance of competing software and hardware based remote solutions that modify the RDP protocol only externally. For example, Ericom Blaze uses lossy compression algorithms that can reach upwards of 96% data compression.
- **Enhanced Security:** Other solutions that compress RDP may expose RDP traffic to security risks by requiring the removal of RDP encryption over segments of the RDP traffic, such as within the LAN. In contrast, Ericom Blaze encrypts the entire RDP traffic path with strong, end-to-end SSL encryption.
- **Infrastructure Requirements:** With Ericom Blaze, there is no minimum bandwidth requirement (many competitive solutions require minimum bandwidth).
- **Investment Protection:** Ericom Blaze works seamlessly with existing hardware accelerators, improving RDP traffic
- **Intelligent Frame** display renders screens as single units rather than as a sequence of blocks.

For additional information including a full list of supported platforms, go to: www.EricomBlaze.com.

Final Thoughts

Delivering a great end-user experience is a priority for organizations looking to realize the benefits of remote access. Challenges in accessing critical information in a timely manner is often a significant impediment to attaining business objectives or ensuring that users are working efficiently and productively. Unfortunately, Microsoft RDP, the de-facto remote display protocol, is limited in ways that often degrade the end-user experience. Organizations should aim to provide the best RDP end-user experience quickly, reliably and within budget.

Some approaches to improving RDP performance, and the end-user experience, may appear more suitable than others. Organizations that address RDP-based application performance challenges by investing in potentially unnecessary, costly and complex infrastructure upgrades and RDP alternatives, may not achieve the required results.

Ericom Blaze is a dedicated RDP compression and acceleration solution that significantly enhances the end-user experience in basic Terminal Services environments. As a simple and cost-effective means to breaking through the RDP end-user experience barrier, Ericom Blaze also makes it possible and productive to roll out desktop virtualization (VDI), Terminal Services, and thin computing to remote/mobile users, branch offices and private Clouds.

[Click here](#) to download a free product trial, or visit EricomBlaze.com

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About Ericom

Ericom® Software is a leading global provider of Application Access, Virtualization and RDP Acceleration Solutions. Since 1993, Ericom enables organizations across all industries to provide secure, centrally managed access to applications, desktops and data running on Microsoft RDS / Terminal Services, VDI, Cloud platforms, and other systems, from a broad range of end user computers and mobile devices. With a comprehensive product line and global customer base in more than 45 countries, Ericom helps organizations of all sizes and across multiple industries align their IT operations with strategic business objectives. Ericom has offices in the United States, United Kingdom and EMEA. Ericom also has an extensive network of distributors and partners throughout North America, Europe, Asia and the Far East. Among our expanding customer base, of more than 30 thousand, with 7 million installations, are leading organizations, corporations, universities and government agencies.

For more information on Ericom's products and services, contact us at the location nearest to you.
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