Enabling Free Seating and Remote Access on the Trading Floor

Over the past 30 years, Amulet Hotkey has designed solutions for the world's largest trading floors. We offer a range of solution platforms for remote trader workstations. This brief describes what, for many, may be just the first step:

- Centralizing your existing trader workstations using Teradici's hardware-accelerated PCoIP® desktop extension protocol.

- Deploying Leostream's Connection Broker to enable secure remote access and seamless free seating on the trading floor.

The Challenge

Workers are returning to the trading floor, often out of commercial necessity even as the COVID19 pandemic continues to spread worldwide. Many of these trading floors are in some of the world's largest cities. This situation poses many new challenges, including:

- How to achieve social distancing on trading floors with dense and fixed seating floor plans.

- How to enable secure, remote access to a trading system that is optimized for high performance.

- How to alternate which traders are on the floor on different days to minimize operational impact while maintaining maximum productivity. When traders sit in their allocated fixed seats, they are not optimally positioned for business lines to collaborate effectively.

The Solution

Allowing a small proportion of traders to work on the trading floor on any given day - 25% is typical - it is possible to collaborate with others while social distancing safely.

Centralize and rack mount the trader workstations in a local data center or equipment room. Install a Zero Client at each trader desktop and a PCoIP Host Card in each centralized workstation. The Connection Broker connects the Zero Client to the appropriate Host Card when a trader enters their network credentials. A trader can seamlessly connect to their dedicated workstation from any Zero Client on the corporate network.

Deploy additional Zero Clients in the trader's home and the DR site. The Connection Broker manages these external PCoIP connections for optimal flexibility and remote access performance. Alternatively, install the PCoIP soft client on the trader's laptop for connecting from home.

About Us

Overview

Amulet Hotkey is a privately owned company founded in 1990 and head-quartered in the UK with global offices in London and New York. Together with a proven network of regional partners, we can meet the needs of our customers around the globe.

What we do

We create centralized computing and remote desktop solutions that include physical and virtual workstations, high-performance computing systems, as well as virtual desktops. Our solutions are optimized for mission and business-critical applications. We deliver reliable, secure, and uncompromised performance backed by world-class support.

How we help

Amulet Hotkey is the ideal partner for deploying your centralized computing infrastructure. We support a broad range of solutions, including compute accelerated workstations and high-performance computing covering all users from knowledge worker desktops to the highest performance 3D graphics visualization and GPU accelerated computing.

We take a comprehensive approach to ensure your success from planning through to deployment, management and support, allowing your IT team to support business objectives by growing services, reducing costs, enhancing security and response times.

At the desk / home / DR site

Install a PCoIP zero client where the worker is located. This provides connections for the standard desktop peripherals including keyboard, mouse, monitor(s) and bi-directional stereo audio.

The zero client also includes a network connection which provides a secure link over LAN or WAN to the trader workstation PCoIP host card. The distance between a PCoIP zero client and the remote PCoIP host card can be many hundreds of miles.

To remote trader workstation

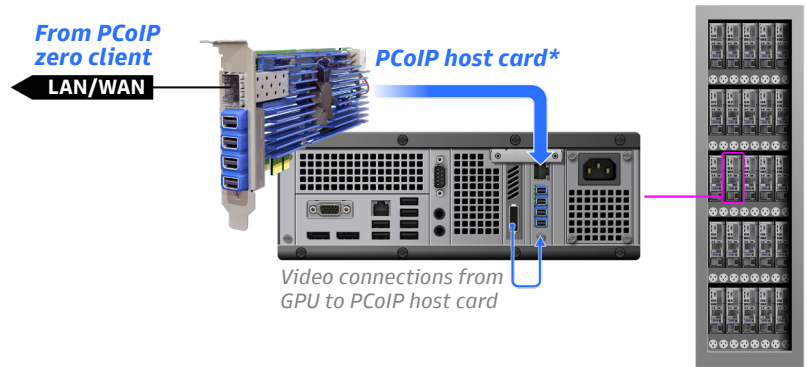**LAN/WAN**

PCoIP zero client

At the office

The illustration shows how trader workstations are centralized in the data center or equipment room. This simplifies maintenance, protects the hardware from unauthorized access and accidental damage.

In addition, the environment is carefully controlled, leading to consistent hardware performance and an extended working life. Depending on the type of workstation - tower, blade or rackmount, this achieves a very high-density.
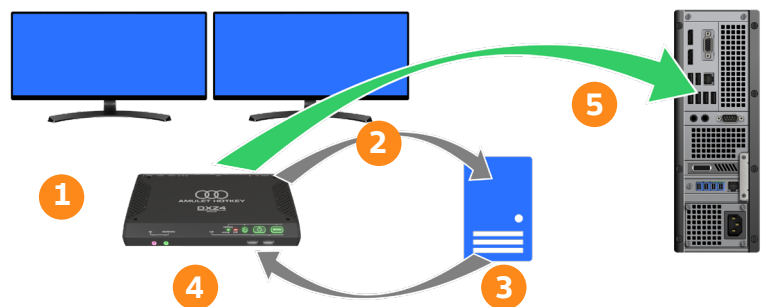
Each workstation is fitted with an Amulet Hotkey PCoIP host card. These are available in various configurations to suit each type of workstation.

From PCoIP zero client

LAN/WAN

PCoIP host card*

Video connections from GPU to PCoIP host card

Operation

When a trader logs in to commence work, the Leostream™ Connection Broker, manages the process of securely connecting a PCoIP zero client to the remote workstation and PCoIP host card.

1. A user logs in with AD.net credentials
2. A zero client sends credentials to a connection broker
3. The connection broker authenticates the credentials against AD
4. The connection broker instructs the zero client to connect to the user's dedicated workstation
5. The zero client establishes direct connection to the user's remote workstation over LAN or WAN

*The PCoIP host card shown is a low profile PCIe form factor version requiring a separate GPU to be installed. Other PCoIP host cards are available from Amulet Hotkey, some with an integrated GPU.

Solution highlights

- Compression workload offloaded onto DXH4 PCoIP host chip, freeing CPU for trading applications

- Full BIOS access & control during POST

- Optional Leostream Gateway eliminates the need for Hardware VPN in remote locations

- Secure 256-bit AES encryption; only pixels leave the datacenter; data remains secure

- DXZ4 Zero Client has no OS; is easy to manage and has no attack service

- Supports 2 x 34-inch screens* running at 3440 x 1440 @ 60Hz PCoIP using a highly efficient 'build to lossless' protocol deploying a combination of CODECs to save bandwidth

- Remote Power Control (hardwired)

- Proven solution used by hundreds of trading floors worldwide

- DXZ4 Zero Client uses dedicated custom silicon to decompress video for optimal performance

High-Level Solution Requirements / Best Practice Recommendations

Typical bandwidth requirements (per 34" screen running at 3440 x 1440)
- Maximum pixel activity (theoretical): 250 Mb/s
- Average trader activity (with multimedia): 50 – 150 Mb/s
- Average trader activity (without multimedia): 3 - 15 Mb/s
- Static Screen: < 1 Mb/s

  Note: These figures are estimates for guidance only. Always take actual measurements in your trading environment to get accurate real-life bandwidth data for network planning purposes.

Latency
- Maximum recommended latency from physical workstation to remote trader locations: 30 – 50 ms round trip recommended, up to 105 ms may be usable under certain conditions
- Note: higher latency connections are less tolerant of low bandwidth conditions

Network optimization
- Implement QoS and follow Teradici's network configuration best practices for optimal real-time interactive performance

Remote trader broadband connections
- 1GB business-grade service recommended for consistent performance (less will work if consistent)

Existing Workstation
- Must have one half-height, half-length PCIe slot available for DXH4PCoIP host card

Remote management
- Review existing remote management capability of workstations; is it sufficient?
- Consider migrating to one of Amulet Hotkey's server-grade remote workstation platforms for better density and remote management capabilities.

Standardized screen layout
- For a seamless, complaint free, free-seating experience, every desk must have the same hardware configuration

Deep clean and sanitize every night following guidelines from your local government

Other video configurations are supported including 8x 1080p, 4x 1920x1200, 2x 2560x1600 and 2x 3840x2160.
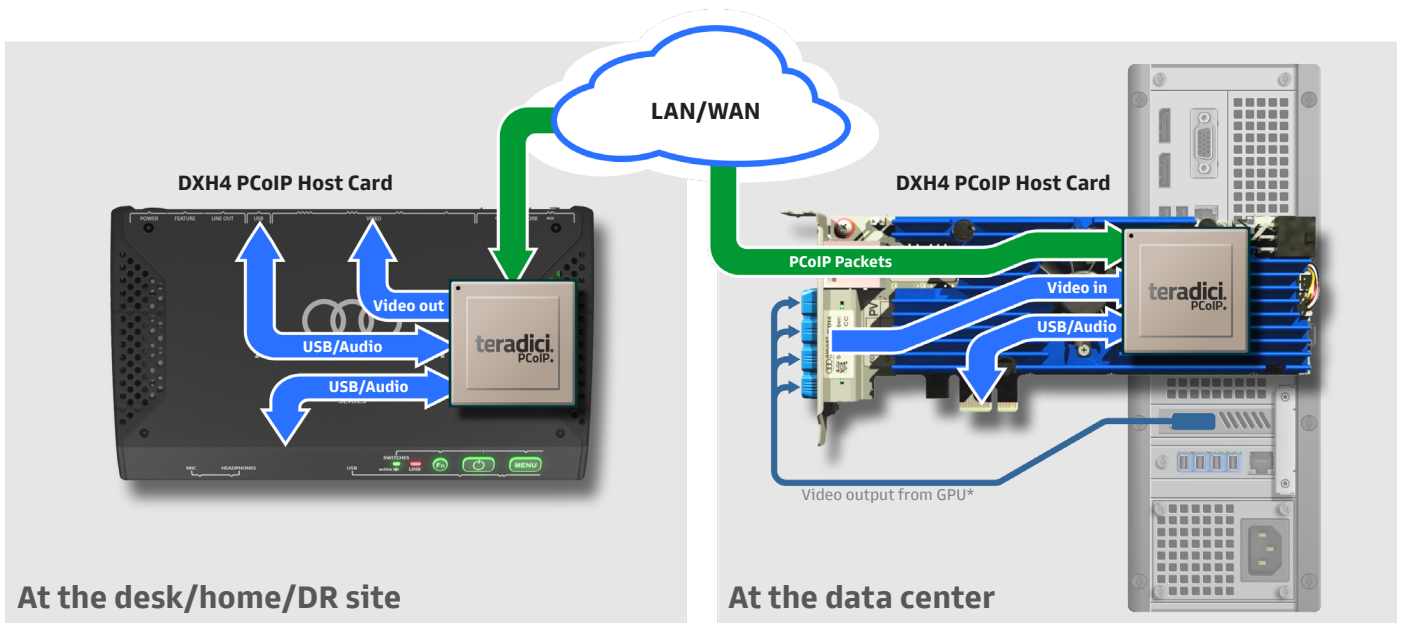
Why Amulet Hotkey?

Amulet Hotkey design and manufacture high-performance compute solutions for mission-critical environments. Over our 30-year history, we have deployed over 50,000 remote trader workstations and understand the special requirements unique to trading floor environments. Ground-up design and inhouse manufacturing give Amulet Hotkey the expertise to support mission-critical deployments from end to end.

Amulet Hotkey provide turnkey solutions for trading floors, complete with deployment and ongoing maintenance services. No two trading floors are exactly alike; our extensive experience will ensure the solution architecture you deploy meets your needs.
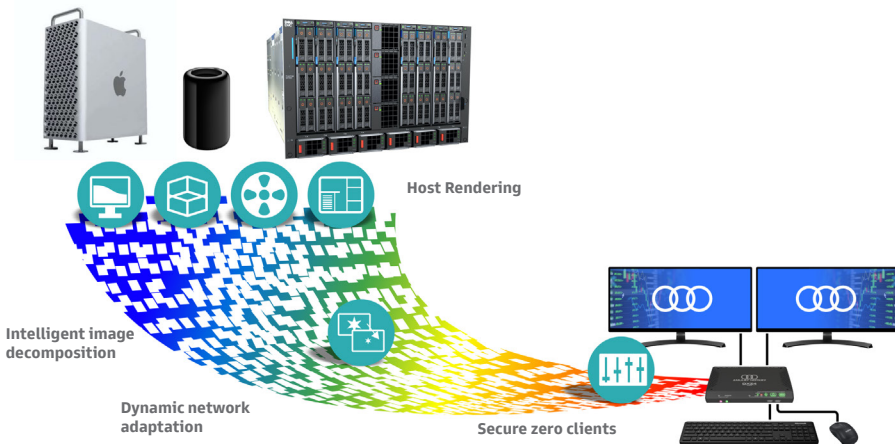
Why PCoIP?

PCoIP is a mature and resilient remote desktop access protocol. Launched by Teradici in 2007, it connects over 20 million physical and virtual remote desktops today. It is inherently suited for mission-critical high-performance use cases.

How does PCoIP work?

Host Rendering	Provides a rich and responsive user experience
Optimized Multi-codec	Optimized bandwidth and image quality
Dynamic Network Adaptation	Delivers best possible user experience under changing network conditions
Only Encrypted Pixels are Transmitted	Data stays secure Application Independent
Simple Client Decode	Enables secure zero clients or flexible software clients

*The PCoIP host card shown is a low profile PCIe form factor version requiring a separate GPU to be installed. Other PCoIP host cards are available from Amulet Hotkey, some with an integrated GPU.

How does PCoIP compare to RDP and other desktop extension protocols?

PCoIP delivers several unique capabilities that make it the best choice for trading floor use cases:

- Multi-CODEC design. Intelligent image decomposition automatically selects the right CODEC for different video types, resulting in increased bandwidth efficiency and real-time interactive performance.
- Build to lossless. If there is not enough bandwidth to transmit all of the pixel changes in any given frame, the changes are saved and sent in subsequent frames. Every decimal point in every trading application is guaranteed to arrive at the trader's display.
- Custom hardware acceleration. The Teradici custom ASIC host and client processors accelerate video compression and encryption into PCoIP packets. This hardware offload eliminates the CPU overhead incurred when the compression and encryption run in software on the host workstation OS. It also delivers better real-time interactive performance because it is not multitasking any other processes.
- PCoIP allows very granular control compared to other protocols. These controls enable superior fine-tuning of the performance for various use cases over different network conditions. These controls include (but are not limited to):

Parameter		Description	Important Considerations
Maximum bandwidth	Constrain the peak bandwidth used by a PCoIP session.	Sets a session bandwidth limit. Avoids having PCoIP try to determine the maximum network bandwidth, as this can impact image quality when it hits the limit and falls back.	Do not set too low, since the ability to reach the peak is key to user experience and performance.
Bandwidth floor	Set the minimum bandwidth a PCoIP session will transmit at when needed.	Ensure base user experience for wireless or constrained networks avoid having PCoIP drop to the lowest image quality levels for network connections with expected congestion or packet loss.	Ensure sufficient network bandwidth to support all PCoIP sessions transmitting at the floor rate (since they won't drop below the floor rate when needed). Actual session bandwidth can be below the floor if PCoIP does not require the minimum.
Minimum Image Quality	Set preference for higher image quality or frame rate during network congestion.	A higher frame rate (lower value) for smooth motion with possible lower image quality/blurring. A higher image quality (higher value) for sharp imaging with possible choppy motion.	When the network is not constrained, PCoIP will maintain maximum image quality and frame rate regardless of the setting value. Does not generally reduce session bandwidth.
Maximum Initial Image Quality	Limits the initial image quality for changed regions of the display(s).	Reduce network bandwidth peaks for regions where the display imaging is changing. Lower value: possible blur, more smooth motion, and lower peak bandwidth. Higher value: sharper images and possible choppy motion and higher peak bandwidth.	Unchanged regions of the display will progressively build to a perceptually lossless or lossless (pixel perfect) quality regardless of the setting value.

Why Leostream connection broker?

Leostream works seamlessly with Teradici PCoIP Remote Workstation Cards, providing high-quality graphics for applications running in the data center or cloud. The Leostream Connection Broker allows IT to pool, assign, and manage all PCoIP devices in their organization from a single interface.

The optional Leostream Gateway extension allows remote traders outside of the network to connect to their workstations without the need for a hardware VPN at home.

Authenticate users against one or more authentication servers, including Microsoft Active Directory, NIS, or OpenLDAP™ servers.

Enable two-factor authentication using any identity provider that supports the RADIUS protocol, including Okta and Duo. Supports one-time passcodes and push notifications.

Use multiple, clustered Connection Brokers to spread login and processing load. Manage all Connection Brokers in the cluster from a single web interface. In the case of a Connection Broker failure, user logins failover seamlessly to another Connection Broker.

Leostream monitors the status of a user's connection to inform administrators when a user logs in, disconnects, goes idle, or logs out. These notifications provide organizations with audit-level tracking of machine usage and give administrators control over how long a user retains ownership of a machine. Organizations maximize utilization by sharing resources among users by leveraging Leostream pools and policies.

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