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WHITE PAPER
TECHNOLOGY PRODUCTS

Leveraging the Teradici PCoIP® Protocol to Enable Virtual-Machine Sharing for Collaboration in Broadcast & Media

What Is PCoIP® Technology?

Every remote workspace relies on a remote display protocol to enable the graphical interface by which the user connects to remote machines, be they physical or virtual, on-premises or in the cloud. Teradici, a HP company, developed PC-over-IP (PCoIP®) technology specifically to ensure a secure, high-definition and highly responsive computing experience, even in the face of the most challenging network conditions. The high-performance display protocol is purpose-built to deliver virtual desktops and to provide end users with a rich desktop experience, regardless of task or location, and it is being adopted across the Broadcast, and Media & Entertainment industry.

The Black Box Emerald family of KVM (keyboard, video, mouse) products supports multiple remoting protocols including PCoIP, which is supported in some Emerald receivers and, also via the company's Virtual Machine (VM) Sharing Gateway, the EMD3000GE. (Choosing the right type of access will be discussed later in this paper.)

With PCoIP delivering a streamed pixel representation of their desktop and applications, users experience very little difference between working with a local computer or a remote machine. To leverage PCoIP technology, you need a PCoIP-enabled host and PCoIP-enabled client both available via Teradici® CAS remote desktop software. remote machine.

How Does PCoIP Work?

PCoIP technology encodes, compresses, encrypts, and transports image pixels from a central server or workstation to the remote desktop, where images are decrypted and decompressed to enable user interaction with that particular endpoint, be it a remote workstation or a virtual machine.

Teradici PCoIP technology creates a high-performance remote experience including client-side image caching to reduce bandwidth, bandwidth management enhancements to improve the experience on congested and lossy WAN and wireless networks, fully reversible colour space conversion to render colours remotely as generated at the host, audio compression enhancements to improve audio quality and reduce bandwidth when using audio output devices, and intelligent compression of virtual channel data.

Because PCoIP transfers only display information in the form of pixels, no business data ever leaves the cloud, data center, or workstation. Enterprise data and software remain safely secured inside central systems, preventing any tampering with data or infiltration of an application via a remote endpoint device. To add further security, PCoIP traffic is secured using AES 256 encryption, which meets the highest level of security required by governments.

Why Broadcast and Media Are Moving to PCoIP

For broadcasters and media organizations, PCoIP technology is a natural fit for remote connectivity to workstations or virtual machines because of its high performance, particularly compared to other remoting solutions.

Best color accuracy

Some remote display protocols depend on chroma subsampled techniques such as YUV 4:2:0 compression, which reduce bandwidth requirements by approximating image colors. Other protocols attempt color accuracy via manual lossless modes, compromising frame rates and increasing bandwidth utilization in the process. In contrast to those protocols, PCoIP technology uses a fully reversible color space conversion that results in remote reproduction of image colors precisely as intended by graphics applications.

Highly accurate color reproduction is critical in broadcast and media, where users expect and need to work with images that accurately represent the content, whether in newsroom workflows, on-screen graphics creation, digital effects, video logging, or other processes. Whereas other protocols typically are based on H.264 compression and the truncated spectrum it dictates, PCoIP technology leverages the full color spectrum to achieve complete color accuracy and full image fidelity.

Dynamic network adaptation

Designed for the virtual desktop, PCoIP technology is optimized for all types of screen content including static, complex, and natural images as well as text, video, and intensive graphics. Unlike other protocols, PCoIP adapts to current network bandwidth conditions. With the built-in flexibility to use more bandwidth when it's available, the protocol can deliver the best possible performance at any given time.

Broader benefits of PCoIP

With efficient multicore CPU scaling, PCoIP technology offers unprecedented compression efficiency, especially on modern multi-core CPU architectures. Whether organizations leverage the significant multithread AVX2 enhancements or take advantage of third-party GPU offload, they can free up valuable CPU resources for heavy workloads and increased server consolidation.

All of these factors make PCoIP technology an ideal solution for broadcast and media organizations, and a new partnership between Teradici and Black Box is now bringing PCoIP compatibility to the award-winning Emerald KVM over IP platform deployed broadly across the broadcast and media sector for high-performance signal switching and extension in mission-critical applications.

PCoIP/KVM Partnership: Teradici and Black Box

The Black Box Emerald system was engineered with state-of-the-art access and control for physical machines and "private" mode access to virtual machines, but Teradici's new PCoIP technology was appealing to Black Box because the protocol would allow the company to bring the best of PC-over-IP to market leading KVM solutions. Black Box and Teradici experts worked together to determine the best method to integrate PCoIP into the Emerald system with a specific focus on the broadcast and media sector.

Simultaneous virtual machine sharing

The Black Box Emerald system already provides multiple access modes for physical devices and servers. These modes include private (dedicated access), shared (multiple users can share the same device), and view-only (users can only see the video and hear audio from the device but cannot interact with device), among others. Emerald is also the first KVM system to make access to virtual machines part of every receiver.

The integration of PCoIP technology into Emerald systems addresses users' desire to interact with virtual machines the same way they interact with physical machines — and, particularly, to share access to virtual machines with multiple users. Another key requirement for the broadcast and media sector was to unbundle PCoIP support from VMWare Horizon, which is one of the supported methods within Emerald to access Virtual Machines using PCoIP.

Because PCoIP technology addresses these vital needs within the Media and Entertainment market, Black Box introduced a new gateway, Emerald GE that brings Teradici's best-in-class remote display protocol into the KVM realm. The resulting technology partnership unites the powerful Black Box Emerald KVM platform with the Engineering Emmy® Award-winning Teradici CAS underpinning the company's advanced PCoIP technology and supporting a highly responsive, feature-rich user experience.

Best-in-Class PCoIP and KVM Tech: Emerald GE

The new Emerald GE gateway sits on the user's Emerald KVM network and enables Emerald KVM receivers to take advantage of PCoIP with key benefits including simultaneous shared access to virtual machines. A single Emerald GE unit allows multiple users at any authorized Emerald user desktop — using any type of Emerald receiver device — to leverage PCoIP for high-performance connectivity and seamless access to remote workstation or virtual machine sessions. The complex technology of the Emerald gateway remains invisible; each user simply selects the connection they need.

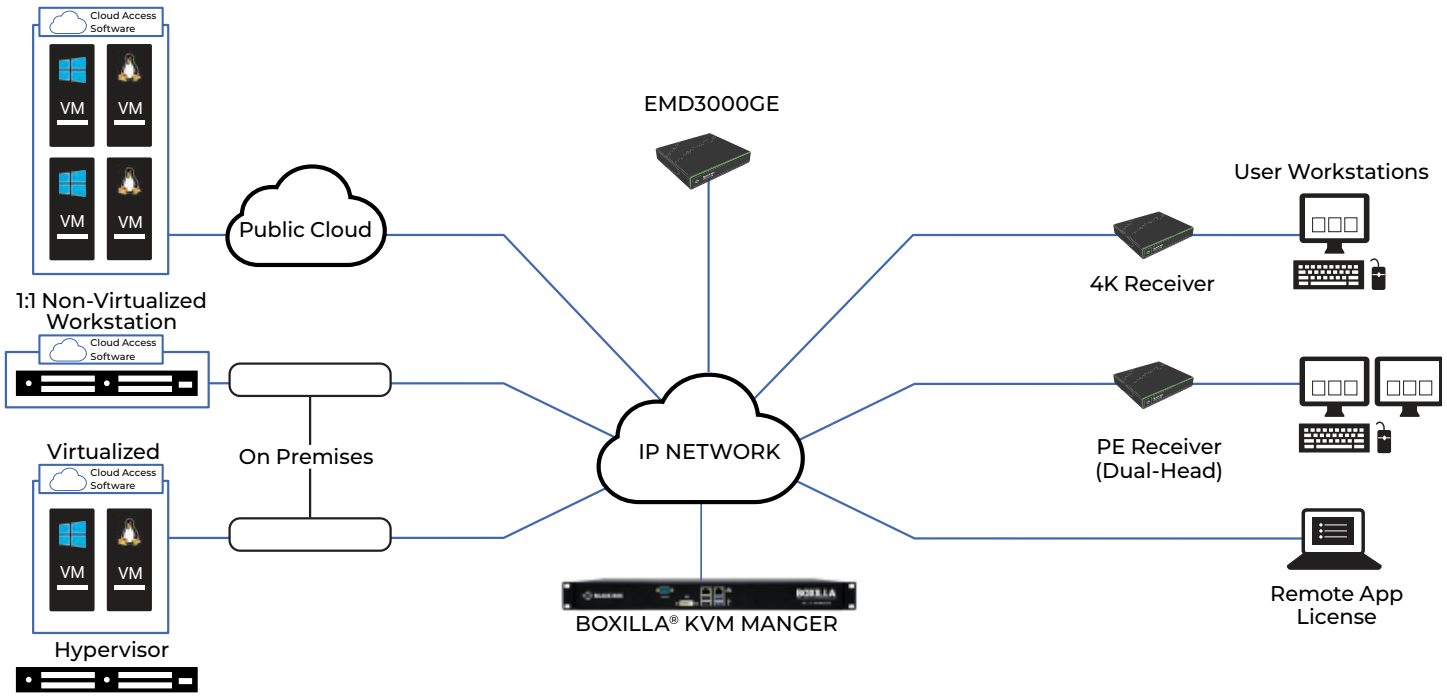

Figure 1 shows how a user can leverage the EMD3000GE to share a virtual machine. The system has Teradici CAS installed on the virtual machine they want to access using PCoIP. The CAS remoting software can be installed on VMWare or Microsoft virtualized servers or on dedicated non-virtualized servers. CAS remoting software can be installed on Windows, Linux, and macOS operating systems.

To enable access to a virtual machine, the user typically defines the connection properties within the Black Box Boxilla KVM manager, including whether direct access to be used or whether CAS Manager broker included in a Teradici CAS subscription is used or alternative (e.g., Leostream). These connection properties include whether the connection should be private, shared, or view-only. To access the virtual machine, the user simply clicks connect on the on-screen display on the Emerald Receiver or RemoteApp, a software client running on standard PC, laptop, or tablet. This causes the receiver to establish a session with EMD3000GE for that virtual machine.

The EMD3000GE launches the actual connection to the virtual machine or joins it to an already established session if a shared-mode type of access had been configured. For the user, the experience of accessing a virtual machine is the same as accessing a physical machine, with all the same access modes and controls. The EMD3000GE is designed to minimize latency for the user and to ensure easy integration with standard IT infrastructure such as Active Directory, NTP, and DNS, among others.

With this first-of-a-kind gateway, broadcast and media organizations can deploy a single box and go on to realize the full benefit of Teradici PCoIP technology. Users can access virtual machines as easily as physical machines, enabling workflows to be maintained as companies migrate more services/applications from physical machines to virtual machines. Administrators benefit from low bandwidth requirements with dynamic network adaptation, as well as centralized access management via the popular Boxilla management system from Black Box.

Future product development

The Emerald GE gateway for PCoIP is a significant addition to the broadcast and media tech marketplace, giving users a straightforward path to higher-performing and more responsive remote work experiences. While this gateway raises the bar for remote access across the many content creation processes being migrated to remote models, it's not the only PCoIP-enabled product on the Black Box roadmap. The collaboration between Black Box and Teradici, an HP company, is ongoing, and their next project is already in development — moving KVM over IP toward the future requirements of broadcast and media organizations.

ABOUT BLACK BOX

Black Box® is a trusted IT solutions provider delivering cutting-edge technology products and world-class consulting services to businesses across the globe in every industry. The breadth of our global reach and depth of our expertise accelerate customer success by bringing people, ideas, and technology together to solve real-world business problems.