HP Anyware Architecture Guide

24.07

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HP Anyware Architecture Guide

This guide provides information for system administrators who are looking to implement, install, and develop HP Anyware solutions.

The material in this guide is based on the supported features and requirements of **HP Anyware 2024.07**. Earlier versions of HP Anyware, and its components, may not provide the level of support documented here.

This guide provides you with information you can use to better understand:

- PCoIP and PCoIP Ultra protocol capabilities.

- User connection and licensing models for HP Anyware.

- The components of an HP Anyware solution.

- How to architect HP Anyware solutions for public cloud infrastructure and on-premises datacenters.

- Where to find detailed information on how to optimize and customize your HP Anyware solution.

- How to optimize and customize an HP Anyware solution.

- How HP Anyware Manager enables scalable and cost-effective Anyware deployments by managing cloud compute costs, facilitating authentication and brokering PCoIP connections to remote Windows, macOS, or Linux workstations.

HP Anyware solutions enable enterprises to easily deliver Windows, Linux and macOS desktops and applications from public or private clouds, with the highest user experience and security, and total cloud independence.

For complete product documentation, visit our support site.

What is PCoIP Technology?

The PCoIP protocol provides remote desktop access to physical or virtualized computers, enabling fully interactive, visually seamless, and secure computing anywhere as a progressive alternative to a local deployment model. Enterprise users in offices, factories, home environments, out in the field or on the go use their favorite devices to connect over any IP network (including LAN, public internet or cellular networks) to remote computers located in corporate data centers, public clouds or even PCs at their office desks. All a user requires is Anyware client software installed on a local client device (e.g., Windows PC, macOS device or mobile device) or purpose-built Anyware Client such as a thin client or stateless Anyware Zero Client. At the remote computer, installed Anyware Agent software uses advanced display compression to deliver remote computing experiences for remote physical workstations, GPU-enabled virtual workstations, or standard virtual desktops. PCoIP also supports many of the peripheral devices available to physical machines, including keyboard, mouse, USB devices, tablets, multiple monitors, printers, audio devices, as well as custom options.

The PCoIP protocol ensures ultra-secure remote connectivity so that corporate IP remains secured within the enterprise cloud or data center, no matter where the user is located and without any need for a virtual private network (VPN). A single PCoIP connection between a remote computer and a client device delivers an encrypted stream of compressed display pixels and audio to the client, while concurrently delivering encrypted keyboard, mouse, USB and audio streams in the opposite direction from the client to the remote computer.

The PCoIP protocol and HP Anyware offers unrivaled performance in terms of user interactivity, frame rate and image quality. PCoIP also features a 'build-to-lossless' capability which ensures lossless reproduction of the original display image at the Anyware Client endpoint. Lossless reproduction is critical particularly in instances such as medical diagnostics, geospatial analysis, and media production, where the image itself contains important visual information. PCoIP protocol uses the User Datagram Protocol (UDP) which is much better suited for streaming media and real time display situations than TCP-based alternatives, especially over high latency networks.

Key Benefits of PCoIP Technology

The following features and benefits are key aspects of PCoIP technology:

- **Host Rendering:** Pixel-level processing means corporate intellectual property remains secured within the cloud or enterprise data center.

- **Optimized Multi-codec and Auto-Offload:** Highest image quality with intelligent use of CPU or GPU encoder resources, efficient build-to-lossless and optimized bandwidth consumption on any network.

- **Dynamic Network Adaptation:** Automatically delivers the best possible user experience under changing network conditions.

- **Encrypted Pixel Transmission:** AES-256 Encrypted pixels ensures ultra-secure connections to Anyware endpoints.

- **True Multicloud Solutions - End to End:** Deploy Windows, Linux or macOS on public, private or hybrid cloud infrastructure, including Amazon Web Services (AWS), Microsoft Azure, Google Cloud, VMware ESXi or Red Hat KVM. Additionally PCoIP is integrated in Amazon Workspaces, VMware Horizon and major managed service providers (MSPs).

Who Uses PCoIP Technology?

PCoIP technology is used in a wide range of industries, including government, education, financial services, healthcare, oil and gas, automotive, media and entertainment, architecture, engineering and construction, manufacturing, and design. For information on specific industry applications, check out the [case studies](#) featured on our website.

PCoIP Ultra

PCoIP Ultra protocol enhancements offer a significant step in PCoIP performance to meet the demands of next-generation remote workstation environments offering a faster, more interactive experience. PCoIP Ultra includes features such as CPU-Offload, GPU-Offload, Auto-Offload and AV-Lock that enable users in demanding industries such as media and entertainment, broadcast, game development or CAD to enjoy seamless access to graphics-intensive workloads delivered anywhere.

PCoIP Ultra supports 4K/UHD multi-monitor displays, high frame rate workloads, faithful text clarity and bit-exact color accuracy while also making intelligent use of the CPU, GPU, and network bandwidth.

PCoIP Ultra is enabled by default. To enable it, see the "PCoIP Ultra" topic in the guide of your interest:

- [Standard Agent for Windows](#)

- [Standard Agent for Linux](#)

- [Graphics Agent for Windows](#)

- [Graphics Agent for Linux](#)

- [Graphics Agent for macOS](#)

PCoIP Ultra Enhancements

PCoIP Ultra provides the following benefits:

- Support for 4K/UHD high frame rate content.

- PCoIP Ultra CPU Offload provides efficient scaling across multicore CPUs leveraging AVX2 instructions.

- PCoIP Ultra GPU Offload provides CPU and network bandwidth efficiencies by leveraging the H.264 encoder capabilities of NVIDIA NVENC hardware.

- PCoIP Ultra Auto-Offload offers build-to-lossless color accuracy in conjunction with network efficiency by automatically switching between CPU Offload, and GPU Offload modes, based on display activity.

Requirements

To take advantage of PCoIP Ultra, you need to meet these requirements:

- PCoIP Ultra CPU Offload requires support for AVX2 instructions on both the remote computer and the client device.

- PCoIP Ultra GPU Offload and PCoIP Auto-Offload require a PCoIP supported NVIDIA graphics card on the remote computer.

Troubleshooting PCoIP Ultra

For troubleshooting information around implementing the PCoIP Ultra protocol enhancements, see the knowledge base article: [Troubleshooting PCoIP Ultra](#).

HP Anyware Connection Models

HP Anyware enables PCoIP connections between users and remote workstations or desktops using any of several connection models dependent on number of users, location of users relative to remote workstations, your desire to incorporate public cloud workstations and your authentication requirements. Ultimately, your deployment architecture may be based on one or more of these connection models according to your corporate use case:

- Unmanaged direct connections

- Managed connections with HP Anyware Manager

- Managed connections for on-site users

- Managed connections for WAN users connecting to on-premises resources

- Managed connections for on-site users and public cloud workstations

- Managed connections for remote workstations in multicloud environments
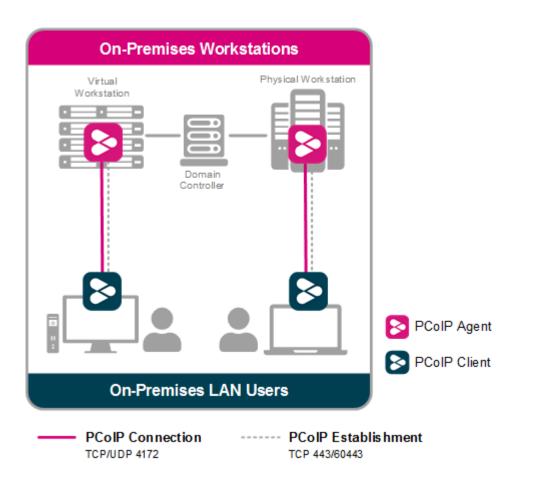
- Work-From-Home Options

You can choose to license your HP Anyware deployment using the Cloud Licensing Service or a License Server. Information on the License Server is available in Licensing.

> 🔥 **Tip: Session Enablement help**
>
> For troubleshooting tips, FAQs and specific documentation around PCoIP Session Establishment, see the following KB article. This article includes guidelines, troubleshooting checklists as well as links to the PCoIP connection instructions found in the various component guides.

Unmanaged Direct Connections

Unmanaged direct connections, as shown below, are well suited to proof of concepts, trials and small to medium sized LAN deployments where flexibility in machine assignment and multifactor authentication may not be required. Each Anyware endpoint connects directly to the IP address of a remote workstation.

Each Anyware Client connects to Anyware Agent software installed on a remote workstation.

- To learn more about Anyware Clients, see the relevant HP Anyware Client Guide.
- To learn more about Anyware Agents, see the relevant HP Anyware Agent Guide.

Managed Connections With HP Anyware Manager

In larger LAN deployments, or WAN deployments incorporating on-premises or public cloud workstations, the Anyware clients and the remote desktops may be behind firewalls or distributed across a collection of public or private clouds. In this scenario, management capabilities may be required to coordinate and administer connections.
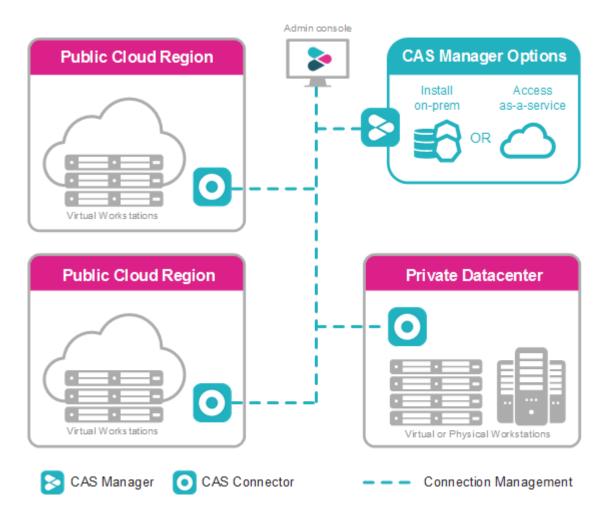
HP Anyware Manager is a management plane that enables users to configure, manage and monitor remote workstation connections. Anyware Manager enables highly-scalable and cost-effective HP Anyware deployments by managing cloud compute costs by brokering PCoIP connections to remote Windows or Linux workstations.

Anyware Manager is offered in two variants: as an HP managed Service, and as an installable instance deployed and managed by corporate IT in your on-premises or cloud environments. For more information, see Anyware Manager as a Service.

Anyware Manager requires a separate component, called an **Anyware Connector**, which is installed in the corporate deployment. The Anyware Connector acts as an access hub, facilitating PCoIP connections to remote desktops and workstations by providing user authentication, entitlement, and security gateway services.

For more information, see the "Key Concepts" topic in the Anyware Manager as a Service guide.
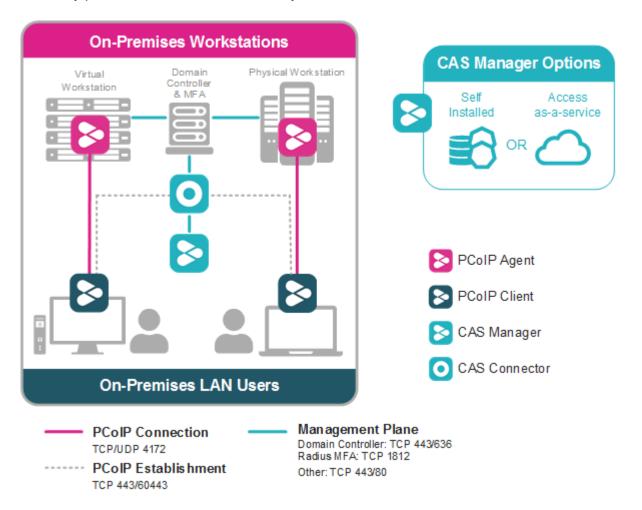
In environments with multiple cloud regions or on-premises environments, you can install a separate Anyware Connector into each; Anyware Manager will communicate with multiple Anyware Connectors.

In addition to managing cloud compute costs, Anyware Manager handles user entitlement, authentication including RADIUS-compatible multifactor authentication (MFA), and brokering of connections during PCoIP session establishment. The Anyware Connector enables external users to access their remote desktops without the complexity of endpoint VPNs.

For more information, see the [Anyware Manager Administrators' Guide](#).

On-site LAN users

LAN Users establish a PCoIP connection with a remote workstation by first connecting to an internally published IP address of the Anyware Connector.
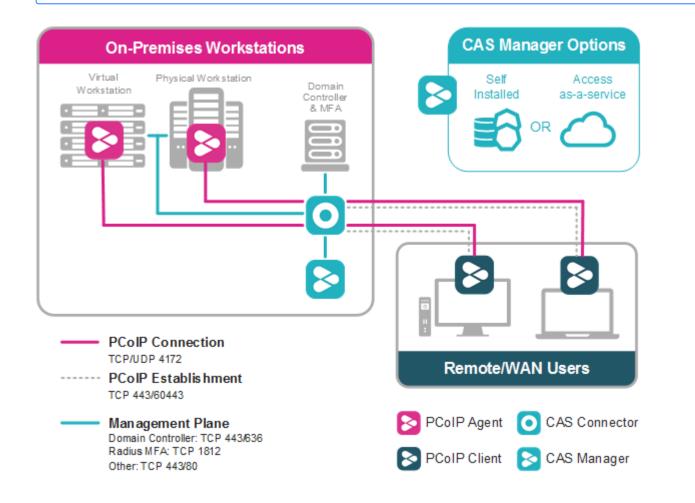

Anyware Connector configuration details are described in the [Anyware Manager Administrators' guide](#).

WAN Users Connecting On-Premises

Off-site WAN users wishing to connect to on-premises remote workstations connect to an externally published IP address of the Anyware Connector.

> ✏️ **Anyware Connector DMZ Deployment**
>
> The Anyware Connector is conventionally deployed in a DMZ or semi-trusted zone (not shown in the diagram) and may be coupled with a reverse proxy to facilitate load balancing.

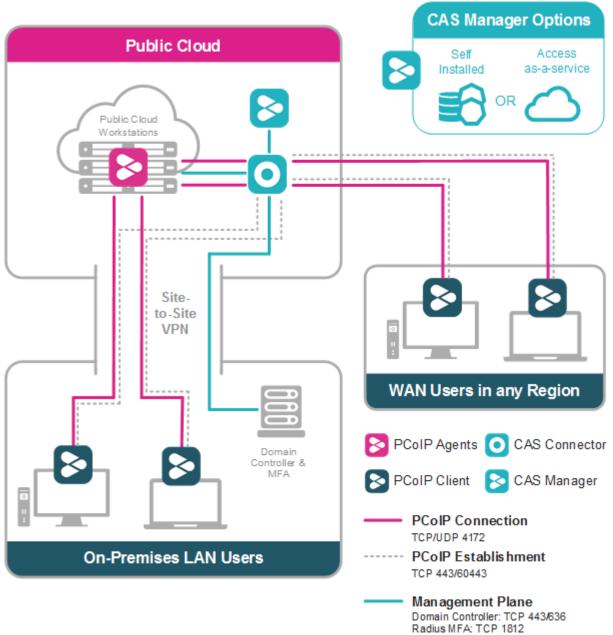> 🔥 **TCP 60443**
>
> We recommend using TCP 60443 for internal connections. It is not mandatory for TCP 60443 to be opened to the public network.

Anyware Connector configuration details are described in the Anyware Manager Administrators' guide.

Public Cloud Workstations

Anyware Manager supports connections to public cloud workstations. By deploying the Anyware Connector in your preferred public cloud (in one or more regions and/or multiple public clouds), you can provide your on-site users with public cloud workstations or support users across different geographic regions with the nearest public cloud workstations. By choosing public cloud workstations situated geographically close to your remote users, the user experience is optimized.

Copyright 2023 HP Development Company, L.P

> 🔥 **TCP 60443**
>
> We recommend using TCP 60443 for internal connections. It is not mandatory for TCP 60443 to be opened to the public network.

Anyware Connector configuration details are described in the [Anyware Manager Administrators' guide](#).

Multi-Cloud Workstations

Anyware Manager supports hybrid multicloud deployments comprising a combination of on-premises remote workstations (e.g. on VMware ESXi or KVM) and public cloud workstations in your preferred public cloud (in one or more regions and/or multiple public clouds). This is achieved by deploying the Anyware Connector both on-premises and in one or more public clouds. By choosing public cloud workstations situated geographically close to your remote users, the user experience is optimized.
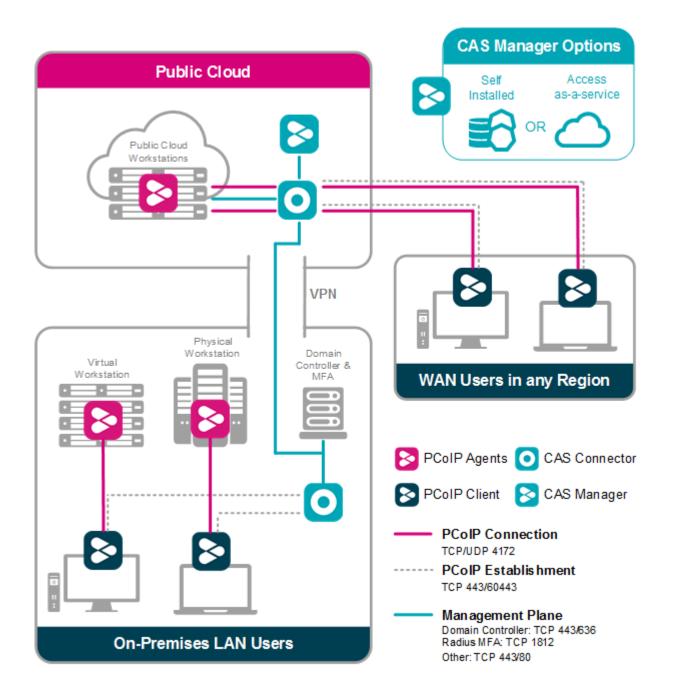
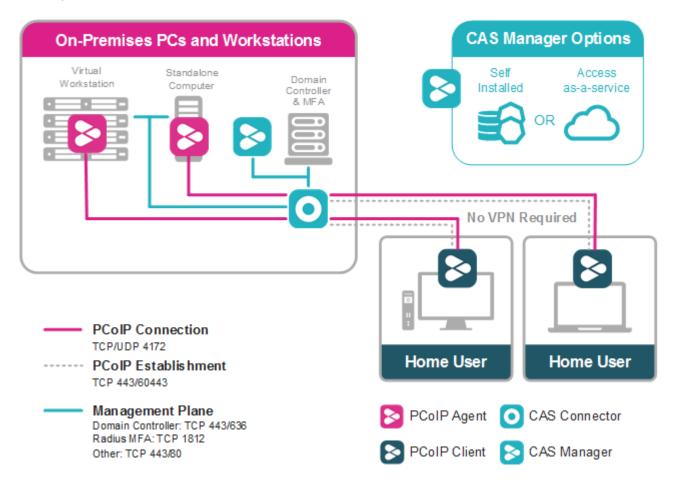> **TCP 60443**
>
> We recommend using TCP 60443 for internal connections. It is not mandatory for TCP 60443 to be opened to the public network.

Anyware Connector configuration details are described in the [Anyware Manager Administrators' guide](#).

Work-From-Home Options

HP HP Anyware can offer a number of different solutions to your corporate work-from-home demands. The following image outlines a top-level architecture of the Work-from-Home scenario with HP Anyware:

> 🔥 **TCP 60443**
>
> We recommend using TCP 60443 for internal connections. It is not mandatory for TCP 60443 to be opened to the public network.

For an in-depth view of our work-from-home offerings, please see our Work-from-Home Rapid Response Guide.

This guide outlines:

- Work-from-Home options for Standalone Computers.
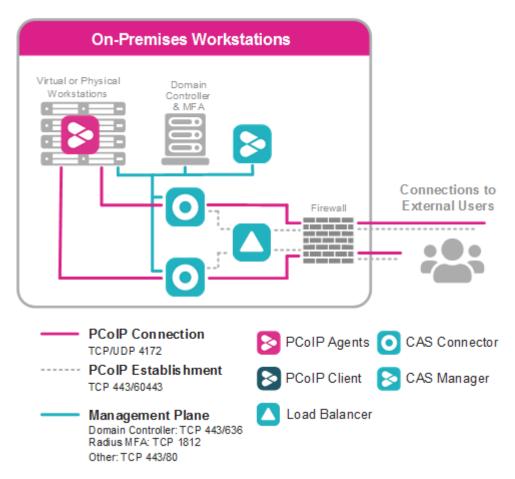
- Work-from-Home options with Remote Workstation Cards.

- [Work-from-Home options with HP Anyware](#).

- [Work-from-Home options for VMware Horizon](#).

- [Performance Tips for Work-from-Home Use Cases](#).

HP Anyware Load Balancing

Load balancers may be added to an HP Anyware deployment to distribute system and to optimize performance by distributing PCoIP connections across several Anyware Connectors.

Using Load Balancing for On-Premises Deployments

The following diagram outlines a load balancing scenario for an HP Anyware deployment with Anyware Manager integration.

Load balancers must support both HTTP and sticky sessions (jsessionid). During the session establishment phase, the Anyware Connector passes it's `ExternalRoutableIP` configuration value to the Anyware Client. After the session has been established, the Anyware Client uses the provided

IP address to communicate directly with the Anyware Connector. TCP Ports 443/60443 can be opened for session establishment.

> 🔥 **TCP 60443**
>
> We recommend using TCP 60443 for internal connections. It is not mandatory for TCP 60443 to be opened to the public network.

> 🔥 `ExternalRoutableIP` **must point to the Anyware Connector**
>
> If the `ExternalRoutableIP` setting is configured to point to the load balancer instead of the Anyware Connector, the load balancer may direct the Anyware Client to the incorrect Anyware Connector on the wrong server and the Anyware Client will not be able to establish a session.

> 🔥 **Anyware Connector Public IP Addresses**
>
> In the above configuration, each Anyware Connector must have a unique public IP address and it must be routable externally for port 4172.

Load Balancer Session Planning

The number of users allocated per individual Anyware Connector varies according to user type and considerations such as display topology and resolution. At present, the throughput of PCoIP traffic through an individual Anyware Connector is limited to approximately 400 Mbps. As an example, a typical 1080p VDI workloads demanding less than 5 Mbps per session would allow in excess of 80 concurrent sessions per Anyware Connector instance.

In contrast, a 4K/UHD video editorial user or VFX artist may require upward of 50 Mbps on average, limiting each Anyware Connector instance to less than 10 concurrent sessions.
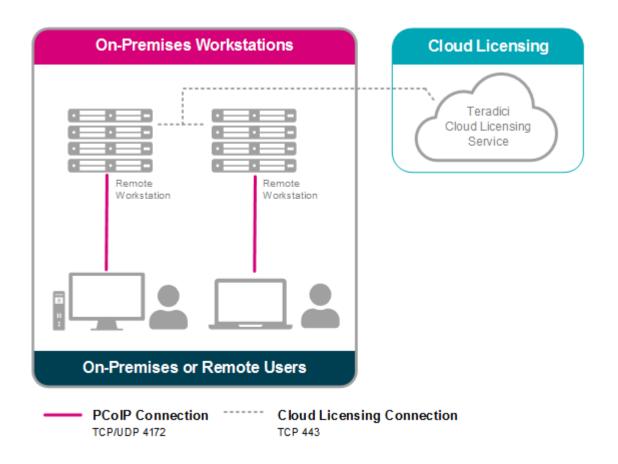
HP Anyware Licensing Models

HP Anyware is supported by two licensing models. Each model requires a specific license type:

- **Cloud Licensing Service:** These licenses should be used if your PCoIP agent has access to the internet.
- **License Server based licenses:** These licenses should be used if your PCoIP agent runs in a restricted environment and does not have access to the internet.

Most PCoIP deployments can take advantage of the automated Cloud Licensing Service which eliminates the complexity of on-premises licensing infrastructure. If your deployment cannot use cloud licensing, either because the site is not connected to the public internet or local management of licenses is necessary then License Server based licensing may be the appropriate licensing model.

Cloud Licensing Service for On-Premises Workstations

The following image outlines the Cloud Licensing Service model for an on-premises scenario.
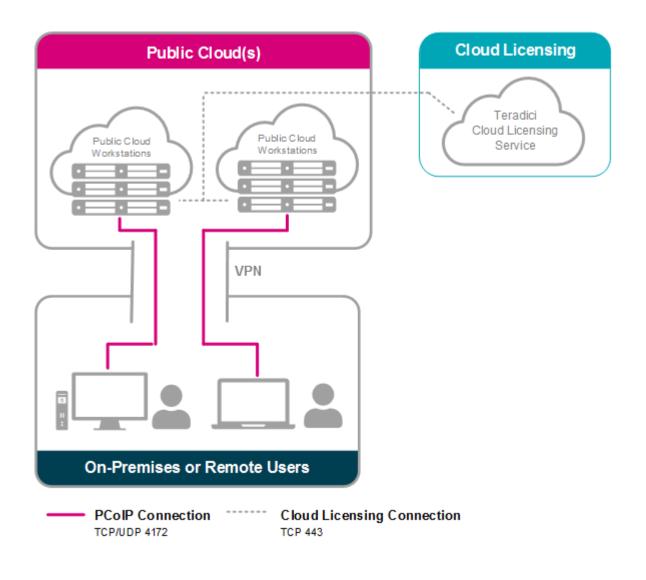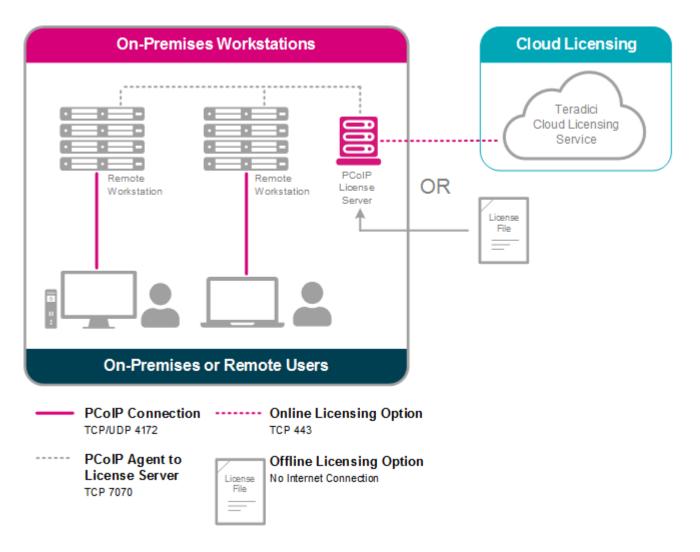
Cloud Licensing Service for Public Cloud Workstations

The following image outlines the Cloud Licensing Service model for a public cloud scenario.

License Server Model

The following image outlines the License Server model. The License Server can be used either online or offline.

For information on the Windows and Linux License Servers, see Local Licensing Servers.

HP Anyware Security

HP Anyware incorporates features that maximize the security of any deployment model, including on-premises, hybrid or public cloud architectures:

• RADIUS-based multi-factor authentication (MFA).

• All Anyware components use security certificates to ensure a trusted, end-to-end Transport Layer Security (TLS) connection for TCP communications.

• The PCoIP UDP protocol is encrypted with industry-standard secure AES-256 encryption.

• HP Anyware Connector ensures secure PCoIP traffic flow between external and internal networks.

• The PCoIP protocol is host-rendered and no data ever leaves the remote workstation, except encrypted pixels.

Firewall Settings

The PCoIP protocol uses ports UDP:4172, TCP:4172 and either TCP:443 or TCP:60443 as preferred. These ports must be open to allow the flow of PCoIP traffic through the firewall. For an in-depth look at the port settings for different environments relating to HP Anyware, Management Console and Anyware Zero Clients, see the following [KB Article](#).

Security Certificates

Certificates are used to ensure that all communication endpoints are trusted. All communications between Anyware components are performed over encrypted secure channels that use certificates for validation.

MFA Integrations with Anyware Manager

It is possible to integrate third-party MFA applications with Anyware Manager and HP Anyware. We have tested MFA integrations with certain applications and versions of HP Anyware, within specific environments.

The [HP Anyware - Okta MFA Integration in GCP](#) KB article outline the processes involved in setting up these specific integrations.

> ⚠️ **Third-Party MFA Information**
>
> The knowledge base articles contain steps and processes that were accurate at the time of testing. **We do not take responsibility for updates to third-party applications, or updates to how these applications work**. Using different versions of these applications may not yield the same results and may lead to different behavior. If you discover that the steps outlined below are no longer valid, please contact us and we will investigate.

Disaster Recovery

Business continuity can take many forms. Whether it be a bank processing transactions without interruptions, a retail store transacting sales at point of sale terminals, or universities running computer labs with zero downtime, business continuity is important to every type of organization. Downtime can result in significant losses in revenue or permanent damage to a brand's reputation.
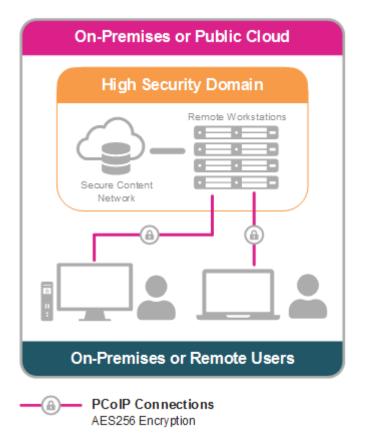
HP Anyware is a perfect option and solution to base your companies and organizations disaster recovery plan around. For detailed information on ow to use HP Anyware as part of your disaster recovery strategy, see [Disaster Recovery for Virtual Desktops](#).

Corporate Security Compliance

Isolating a Secure Content Network
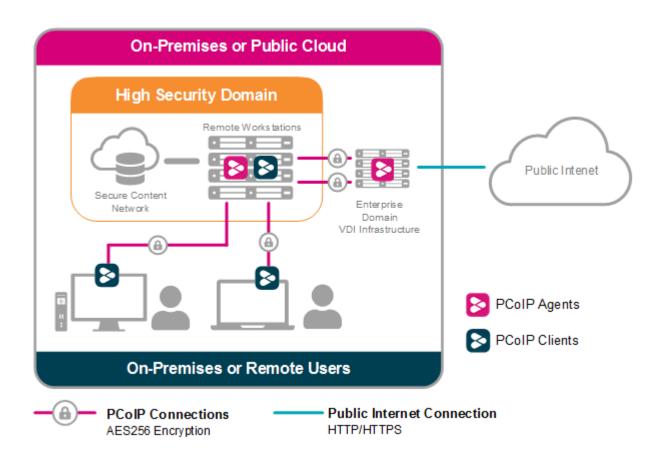
Major media and entertainment corporations rely on the PCoIP protocol to conform with MPAA (Motion Picture Association of America) and CDSA (Content Delivery and Security Association) best

practices in addition to meeting Trusted Partner Network (TPN) compliance obligations. Media assets are securely isolated on production networks, only accessible from authorized network endpoints as an AES-256 encrypted stream of pixels. As media assets themselves are never downloaded to the endpoints, intellectual property remains secured, no matter what applications are used, as outlined in the image below.

Accessing the Public Internet from an Isolated Workstation

Users inside highly secured enterprises, such as TPN certified environments or those compliant with MPAA or CDSA best practices, may require the public internet for access to media assets or other information. HP Anyware enables isolated remote workstations, such as those attached to content networks, to access the public internet via back-to-back PCoIP connections as outlined in the image below.

Referring to the diagram above, the secured remote workstation is deployed with both Anyware Agent software and Anyware Client software. While the Anyware Agent software serves encrypted pixels to the user at the Anyware Client, a second Anyware Agent deployed on a generic virtual desktop outside the high security domain serves the remote workstation with the internet browser image of the virtual desktop, also in the form of encrypted pixels. Such an architecture, supported on Windows, macOS, and Linux remote workstations, ensures that the airgap perimeter of the high security domain is only traversed with encrypted pixels which adheres to compliance practices.

Public Cloud Implementations

HP Anyware solutions can be implemented and deployed on Microsoft Azure, AWS and Google Cloud environments, as well as on-premises. The following section points to reference information on these cloud vendors, specifically looking at the platform architectures.

HP Anyware on Microsoft Azure

For general information on Microsoft Azure's cloud architecture, see Azure Architecture Center.

For information about graphics processing options for Microsoft Azure, see https://docs.microsoft.com/en-us/azure/virtual-machines/windows/sizes-gpu#nv-series

For information, see the "System Requirements" topic in the following guides:

- Standard Agent for Windows
- Standard Agent for Linux
- Graphics Agent for Windows
- Graphics Agent for Linux
- Graphics Agent for macOS

HP Anyware on AWS

For general information on AWS's cloud architecture, see https://docs.aws.amazon.com/index.html#lang/en_us

For information around building a GPU workstation on AWS with HP Anyware Solutions, see https://aws.amazon.com/blogs/compute/building-a-gpu-workstation-for-visual-effects-with-aws/

For information on AWS cloud video editing with HP Anyware, see https://aws.amazon.com/quickstart/architecture/cloud-video-editing/

For information on AWS cloud VFX workstations with HP Anyware, see https://aws.amazon.com/quickstart/architecture/vfx-workstations-with-teradici/

For information, see the "System Requirements" topic in the following guides:

- Standard Agent for Windows

- Standard Agent for Linux

- Graphics Agent for Windows

- Graphics Agent for Linux

- Graphics Agent for macOS

Consume HP Anyware using pre-configured machine images with integrated billing, available through our cloud partner marketplaces: https://aws.amazon.com/marketplace/search/?filters=vendor_id&vendor_id=04ffecf1-f40e-4387-b015-59428958d233&category=2649340011

HP Anyware on Google Cloud

For general information on Google Cloud's cloud architecture and products, see https://cloud.google.com/docs/

For information around building a virtual Linux workstation on Google Cloud with HP Anyware Solutions, see https://cloud.google.com/solutions/creating-a-virtual-gpu-accelerated-linux-workstation

For information, see the "System Requirements" topic in the following guides:

- Standard Agent for Windows

- Standard Agent for Linux

- Graphics Agent for Windows

- Graphics Agent for Linux

- Graphics Agent for macOS
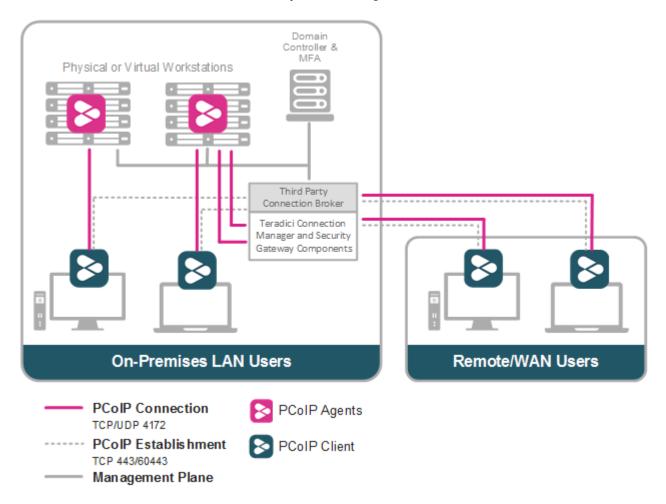
Consume HP Anyware using pre-configured machine images with integrated billing, available through our cloud partner marketplaces:

- Windows Graphics Agent: https://console.cloud.google.com/marketplace/product/teradici-public/hp-anyware-windows-graphics-2019

- Windows Standard Agent: https://console.cloud.google.com/marketplace/product/teradici-public/hp-anyware-windows-standard-2019

- Linux: https://console.cloud.google.com/marketplace/product/teradici-public/hp-anyware-graphics-centos-7

Using Third Party Connection Brokers

HP Anyware is fully compatible with third-party brokers without the deployment of Anyware Connectors or features included with Anyware Manager.

Consult third party documentation for pricing and deployment details. When using a third-party connection broker, PCoIP connections are brokered in conjunction with the Connection Manager and Security Gateway; see Connection Manager and Security Gateway for complete information. Consult the third-party broker documentation for information on what what deployment architectures are supported.

HP Anyware Components

HP Anyware deployments are built from several distinct components that all work together. This page introduces the most common components you'll need to understand.

Anyware Clients

The Anyware Client is a standalone hardware device or software application that enables the user to connect to the remote workstation. The Anyware Client decodes a stream of PCoIP pixels from the remote workstation and presents the results to the user. The Anyware Client is offered in different forms, including Anyware Zero Clients, iOS and Android, Mobile clients, and Software Clients compatible with Windows, Linux, OS X and Chrome OS operating systems.

PCoIP Zero Clients   Mobile Clients   Software Clients

For more information on the Anyware Client, see the "System Requirements" topic in the Anyware Client guides:

- Software Client for Windows

- Software Client for macOS

- Software Client for Linux

Anyware Agents

The Anyware Agent is a standalone software application installed on a virtual computer or remote workstation that will securely encode the desktop and efficiently stream pixels-only to the

Anyware Client. There are different versions of agents available for supporting both standard and graphics PC architectures.

Anyware Graphics Agents

A Anyware Graphics Agent leverages a discrete graphics processor and associated 3D APIs, including OpenGL and DirectX, The Anyware Graphics Agent is optimized for the latest GPUs, including NVIDIA GRID GPUs supporting NVIDIA Capture SDK and AMD GPUs supporting AMD RapidFire SDK.

For more information, see the following user guides:

- [Graphics Agent for Windows](#)
- [Graphics Agent for Linux](#)
- [Graphics Agent for macOS](#)

Anyware Standard Agents

An Anyware Standard Agent provides each user with a dedicated remote desktop.
A Anyware Standard Agent is optimized for VDI, DaaS, and cloud deployments. Anyware Standard Agent does not support GPU-accelerated 3D graphics.

For more information, see the following user guides:

- [Standard Agent for Windows](#)
- [Standard Agent for Linux](#)

Anyware Manager

Anyware Manager is a management plane enabling users to configure, manage and monitor brokering of remote workstations. Anyware Manager enables highly-scalable and cost-effective HP Anyware deployments by managing cloud compute costs by brokering PCoIP connections to remote Windows or Linux workstations.

Anyware Manager is offered in two variants: as a managed service; and as an installable instance deployed and managed by you, in your on-premises or cloud environment. For information on Anyware Manager as a Service, see the [Anyware Manager as a Service](#).

Anyware Manager also requires an external component called Anyware Connector that resides in the user's environment. Anyware Connector is an access hub that facilitates PCoIP connections to remote desktops and workstations by providing user authentication, entitlement and security gateway services. For more information, see the "Key Concepts section" in the Anyware Manager as a Service guide.

In all deployment environments, Anyware Manager interacts seamlessly with Anyware Connectors to access and manage your remote desktops and workstations.

For more information on Anyware Manager, see [Anyware Manager](#) on our support site.

Anyware Connector

The HP Anyware Connector is an access hub installed in the customer environment which facilitates Anyware Client connections to remote workstations. The HP Anyware Connector operates in conjunction with the HP Anyware Manager Service to provide user authentication and entitlement for remote workstation access, including MFA. For more information on the HP Anyware Connector, see [Anyware Connector](#).

Anyware Licensing

Cloud licensing simplifies the deployment and activation of HP Anyware licenses. Cloud licensing avoids the need to deploy and maintain a license server. Whether you are a new HP Anyware administrator, or upgrading your existing HP Anyware deployment, licenses are now much easier to obtain and manage.

If your users have internet access from their host VMs, you should be using cloud licensing. It's simple to deploy and easily managed, avoids the need for a license server,and supports internet proxy services. If your users do not have internet access (and you cannot use a proxy), use a license server. Although the license server requires installation and maintenance, you can manage your licenses from a single location and easily license new VMs

For a more detailed view of operating system requirements, memory recommendations, socket configuration recommendations, port configuration and bandwidth and CPU recommendations for the License Server, see the guide listed below:

- [Licensing](#)

Management Console

Management Console allows IT administrators to quickly provision new Zero client devices, review metrics, configure settings, update firmware, and view event logs. For more information on the Management console, see [PCoIP® Management Console Administrators' Guide](#).

Virtual Channel SDK

The PCoIP Virtual Channel Software Development Kit (SDK) enables developers to build custom PCoIP Virtual Channel plug-ins for PCoIP sessions. You can implement PCoIP Virtual Channel functionality as a plug-in to send encrypted data between servers and client endpoints during an active PCoIP session.

The PCoIP Virtual Channel Application Programming Interface (API) is available as an optional add-on to solution developers who want to extend the types of traffic flowing through the PCoIP session, such as clipboard redirection, local printing, and customised device support.

The PCoIP Virtual Channel SDK supports up to 15 virtual channels and once a customer's use case is established can be accessed, and utilised.

Required Knowledge to use SDKs

A developer should have an understanding of how the PCoIP protocol works, have knowledge of C++/ C, Visual Studio and CMake. Building plugins for other platforms requires the SCons software construction tool which in turn supports Python, a gcc compiler or a corresponding toolchain which supports the `pthreads` library. Developers can use CMake to configure and generate platform and compiler-specific build files and build the target plugins across all platforms. Customers can also engage with the our Professional Services team to build these plugins. For information, see [Professional Services](#) on our website.

> ⚠️ **Support for Customization Components**
>
> We recommend consulting the Anyware Agent and VChan SDK documentation for the install, upgrade and uninstall of the VChan plugins. Our support team cannot support customized solutions built with SDKs or APIs. If you require support for these components, you should explore a [premium consultation arrangement](#) with Professional Services.

Third-Party Brokers

For a list of PCoIP-compatible connection brokers available from third party vendors, see [Commercial Third-Party Brokers](#) on the our support site. As an alternative to using a third party connection broker, HP Anyware Manager is a cloud service included with HP Anyware subscriptions that simplifies and automates HP Anyware deployments, including connection broker services. For more information on Anyware Manager, see [Anyware Manager](#).