

VMware Horizon Client for Mac Installation and Setup Guide

JUL 2019

VMware Horizon Client for Mac 5.1



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VMware Horizon Client for Mac Installation and Setup Guide

This document, *VMware Horizon Client for Mac Installation and Setup Guide*, provides information about installing, configuring, and using VMware Horizon[®] Client[™] software on a Mac.

This information is intended for administrators who need to set up a Horizon deployment that includes Mac client devices. The information is written for experienced system administrators who are familiar with virtual machine technology and data center operations.

If you are an end user, see the *VMware Horizon Client for Mac User Guide* document on [VMware Docs](#), or view the Horizon Client online help.

Setup and Installation

Setting up a Horizon deployment for Mac clients involves using certain Connection Server configuration settings, meeting the client and server system requirements, and downloading and installing Horizon Client for Mac from the VMware website.

This chapter includes the following topics:

- [System Requirements for Mac Clients](#)
- [System Requirements for Real-Time Audio-Video](#)
- [Smart Card Authentication Requirements](#)
- [Touch ID Authentication Requirements](#)
- [Requirements for Using URL Content Redirection](#)
- [Requirements for Using Skype for Business with Horizon Client](#)
- [Requirements for the Session Collaboration Feature](#)
- [Supported Desktop Operating Systems](#)
- [Preparing Connection Server for Horizon Client](#)
- [Allowing Access to macOS Accessibility Features](#)
- [Install Horizon Client on a Mac](#)
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- [Add Horizon Client to the Dock](#)
- [Setting the Certificate Checking Mode in Horizon Client](#)
- [Configure Advanced TLS Options](#)
- [Configuring Log File Collection Values](#)
- [Configure VMware Blast Options](#)
- [Configure Horizon Client Data Sharing](#)

System Requirements for Mac Clients

The Mac on which you install Horizon Client, and the peripherals it uses, must meet certain system requirements.

Mac models	Any 64-bit Intel-based Mac
Memory	At least 2 GB of RAM
Operating systems	<ul style="list-style-type: none"> ■ macOS Sierra (10.12) ■ macOS High Sierra (10.13) ■ macOS Mojave (10.14)
Smart card authentication	See Smart Card Authentication Requirements .
Touch ID authentication	See Touch ID Authentication Requirements .
Connection Server, security server, and View Agent or Horizon Agent	<p>Latest maintenance release of Horizon 6 version 6.2.x and later releases.</p> <p>If client systems connect from outside the corporate firewall, use a security server or a Unified Access Gateway appliance so that client systems do not require a VPN connection.</p>
Display protocols	<ul style="list-style-type: none"> ■ PCoIP ■ VMware Blast (requires Horizon Agent 7.0 or later)
Network protocols	<ul style="list-style-type: none"> ■ IPv4 ■ IPv6 <p>For information about using Horizon in an IPv6 environment, see the <i>Horizon 7 Installation</i> document.</p>

System Requirements for Real-Time Audio-Video

Real-Time Audio-Video works with standard webcam, USB audio, and analog audio devices. The feature also works with standard conferencing applications, such as Skype, WebEx, Google Hangouts, and Microsoft Teams. To support Real-Time Audio-Video, your Horizon deployment must meet certain software and hardware requirements.

Virtual desktops	When using Microsoft Teams with RTAV, VMware recommends that the virtual desktop have a minimum of 4vCPU and 4 GB RAM.
Published desktops and applications	To use the Real-Time Audio-Video feature with published desktops and applications, Horizon Agent 7.0.2 or later must be installed on the RDS host.

**Horizon Client
computer or client
access device**

The webcam and audio device drivers must be installed, and the webcam and audio device must be operable, on the client computer. You do not need to install the device drivers on the machine where the agent is installed.

Display protocols

- PCoIP
- VMware Blast (requires Horizon Agent 7.0 or later)

Smart Card Authentication Requirements

Client devices that use a smart card for user authentication must meet certain requirements.

Client Hardware and Software Requirements

Each client machine that uses a smart card for user authentication must have the following hardware and software.

- Horizon Client
- A compatible smart card reader
- Product-specific application drivers

Users must have a smart card, and each smart card must contain a user certificate. The following smart cards are supported.

- U.S. Department of Defense Common Access Card (CAC)
- U.S. Federal Government Personal Identity Verification (PIV) card (also called FIPS-201 smart cards)
- Gemalto .NET card
- Gemalto IDPrime MD card

For CAC and PIV cards, Horizon Client uses the CryptoTokenKit smart card driver by default and you do not need to install any middleware.

For Gemalto .NET cards, install the correct SafeNet Authentication Client version for your macOS version. Gemalto SafeNet Authentication Client supports both CryptoTokenKit and TokenD smart card drivers for Gemalto .NET smart cards.

You can also use the following third-party smart card drivers with CAC and PIV cards.

- PKard for Mac v1.7 and v1.7.1
- Charismathics (CCSI_5.0.3_PIV)
- Centrify Express

To use a third-party smart card driver, you must disable the CryptoTokenKit smart card driver. For more information, see [Disabling the CryptoTokenKit Smart Card Driver](#).

Agent Software Requirements

A Horizon administrator must install product-specific application drivers on the agent machine.

With PIV cards, the operating system installs the related driver when you insert a smart card reader and PIV card for a Windows 7 virtual desktop. The following agent drivers are supported for PIV cards for Windows 7 virtual desktops.

- Charismathics (CSTC PIV 5.2.2)
- Microsoft minidriver
- ActivClient 6.x

The following agent drivers are supported for PIV cards for Windows 10 virtual desktops.

- Charismathics (CSTC PIV 5.2.2)
- ActivClient 7.x

For Gemalto .NET cards, the Gemalto Minidriver for .NET Smart Card driver is supported.

Enabling the Username Hint Field in Horizon Client

In some environments, smart card users can use a single smart card certificate to authenticate to multiple user accounts. Users enter their user name in the **Username hint** text box when they use a smart card to authenticate.

To make the **Username hint** text box appear on the Horizon Client login dialog box, you must enable the smart card user name hints feature for the Connection Server instance in Horizon Administrator. The smart card user name hints feature is supported only with Horizon 7 version 7.0.2 and later servers and agents. For information about enabling the smart card user name hints feature, see the *Horizon 7 Administration* document.

If your environment uses a Unified Access Gateway appliance rather than a security server for secure external access, you must configure the Unified Access Gateway appliance to support the smart card user name hints feature. The smart card user name hints feature is supported only with Unified Access Gateway 2.7.2 and later. For information about enabling the smart card user name hints feature in Unified Access Gateway, see the *Deploying and Configuring Unified Access Gateway* document.

Note Horizon Client supports single-account smart card certificates, even when the smart card user name hints feature is enabled.

Additional Smart Card Authentication Requirements

In addition to meeting the smart card requirements for Horizon Client systems, other Horizon components must meet certain configuration requirements to support smart cards.

Connection Server and security server hosts

A Horizon administrator must add all applicable Certificate Authority (CA) certificates for all trusted user certificates to a server truststore file on the Connection Server host or security server host. These certificates include

root certificates and must include intermediate certificates if the user's smart card certificate was issued by an intermediate certificate authority.

When you generate a certificate for a blank PIV card, enter the path to the server truststore file on the Connection Server or security server host on the **Crypto Provider** tab in the PIV Data Generator tool.

For information about configuring Connection Server to support smart card use, see the *Horizon 7 Administration* document.

Active Directory

For information about tasks that an administrator might need to perform in Active Directory to implement smart card authentication, see the *Horizon 7 Administration* document.

Disabling the CryptoTokenKit Smart Card Driver

To use a third-party smart card driver, you must disable the CryptoTokenKit smart card driver on the client system.

To determine which smart card drivers are installed, type the following command on the client system.

```
#system_profiler SPSmartCardsDataType
```

To determine whether a smart card is supported by the CryptoTokenKit smart card driver, type the following command on the client system.

```
#security list-smartcards
```

To disable the CryptoTokenKit smart card driver for CAC and PIV cards, use the following command on the client system.

```
#sudo defaults write /Library/Preferences/com.apple.security.smartcard DisabledTokens -array com.apple.CryptoTokenKit.pivtoken
```

To disable the CryptoTokenKit smart card driver for Gemalto .NET cards, use the following command on the client system.

```
#sudo defaults write /Library/Preferences/com.apple.security.smartcard DisabledTokens -array com.gemalto.Gemalto-Smart-Card-Token.PKCS11-Token
```

Touch ID Authentication Requirements

To use Touch ID for user authentication in Horizon Client, you must meet certain requirements.

Mac models

Any Mac model that supports Touch ID, for example, MacBook Pro.

Operating system requirements

Add at least one fingerprint in the Touch ID setting.

Connection Server requirements

- Enable biometric authentication in Connection Server. For information, see the *Horizon 7 Administration* document.
- The Connection Server instance must present a valid root-signed certificate to Horizon Client.

Horizon Client requirements

- Set the certificate checking mode to **Never connect to untrusted servers** or **Warn before connecting to untrusted servers**. For information about setting the certificate checking mode, see [Setting the Certificate Checking Mode in Horizon Client](#).
- Enable Touch ID when you connect to the server. After you successfully log in, your Active Directory credentials are stored securely on the Mac client system. The Touch ID option is shown the first time you log in and does not appear after Touch ID is enabled.

You can use Touch ID with smart card authentication and as part of two-factor authentication with RSA SecurID and RADIUS authentication. If you use Touch ID with smart card authentication, Horizon Client connects to the server after you enter your PIN and the Touch ID login screen does not appear.

Requirements for Using URL Content Redirection

With the URL Content Redirection feature, URL content can be redirected from the client machine to a remote desktop or published application (client-to-agent redirection), or from a remote desktop or published application to the client machine (agent-to-client redirection).

For example, an end user can click a link in the native Microsoft Word application on the client and the link opens in the remote Internet Explorer application, or an end user can click a link in the remote Internet Explorer application and the link opens in a native browser on the client machine. Any number of protocols can be configured for redirection, including HTTP, mailto, and callto.

Note The callto protocol is not supported for URL content redirection with the Chrome browser.

Web browsers

You can type or click a URL in the following browsers and have that URL redirected.

- Internet Explorer 9, 10, and 11
- 64-bit or 32-bit Chrome 60.0.3112.101, Official Build or later (requires Horizon 7 version 7.4 or later)

URL Content Redirection does not work for links clicked from inside Windows 10 universal apps, including the Microsoft Edge Browser.

Client system

To use URL Content Redirection with the Chrome browser, you must enable the VMware Horizon URL Content Redirection Helper extension for Chrome. This extension is installed, but is not enabled, when you connect to a Connection Server instance on which URL Content Redirection rules

are configured. To enable the extension, restart Chrome after you connect to the Connection Server instance and click **Enable Extension** when Chrome prompts you to enable the extension.

The first time a URL is redirected from the Chrome browser, you are prompted to open the URL in Horizon Client. You must click **Open VMware Horizon Client** for URL content redirection to occur. If you select the **Remember my choice for VMware Horizon Client links** check box, this prompt does not appear again.

Remote desktop or published application

A Horizon administrator must enable URL Content Redirection when Horizon Agent is installed. For information, see the *Setting Up Virtual Desktops in Horizon 7* or *Setting Up Published Desktops and Applications in Horizon 7* documents.

To use URL Content Redirection with the Chrome browser, a Horizon administrator must install and enable the VMware Horizon URL Content Redirection Helper extension on the Windows agent machine. For information, see the *Configuring Remote Desktop Features in Horizon 7* document for Horizon 7 version 7.4 or later.

A Horizon administrator must also configure settings that specify how Horizon Client redirects URL content from the client to a remote desktop or published application, or how Horizon Agent redirects URL content from a remote desktop or published application to the client. For complete information, see the "Configuring URL Content Redirection" topic in the *Configuring Remote Desktop Features in Horizon 7* document.

Requirements for Using Skype for Business with Horizon Client

An end user can run Skype for Business inside a virtual desktop without negatively affecting the virtual infrastructure and overloading the network. During Skype audio and video calls, all media processing takes place on the client machine instead of in the virtual desktop.

To use this feature, the VMware Horizon Virtualization Pack for Skype for Business software must be installed on the client machine. This software is installed by default when Horizon Client for Mac is installed.

A Horizon administrator must also install the VMware Virtualization Pack for Skype for Business feature on the virtual desktop when Horizon Agent is installed. For information about installing Horizon Agent, see the *Setting Up Virtual Desktops in Horizon 7* document.

For complete requirements, see "Configure Skype for Business" in the *Configuring Remote Desktop Features in Horizon 7* document.

Requirements for the Session Collaboration Feature

With the Session Collaboration feature, users can invite other users to join an existing Windows remote desktop session. To support the Session Collaboration feature, your Horizon deployment must meet certain requirements.

Session collaborators	To join a collaborative session, a user must have Horizon Client 4.7 or later for Windows, Mac, or Linux installed on the client system, or must use HTML Access 4.7 or later.
Windows remote desktops	<ul style="list-style-type: none"> ■ Horizon Agent 7.4 or later must be installed in the Windows virtual desktop, or on the RDS host for published desktops. ■ The Session Collaboration feature must be enabled at the desktop pool or farm level. For information about enabling the Session Collaboration feature for desktop pools, see the <i>Setting Up Virtual Desktops in Horizon 7</i> document. For information about enabling the Session Collaboration feature for a farm, see the <i>Setting Up Published Desktops and Applications in Horizon 7</i> document. <p>You can use Horizon Agent group policy settings to configure the Session Collaboration feature. For information, see the <i>Configuring Remote Desktop Features in Horizon 7</i> document.</p>
Linux remote desktops	For Linux remote desktop requirements, see the <i>Setting Up Horizon 7 for Linux Desktops</i> document.
Connection Server	The Session Collaboration feature requires that the Connection Server instance uses an Enterprise license.
Display protocols	VMware Blast

The Session Collaboration feature does not support published application sessions.

Supported Desktop Operating Systems

A Horizon administrator creates virtual machines that have a guest operating system and installs agent software in the guest operating system. End users can log in to these virtual machines from a client device.

For a list of the supported Windows guest operating systems, see the *Horizon 7 Installation* document.

Some Linux guest operating systems are also supported. For information about system requirements, configuring Linux virtual machines, and a list of supported features, see the *Setting Up Horizon 7 for Linux Desktops* document.

Preparing Connection Server for Horizon Client

Before end users can connect to a server and access a remote desktop or published application, a Horizon administrator must configure certain Connection Server settings.

Unified Access Gateway and Security Servers

- If your Horizon deployment includes a Unified Access Gateway appliance, configure Connection Server to work with Unified Access Gateway. See the *Deploying and Configuring Unified Access Gateway* document. Unified Access Gateway appliances perform the same role as security servers.
- If your Horizon deployment includes a security server, verify that you are using the latest maintenance releases of Connection Server 6.2.x and Security Server 6.2.x or later releases. For more information, see the installation document for your Horizon version.

Secure Tunnel Connection

If you plan to use a secure tunnel connection for client devices, and if the secure connection is configured with a DNS host name for a Connection Server instance or a security server, verify that the client device can resolve this DNS name.

Desktop and Application Pools

- Verify that a desktop or application pool has been created and that the user account that you plan to use is entitled to access the pool. For more information, see the *Setting Up Virtual Desktops in Horizon 7* and *Setting Up Published Desktops and Applications in Horizon 7* documents.
- If end users have a high-resolution display and use the High Resolution Mode client setting while viewing their remote desktops in full screen mode, verify that sufficient vRAM is allocated for each Windows 7 or later remote desktop. The amount of vRAM depends on the number of monitors configured for end users and on the display resolution. To estimate the amount of vRAM, see the *Horizon 7 Architecture Planning* document.

User Authentication

- To enable end users to save their passwords with Horizon Client, so that they do not have to supply credentials when they connect to a Connection Server instance, configure Horizon LDAP for this feature in Connection Server.

Users can save their passwords if Horizon LDAP is configured to allow it, if the Horizon Client certificate verification mode is set to **Warn before connecting to untrusted servers** or **Never connect to untrusted servers**, and if Horizon Client can fully verify the server certificate that Connection Server presents. For more information, see the *Horizon 7 Administration* document.

- To use two-factor authentication, such as RSA SecurID or RADIUS authentication, with Horizon Client, you must enable the two-factor authentication feature for the Connection Server instance. For more information, see the topics about two-factor authentication in the *Horizon 7 Administration* document.

- To hide the server URL in Horizon Client, enable the **Hide server information in client user interface** global setting. This setting is available in Horizon 7 version 7.1 and later. For more information, see the *Horizon 7 Administration* document.
- To hide the **Domain** drop-down menu in Horizon Client, enable the **Hide domain list in client user interface** global setting. This setting is available in Horizon 7 version 7.1 and later. Beginning with Horizon 7 version 7.8, it is enabled by default. For more information, see the *Horizon 7 Administration* document.
- To send the domain list to Horizon Client, enable the **Send domain list** global setting in Horizon Administrator. This setting is available in Horizon 7 version 7.8 and later and is disabled by default. Earlier Horizon 7 versions send the domain list. For more information, see the *Horizon 7 Administration* document.

The following table shows how the **Send domain list** and **Hide domain list in client user interface** global settings determine how users can log in to the server.

Send domain list setting	Hide domain list in client user interface setting	How users log in
Disabled (default)	Enabled	<p>The Domain drop-down menu is hidden. Users must enter one of the following values in the User name text box.</p> <ul style="list-style-type: none"> ■ User name (not allowed for multiple domains) ■ <i>domain\username</i> ■ <i>username@domain.com</i>
Disabled (default)	Disabled	<p>If a default domain is configured on the client, the default domain appears in the Domain drop-down menu. If the client does not know a default domain, *DefaultDomain* appears in the Domain drop-down menu. Users must enter one of the following values in the User name text box.</p> <ul style="list-style-type: none"> ■ User name (not allowed for multiple domains) ■ <i>domain\username</i> ■ <i>username@domain.com</i>
Enabled	Enabled	<p>The Domain drop-down menu is hidden. Users must enter one of the following values in the User name text box.</p> <ul style="list-style-type: none"> ■ User name (not allowed for multiple domains) ■ <i>domain\username</i> ■ <i>username@domain.com</i>
Enabled	Disabled	<p>Users can enter a user name in the User name text box and then select a domain from the Domain drop-down menu. Alternatively, users can enter one of the following values in the User name text box.</p> <ul style="list-style-type: none"> ■ <i>domain\username</i> ■ <i>username@domain.com</i>

Allowing Access to macOS Accessibility Features

If the client system is running macOS Mojave (10.14), you must grant Horizon Client access to the system's accessibility features for optimal performance of the keyboard and mouse inside remote desktops and published applications.

When you first start Horizon Client on a macOS Mojave (10.14) client system, Horizon Client prompts you to grant access to the system's accessibility features. If you do not grant access at that time, you can grant access later by going to System Preferences, selecting **Security & Privacy**, clicking the **Privacy** tab, and selecting **Accessibility**.

Install Horizon Client on a Mac

You install Horizon Client on Mac client systems from a disk image file.

Prerequisites

- Verify that the client system uses a supported operating system. See [System Requirements for Mac Clients](#).
- Verify that you can log in as an administrator on the client system.
- Verify that you have the URL for a download page that contains the Horizon Client installer. This URL might be the VMware Downloads page at <http://www.vmware.com/go/viewclients>, or it might be the URL for a Connection Server instance.

Procedure

- 1 On the Mac client system, browse to the URL for downloading the Horizon Client installer file.

The filename format is `VMware-Horizon-Client-y.y.y-xxxxxx.dmg`, where `xxxxxx` is the build number and `y.y.y` is the version number.

- 2 Double-click the `.dmg` file and click **Agree**.

The contents of the disk image appear in a Horizon Client Finder window.

- 3 In the Finder window, drag the **VMware Horizon Client** icon to the **Applications** folder icon.

If you are not logged in as an administrator user, the Mac client system prompts you for an administrator user name and password.

What to do next

Start Horizon Client and verify that you can connect to a remote desktop or published application. See [Connect to a Remote Desktop or Published Application](#).

Upgrade Horizon Client Online

You can configure Horizon Client to look for and install updates each time it starts. You can also look for and install updates manually.

If Horizon Client detects a new version, you can download and install the new version, have Horizon Client remind you to install the new version the next time it starts, or skip the new version. If you skip a new version when looking for updates manually, the automatic update process also skips that version.

Procedure

- ◆ To configure Horizon Client to look for and install updates each time it starts, select **VMware Horizon Client > Preferences** and select the **Automatically check for updates** check box.

The **Automatically check for updates** check box is selected by default.

- ◆ To look manually for and install an update, select **VMware Horizon Client > Check for Updates**.

Add Horizon Client to the Dock

You can add Horizon Client to the Dock on the Mac client system.

Procedure

- 1 In the **Applications** folder, select **VMware Horizon Client**.
- 2 Drag the **VMware Horizon Client** icon to the Dock.
- 3 To configure the Dock icon to open Horizon Client at login or to show the icon in the Finder, right-click the icon on the Dock, select **Options**, and select the appropriate command from the context menu.

When you quit Horizon Client, the application shortcut remains in the Dock.

Setting the Certificate Checking Mode in Horizon Client

Server certificate checking occurs for connections between Horizon Client and a server. A certificate is a digital form of identification, similar to a passport or a driver's license.

End users can configure a setting in Horizon Client to determine whether Horizon Client connections are rejected if server certificate checking fails.

You can configure the default certificate checking mode and prevent end users from changing it in Horizon Client. For more information, see [Configuring the Certificate Checking Mode for End Users](#).

Server certificate checking includes the following checks:

- Is the certificate intended for a purpose other than verifying the identity of the sender and encrypting server communications? That is, is it the correct type of certificate?
- Has the certificate expired, or is it valid only in the future? That is, is the certificate valid according to the computer clock?
- Does the common name on the certificate match the host name of the server that sends it? A mismatch can occur if a load balancer redirects Horizon Client to a server that has a certificate that does not match the host name entered in Horizon Client. Another reason a mismatch can occur is if you enter an IP address rather than a host name in the client.
- Is the certificate signed by an unknown or untrusted certificate authority (CA)? Self-signed certificates are one type of untrusted CA.

To pass this check, the certificate's chain of trust must be rooted in the device's local certificate store.

For information about distributing a self-signed root certificate and installing it on Mac client systems, see the *Advanced Server Administration* document for the Mac Server that you are using, which is available from the Apple website.

In addition to presenting a server certificate, the server also sends a certificate thumbprint to Horizon Client. The thumbprint is a hash of the certificate public key and is used as an abbreviation of the public key. If the server does not send a thumbprint, you see a warning that the connection is untrusted.

To set the certificate checking mode, start Horizon Client and select **VMware Horizon Client > Preferences** from the menu bar. You have three choices:

- **Never connect to untrusted servers.** This setting means that you cannot connect to the server if any of the certificate checks fail. An error message lists the checks that failed.
- **Warn before connecting to untrusted servers.** This setting means that you can click **Continue** to ignore the warning if a certificate check fails because the server uses a self-signed certificate. For self-signed certificates, the certificate name is not required to match the server name that you entered in Horizon Client.
- **Do not verify server identity certificates.** This setting means that no certificate checking occurs.

If an administrator later installs a security certificate from a trusted certificate authority and all certificate checks pass when you connect, this trusted connection is remembered for that specific server. In the future, if that server ever presents a self-signed certificate again, the connection fails. After a particular server presents a fully verifiable certificate, it must always do so.

Configuring the Certificate Checking Mode for End Users

You can configure the certificate checking mode for end users. For example, you can configure that full verification is always performed. Certificate checking occurs for TLS connections between a server and Horizon Client.

You can configure one of the following certificate verification strategies for end users.

- End users are allowed to select the certificate checking mode in Horizon Client.
- (No verification) No certificate checks are performed.
- (Warn) If the server presents a self-signed certificate, end users are warned. Users can determine whether to allow this type of connection.
- (Full security) Full verification is performed and connections that do not pass full verification are rejected.

For information about the types of certificate checks that can be performed, see [Setting the Certificate Checking Mode in Horizon Client](#).

To configure the certificate checking mode so that end users cannot change it, set the Security Mode key in the `/Library/Preferences/com.vmware.horizon.plist` file on the Mac client to one of the following values.

- **1** implements Never connect to untrusted servers.

- 2 implements Warn before connecting to untrusted servers.
- 3 implements Do not verify server identity certificates.

Configure Advanced TLS Options

You can select the security protocols and cryptographic algorithms that Horizon uses to encrypt communications between Horizon Client and servers, and between Horizon Client and Horizon Agent.

Horizon also uses the security options to encrypt the USB channel (communication between the USB plugin and Horizon Agent).

By default, TLS v1.1 and TLS v1.2 are enabled. SSL v2.0, SSL v3.0, and TLS v1.0 are not supported. The default cipher control string is "!\aNULL:kECDH+AESGCM:ECDH+AESGCM:RSA+AESGCM:kECDH+AES:ECDH+AES:RSA+AES".

If you configure a security protocol for Horizon Client that is not enabled on the server to which the client system connects, a TLS error occurs and the connection fails.

Important At least one of the protocol versions that you enable in Horizon Client must also be enabled in the remote desktop for USB devices to be redirected to the remote desktop.

For information about configuring the security protocols that Connection Server can accept, see the *Horizon 7 Security* document.

Procedure

- 1 Select **VMware Horizon Client > Preferences** from the menu bar, click **Security**, and click **Advanced**.
- 2 To enable or disable a security protocol, select the check box next to the security protocol name.
- 3 To change the cipher control string, replace the default string.
- 4 (Optional) To revert to the default settings, click **Restore Defaults**.
- 5 To save your changes, click **Confirm**.

Your changes take effect the next time you connect to the server.

Configuring Log File Collection Values

Horizon Client generates log files in the ~/Library/Logs/VMware Horizon Client directory on the Mac client. An administrator can configure the maximum number of log files, and the maximum number of days to keep log files, by setting keys in the /Library/Preferences/com.vmware.horizon.plist file on the Mac client.

Table 1-1. PLIST Keys for Log File Collection

Key	Description
MaxDebugLogs	Maximum number of log files. The maximum value is 100.
MaxDaysToKeepLogs	Maximum number of days to keep log files. This value has no limit.

Files that do not match these criteria are deleted when you start Horizon Client.

If the MaxDebugLogs or MaxDaysToKeepLogs keys are not set in the `com.vmware.horizon.plist` file, the default number of log files is five and the default number of days to keep log files is seven.

Configure VMware Blast Options

You can configure VMware Blast options for remote desktop and published application sessions that use the VMware Blast display protocol.

You can allow H.264 decoding. You can also allow increased color fidelity when H.264 decoding is allowed.

You can configure H.264 decoding and high color accuracy before or after you connect to a server.

Prerequisites

To use H.264 decoding, Horizon Agent 7.0 or later must be installed.

To allow increased color fidelity when H.264 decoding is allowed, Horizon Agent 7.4 or later must be installed.

Procedure

- 1 Start Horizon Client.
- 2 Select **VMware Horizon Client > Preferences** from the menu bar and click **VMware Blast**.
- 3 To allow H.264 decoding in Horizon Client, select the **Allow H.264 decoding** check box.
 When this option is selected (the default setting), Horizon Client uses H.264 decoding if the agent supports H.264 software or hardware encoding. If the agent does not support H.264 software or hardware encoding, Horizon Client uses JPG/PNG decoding. When this option is deselected, Horizon Client uses JPG/PNG decoding.
- 4 (Optional) To allow increased color fidelity when H.264 decoding is allowed in Horizon Client, select the **High color accuracy** check box.
 When this option is selected, Horizon Client uses high color accuracy, but only if the agent supports high color accuracy. Selecting this option might reduce battery life and performance. This feature is disabled by default.

Changes take effect the next time a user connects to a remote desktop or published application and selects the VMware Blast display protocol. Your changes do not affect existing VMware Blast sessions.

Configure Horizon Client Data Sharing

If your Horizon administrator has opted to participate in the customer experience improvement program, VMware collects and receives anonymous data on client systems to prioritize hardware and software compatibility. You can configure whether to share information on your client system by enabling or disabling a setting in Horizon Client.

Horizon Client data sharing is enabled by default. You must configure the data sharing setting before you connect to a server. The setting is applied to all servers. You cannot change the Horizon Client data sharing setting after you connect to a server.

Procedure

- 1 Start Horizon Client.
- 2 Select **VMware Horizon Client > Preferences** from the menu bar and click **General**.
- 3 Select or deselect the **Allow data sharing** check box.

Horizon Client Data Collected by VMware

If a Horizon administrator has opted to participate in the customer experience improvement program, and data sharing is enabled on the client system, VMware collects data about the client system.

VMware collects data about client systems to prioritize hardware and software compatibility. If your Horizon administrator has opted to participate in the customer experience improvement program, VMware collects anonymous data about your deployment to respond better to customer requirements. VMware does not collect data that identifies your organization. Horizon Client information is sent first to the Connection Server instance and then to VMware, along with data about Connection Server, desktop pools, and remote desktops.

The information is encrypted when it is in transit to the Connection Server instance. The information on the client system is logged unencrypted in a user-specific directory. The logs do not contain personally identifiable information.

A Horizon administrator can select whether to participate in the VMware customer experience improvement program when installing Connection Server or by setting an option in Horizon Administrator after the installation.

Table 1-2. Data Collected from Horizon Clients for the Customer Experience Improvement Program

Description	Is This Field Made Anonymous?	Example Value
Company that produced the Horizon Client application	No	VMware
Product name	No	VMware Horizon Client
Client product version	No	(The format is x.x.x-yyyyyy, where x.x.x is the client version number and yyyyyy is the build number.)

Description	Is This Field Made Anonymous?	Example Value
Client binary architecture	No	Examples include the following: <ul style="list-style-type: none"> ■ i386 ■ x86_64 ■ arm
Client build name	No	Examples include the following: <ul style="list-style-type: none"> ■ VMware-Horizon-Client-Win32-Windows ■ VMware-Horizon-Client-Linux ■ VMware-Horizon-Client-iOS ■ VMware-Horizon-Client-Mac ■ VMware-Horizon-Client-Android ■ VMware-Horizon-Client-WinStore
Host operating system	No	Examples include the following: <ul style="list-style-type: none"> ■ Windows 8.1 ■ Windows 7, 64-bit Service Pack 1 (Build 7601) ■ iPhone OS 5.1.1 (9B206) ■ Ubuntu 12.04.4 LTS ■ Mac OS X 10.8.5 (12F45)
Host operating system kernel	No	Examples include the following: <ul style="list-style-type: none"> ■ Windows 6.1.7601 SP1 ■ Darwin Kernel Version 11.0.0: Sun Apr 8 21:52:26 PDT 2012; root:xnu-1878.11.10~1/RELEASE_ARM_S5L8945X ■ Darwin 11.4.2 ■ Linux 2.6.32-44-generic #98-Ubuntu SMP Mon Sep 24 17:27:10 UTC 2012 ■ unknown (for Windows Store)
Host operating system architecture	No	Examples include the following: <ul style="list-style-type: none"> ■ x86_64 ■ i386 ■ armv71 ■ ARM
Host system model	No	Examples include the following: <ul style="list-style-type: none"> ■ Dell Inc. OptiPlex 960 ■ iPad3,3 ■ MacBookPro8,2 ■ Dell Inc. Precision Workstation T3400 (A04 03/21/2008)
Host system CPU	No	Examples include the following: <ul style="list-style-type: none"> ■ Intel(R) Core(TM)2 Duo CPU E8400 @ 3.00GH ■ Intel(R) Core(TM)2 Quad CPU Q6600 @ 2.40GH ■ unknown (for iPad)
Number of cores in the host system's processor	No	For example: 4

Description	Is This Field Made Anonymous?	Example Value
MB of memory on the host system	No	Examples include the following: <ul style="list-style-type: none"> ■ 4096 ■ unknown (for Windows Store)
Number of USB devices connected	No	2 (USB device redirection is supported only for Linux, Windows, and Mac clients.)
Maximum concurrent USB device connections	No	2
USB device vendor ID	No	Examples include the following: <ul style="list-style-type: none"> ■ Kingston ■ NEC ■ Nokia ■ Wacom
USB device product ID	No	Examples include the following: <ul style="list-style-type: none"> ■ DataTraveler ■ Gamepad ■ Storage Drive ■ Wireless Mouse
USB device family	No	Examples include the following: <ul style="list-style-type: none"> ■ Security ■ Human Interface Device ■ Imaging
USB device use count	No	(Number of times the device was shared)

Using URIs to Configure Horizon Client

2

You can use uniform resource identifiers (URIs) to create Web page or email links that end users can click to start Horizon Client, connect to a server, or open a remote desktop or published application.

You create these links by constructing URIs that provide some or all the following information, so that your end users do not need to supply it.

- Server address
- Port number for the server
- Active Directory user name
- Domain name
- Remote desktop or published application display name
- Window size
- Actions including reset, log out, and start session
- Display protocol
- Options for redirecting USB devices

To construct a URI, you use the `vmware-view` URI scheme with Horizon Client specific path and query parts.

To use URIs to start Horizon Client, Horizon Client must already be installed on client computers.

This chapter includes the following topics:

- [Syntax for Creating vmware-view URIs](#)
- [Examples of vmware-view URIs](#)

Syntax for Creating vmware-view URIs

URI syntax includes the `vmware-view` URI scheme, a path part to specify the remote desktop or published application, and, optionally, a query to specify remote desktop or published application actions or configuration options.

URI Specification

Use the following syntax to create URIs to start Horizon Client.

```
vmware-view://[authority-part]/[path-part][?query-part]
```

The only required element is the URI scheme, `vmware-view`. Because the scheme name is case-sensitive for some versions of some client operating systems, type `vmware-view`.

Important In all parts, non-ASCII characters must first be encoded according to UTF-8 [STD63], and then each octet of the corresponding UTF-8 sequence must be percent-encoded to be represented as URI characters.

For information about encoding for ASCII characters, see the URL encoding reference at <http://www.utf8-chartable.de/>.

authority-part

Server address and, optionally, a user name, a non-default port number, or both. Underscores (_) are not supported in server names. Server names must conform to DNS syntax.

To specify a user name, use the following syntax.

```
user1@server-address
```

You cannot specify a UPN address, which includes the domain. To specify the domain, you can use the `domainName` query part in the URI.

To specify a port number, use the following syntax.

```
server-address:port-number
```

path-part

Remote desktop or published application. Use the remote desktop display name or published application display name. This value is the name that is specified in Horizon Administrator when the desktop or application pool was created. If the display name contains a space, use the `%20` encoding mechanism to represent the space.

query-part

Configuration options to use, or the remote desktop or published application actions to perform. Queries are not case-sensitive. To use multiple queries, use an ampersand (&) between the queries. If the queries conflict, Horizon Client uses the last query in the list. Use the following syntax.

```
query1=value1[&query2=value2...]
```

Supported Queries

The following queries are supported for this type of Horizon Client. If you are creating URIs for multiple types of clients, such as desktop clients and mobile clients, see the installation and setup guide for each type of client system for the list of supported queries.

action

Table 2-1. Values That Can Be Used with the action Query

Value	Description
browse	Displays a list of available remote desktops and published applications hosted on the specified server. You are not required to specify a remote desktop or published application when using this action. If you use the browse action and specify a remote desktop or published application, the remote desktop or published application is highlighted in the list of available items.
start-session	Opens the specified remote desktop or published application. If no action query is provided and the remote desktop or published application name is provided, start-session is the default action.
reset	Shuts down and restarts the specified remote desktop or published application. Unsaved data is lost. Resetting a remote desktop is the same as pressing the Reset button on a physical PC.
restart	Shuts down and restarts the specified remote desktop. Restarting a remote desktop is the same as the Windows operating system restart command. The operating system usually prompts the user to save any unsaved data before it restarts.
logout	Logs the user out of the guest operating system in the remote desktop. If you specify a published application, the action is ignored or the end user sees the warning message "Invalid URI action."

args

Specifies command-line arguments to add when the published application starts. Use the syntax `args=value`, where *value* is a string. Use percent encoding for the following characters:

- For a colon (:), use `%3A`
- For a back slash (\), use `%5C`
- For a space (), use `%20`
- For a double quotation mark ("), use `%22`

For example, to specify the filename "My new file.txt" for the Notepad ++ application, use `%22My%20new%20file.txt%22`.

appProtocol

For published applications, valid values are **PCoIP** and **BLAST**. For example, to specify PCoIP, use the syntax `appProtocol=PCoIP`.

connectUSBOnInsert

Connects a USB device to the foreground remote desktop when you plug in the device. This query is implicitly set if you specify the unattended query for a remote desktop. To use this query, you must set the action query to

start-session or else not have an action query. Valid values are **true** and **false**. An example of the syntax is **connectUSBOnInsert=true**.

connectUSBOnStartup

Redirects all USB devices that are currently connected to the client system to the remote desktop. This query is implicitly set if you specify the unattended query for a remote desktop. To use this query, you must set the action query to **start-session** or else not have an action query. Valid values are **true** and **false**. An example of the syntax is **connectUSBOnStartup=true**.

desktopLayout

Sets the size of the window that displays a remote desktop. To use this query, you must set the action query to **start-session** or else not have an action query.

Table 2-2. Valid Values for the desktopLayout Query

Value	Description
fullscreen	Full screen on all connected external monitors. This value is the default.
windowLarge	Large window.
windowSmall	Small window.
<i>WxH</i>	Custom resolution, where you specify the width by height, in pixels. An example of the syntax is desktopLayout=1280x800 .

desktopProtocol

For remote desktops, valid values are **PCOIP** and **BLAST**. For example, to specify PCoIP, use the syntax **desktopProtocol=PCOIP**.

domainName

The NETBIOS domain name associated with the user who is connecting to the remote desktop or published application. For example, you might use **mycompany** rather than **mycompany.com**.

filePath

Specifies the path to the file on the local system that you want to open with the published application. You can specify the full path or a relative path, for example, **~/username/test%20file.txt**. Use percent encoding for the following characters:

- For a colon (:), use **%3A**
- For a back slash (\), use **%5C**
- For a space (), use **%20**

For example, to represent file path **/Users/username/test file.txt**, use **/User/username/test%20file.txt**.

Examples of vmware-view URIs

You can use the `vmware-view` URI scheme to create hypertext links or buttons and include these links in email or on a Web page. For example, an end user can click a URI link to start a remote desktop with the startup options that you specify.

URI Syntax Examples

Each URI example is followed by a description of what the end user sees after clicking the URI link.

1 `vmware-view://view.mycompany.com/Primary%20Desktop?action=start-session`

Horizon Client starts and connects to the `view.mycompany.com` server. The login dialog box prompts the user for a user name, domain name, and password. After a successful login, the client connects to the remote desktop that has the display name `Primary Desktop`, and the user is logged in to the guest operating system.

Note In this example, the default display protocol and window size are used. The default display protocol is PCoIP and the default window size is full screen.

2 `vmware-view://view.mycompany.com:7555/Primary%20Desktop`

This URI has the same effect as the previous example, except that it uses the nondefault port of 7555 for the Connection Server instance. (The default port is 443.) Because a remote desktop identifier is provided, the remote desktop opens, even though the `start-session` action is not included in the URI.

3 `vmware-view://fred@view.mycompany.com/Finance%20Desktop?desktopProtocol=PCoIP`

Horizon Client starts and connects to the `view.mycompany.com` server. In the login dialog box, the **User name** text box is populated with `fred`. The user must supply the domain name and password. After a successful login, the client connects to the remote desktop that has the display name `Finance Desktop`, and the user is logged in to the guest operating system. The connection uses the PCoIP display protocol.

4 `vmware-view://view.mycompany.com/Calculator?action=start-session&appProtocol=BLAST`

Horizon Client starts and connects to the `view.mycompany.com` server. In the login dialog box, the user must supply the user name, domain name, and password. After a successful login, the client connects to the published application that has the display name `Calculator`. The connection uses the VMware Blast display protocol.

5 `vmware-view://fred@view.mycompany.com/Finance%20Desktop?domainName=mycompany`

Horizon Client starts and connects to the `view.mycompany.com` server. In the login dialog box, the **User name** text box is populated with `fred`, and the **Domain** text box is populated with `mycompany`. The user must supply only a password. After a successful login, the client connects to the remote desktop that has the display name `Finance Desktop`, and the user is logged in to the guest operating system.

6 `vmware-view://view.mycompany.com/`

Horizon Client starts and the user is taken to the login prompt for connecting to the `view.mycompany.com` server.

7 `vmware-view://view.mycompany.com/Primary%20Desktop?action=reset`

Horizon Client starts and connects to the `view.mycompany.com` server. The login dialog box prompts the user for a user name, domain name, and password. After a successful login, Horizon Client shows a dialog box that prompts the user to confirm the reset operation for `Primary Desktop`.

Note This action is available only if a Horizon administrator has enabled the reset feature for the remote desktop.

8 `vmware-view://view.mycompany.com/Primary%20Desktop?action=restart`

Horizon Client starts and connects to the `view.mycompany.com` server. The login dialog box prompts the user for a user name, domain name, and password. After a successful login, Horizon Client shows a dialog box that prompts the user to confirm the restart operation for `Primary Desktop`.

Note This action is available only if a Horizon administrator has enabled the restart feature for the remote desktop.

9 `vmware-view://`

Horizon Client starts and the user is taken to the page for entering the address of a server.

10 `vmware-view://10.10.10.10/My%20Notepad++?args=%22My%20new%20file.txt%22`

Starts `My Notepad++` on server `10.10.10.10` and passes the argument `My new file.txt` in the published application start command. The filename is enclosed in double quotes because it contains spaces.

11 `vmware-view://10.10.10.10/Notepad++%2012?args=a.txt%20b.txt`

Starts `Notepad++ 12` on server `10.10.10.10` and passes the argument `a.txt b.txt` in the published application start command. Because the argument is not enclosed in quotes, a space separates the filenames and the two files are opened separately in `Notepad++`.

Note Published applications can differ in the way that they use command-line arguments. For example, if you pass the argument `a.txt b.txt` to `WordPad`, `WordPad` opens only one file, `a.txt`.

HTML Code Examples

You can use URIs to make hypertext links and buttons to include in emails or on Web pages. The following examples show how to use the URI from the first URI example to code the hypertext link labeled **Test Link** and a button labeled **TestButton**.

```
<html>
<body>

<a href="vmware-view://view.mycompany.com/Primary%20Desktop?action=start-session">Test Link</a><br>

<form><input type="button" value="TestButton" onClick="window.location.href=
'vmware-view://view.mycompany.com/Primary%20Desktop?action=start-session'"></form> <br>

</body>
</html>
```

Managing Remote Desktop and Published Application Connections

3

End users can use Horizon Client to connect to a server, log in to or off of remote desktops, and use published applications. For troubleshooting purposes, end users can also restart and reset remote desktops and reset published applications.

Depending on how you configure policies, end users might be able to perform many operations on their remote desktops and published applications.

This chapter includes the following topics:

- [Configure Horizon Client to Select a Smart Card Certificate](#)
- [Connect to a Remote Desktop or Published Application](#)
- [Share Access to Local Folders and Drives with Client Drive Redirection](#)
- [Clicking URL Links That Open Outside of Horizon Client](#)
- [Open a Recent Remote Desktop or Published Application](#)
- [Using a Touch Bar with Server, Desktop, and Application Connections](#)
- [Connecting to a Server When Horizon Client Starts](#)
- [Configure Horizon Client to Forget the Server User Name and Domain](#)
- [Hide the VMware Horizon Client Window](#)
- [Create Keyboard Shortcut Mappings](#)
- [Modify the Horizon Client Mouse Shortcut Mappings](#)
- [Modify the Horizon Client Shortcuts for Windows Actions](#)
- [Searching for Remote Desktops and Published Applications](#)
- [Select a Favorite Remote Desktop or Published Application](#)
- [Switch Remote Desktops or Published Applications](#)
- [Log Off or Disconnect](#)
- [Autoconnect to a Remote Desktop](#)
- [Configure Reconnect Behavior for Published Applications](#)

- [Removing a Server Shortcut from the Home Window](#)
- [Reordering Shortcuts](#)
- [Dragging Shortcuts and URIs](#)
- [Disconnecting from a Server](#)

Configure Horizon Client to Select a Smart Card Certificate

You can configure a Horizon Client setting to select a local certificate, or the certificate on a smart card, when you connect to a server. If you do not configure this setting, you must manually select a certificate.

Prerequisites

For your setting to take effect, a Horizon administrator must configure smart card authentication on the server and only one certificate must be available on your client system or smart card.

If you have multiple certificates, Horizon Client always prompts you to select a certificate, regardless of how you configure this setting.

Procedure

- 1 In the **Applications** folder, double-click **VMware Horizon Client**.
- 2 Select **VMware Horizon Client > Preferences** from the menu bar.
- 3 Click **General** in the Preferences dialog box.
- 4 Select **Automatically select certificate**.
- 5 Close the Preferences dialog box.

Your changes take effect when the dialog box is closed.

Connect to a Remote Desktop or Published Application

To connect to a remote desktop or published application, you must provide the name of a server and supply credentials for your user account.

Before you have end users access remote desktops and published applications, test that you can connect to a remote desktop or published application from the client system.

Prerequisites

- Obtain login credentials, such as a user name and password, RSA SecurID user name and passcode, RADIUS authentication user name and passcode, or smart card personal identification number (PIN).
- Obtain the NETBIOS domain name for logging in. For example, you might use mycompany rather than mycompany.com.
- Perform the administrative tasks described in [Preparing Connection Server for Horizon Client](#).

- If you are outside the corporate network and require a VPN connection to access remote desktops and published applications, verify that the client device is set up to use a VPN connection and turn on that connection.
- Verify that you have the fully qualified domain name (FQDN) of the server that provides access to the remote desktop or published application. Underscores (_) are not supported in server names. If the port is not 443, you also need the port number.
- Configure the certificate checking mode for the certificate that the server presents. See [Setting the Certificate Checking Mode in Horizon Client](#).
- If you are using smart card authentication, configure Horizon Client to use a local certificate or the certificate on your smart card automatically. See [Configure Horizon Client to Select a Smart Card Certificate](#).
- If you plan to use Touch ID to authenticate, add at least one fingerprint in the Touch setting on your Mac. Touch ID authentication is available only if biometric authentication is enabled on the server. For complete Touch ID authentication requirements, see [Touch ID Authentication Requirements](#).

Procedure

- 1 If a VPN connection is required, turn on the VPN.
- 2 In the **Applications** folder, double-click **VMware Horizon Client**.
- 3 Click **Continue** to start remote desktop USB and printing services, or click **Cancel** to use Horizon Client without remote desktop USB and printing services.

If you click **Continue**, you must provide system credentials. If you click **Cancel**, you can enable remote desktop USB and printing services later.

Note The prompt to start remote desktop USB and printing services appears the first time you start Horizon Client. It does not appear again, regardless of whether you click **Cancel** or **Continue**.

- 4 Connect to a server.

Option	Description
Connect to a new server	Click the New Server icon on the Horizon Client Home window, enter the server name and port number (if necessary), and click Connect . An example of using a non-default port is view.company.com:1443 .
Connect to an existing server	Double-click the server shortcut on the Horizon Client Home window.

- 5 If you are prompted for RSA SecurID credentials or RADIUS authentication credentials, enter the user name and passcode and click **Login**.

- 6 If you are prompted for a user name and password, supply Active Directory credentials.
 - a Type the user name and password of a user who is entitled to use at least one desktop or application pool.
 - b Select a domain.

If the **Domain** drop-down menu is hidden, you must type the user name as *username@domain* or *domain\username*.
 - c (Optional) Select the **Remember this password** check box if this feature is enabled and if the server certificate can be fully verified.
 - d (Optional) Select the **Enable Touch ID** check box to enable Touch ID authentication.

If Touch ID is enabled and you are logging in for the first time, your Active Directory credentials are stored securely on your Mac for future use.
 - e Click **Login**.

You might see a message that you must confirm before the login dialog box appears.
- 7 If the desktop security indicator turns red and a warning message appears, respond to the prompt.

Usually, this warning means that the server did not send a certificate thumbprint to the client. The thumbprint is a hash of the certificate public key and is used as an abbreviation of the public key.
- 8 If you are prompted for Touch ID authentication, place your finger on the Touch ID sensor.
- 9 (Optional) If multiple display protocols are configured for a remote desktop, select the protocol to use.

VMware Blast provides better battery life and is the best protocol for high-end 3D and mobile device users.

Option	Description
Select a display protocol for a remote desktop	<p>Select the remote desktop name, press Control-click, and select the display protocol from the context menu.</p> <p>Alternatively, you can select Settings from the context menu and select the display protocol from the Connect Via drop-down menu in the Settings dialog box.</p>
Select a display protocol for a published application	<p>Select the published application name, press Control-click, select Settings from the context menu, and select the display protocol from the Preferred protocol drop-down menu in the Settings dialog box.</p>

- 10 Double-click a remote desktop or published application to connect to it.

If you are connecting to a published desktop, and if the published desktop is already set to use a different display protocol, you are prompted to either use the protocol that is set or have the system log you off the remote operating system so that a connection can be made with the protocol that you selected.

Note If you are entitled to only one remote desktop on the server, Horizon Client connects automatically to that remote desktop.

If a Horizon administrator has enabled the client drive redirection feature, the Sharing dialog box might appear. From the Sharing dialog box, you can allow or deny access to files on your local system. For more information, see [Share Access to Local Folders and Drives with Client Drive Redirection](#).

After you connect to a server for the first time, Horizon Client connects to that server automatically the next time you start Horizon Client. To disable this feature, see [Connecting to a Server When Horizon Client Starts](#).

If Horizon Client cannot connect to the remote desktop or published application, perform the following tasks:

- Verify that the certificate for the server is working properly. If it is not, in Horizon Administrator, you might also see that View Agent or Horizon Agent on remote desktops is unreachable.
- Verify that the tags set on the Connection Server instance allow connections from this user. See the *Horizon 7 Administration* document.
- Verify that the user is entitled to access the remote desktop or published application. For information about entitling users, see the *Setting Up Virtual Desktops in Horizon 7* or *Setting Up Published Desktops and Applications in Horizon 7* document.

Share Access to Local Folders and Drives with Client Drive Redirection

With the client drive redirection feature, you can share folders and drives on the local client system with remote desktops and published applications.

Shared drives can include mapped drives and USB storage devices.

In a Windows remote desktop, shared folders and drives appear in the **This PC** folder or in the **Computer** folder, depending on the Windows operating system version. In a published application, such as Notepad, you can browse to and open a file in a shared folder or drive.

You can turn on the ability to open local files in published applications directly from your local file system. If you select a local file and press Control-click, the **Open With** menu lists the available published applications. You can also open a local file by dragging it into the published application window or Dock icon.

If you set a published application as the default application for files that have a certain file extension, all files on your local file system that have that file extension are registered with the server. You can also turn on the ability to run published applications from the Applications folder.

Note If a filename contains characters that are invalid in the Windows file system, you cannot open the file in a published application. For example, you cannot open a file named test2<.txt in Notepad.

The client drive redirection settings apply to all remote desktops and published applications.

Prerequisites

To share folders and drives with a remote desktop or published application, a Horizon administrator must enable the client drive redirection feature. This task involves enabling the agent **Client Drive Redirection** option in Horizon Agent. It can also include setting policies to control the client drive redirection behavior. For more information, see the *Configuring Remote Desktop Features in Horizon 7* document.

With Horizon Agent 7.9 and later, you can include or exclude folders on devices that have specified vendor and product IDs from being redirected by using the **Include Vid/Pid Device** and **Exclude Vid/Pid Device** group policy settings. For more information, see the *Configuring Remote Desktop Features in Horizon 7* document.

Procedure

- 1 Open the Preferences dialog box and display the Sharing panel.

Option	Description
From the desktop and application selection window	Select VMware Horizon Client > Preferences and click Sharing .
From the Sharing dialog box that appears when you connect to a remote desktop or published application	Click the Preferences > Sharing link in the dialog box.
From within a remote desktop operating system	Select VMware Horizon Client > Preferences from the menu bar and click Sharing .

- 2 Configure the client drive redirection settings.

Option	Action
Share a specific folder or drive with remote desktops and published applications	Click the plus (+) button, browse to and select the folder or drive to share, and click Add . Note If a USB device is already connected to a remote desktop or published application with the USB redirection feature, you cannot share a folder on the USB device.
Stop sharing a specific folder or drive	Select the folder or drive in the Folder list and click the minus (-) button.
Give remote desktops and published applications access to files in your home directory	Select the Allow access to <i>home-directory</i> check box.

Option	Action
Share USB storage devices with remote desktops and published applications	<p>Select the Allow access to removable storage check box. The client drive redirection feature shares all USB storage devices inserted in your client system and all FireWire and Thunderbolt-connected external drives automatically. Selecting a specific device to share is not necessary.</p> <hr/> <p>Note USB storage devices already connected to a remote desktop or published application with the USB redirection feature are not shared.</p> <hr/> <p>If this check box is deselected, you can use the USB redirection feature to connect USB storage devices to remote desktops and published applications.</p>
Do not show the Sharing dialog box when you connect to a remote desktop or published application	<p>Select the Do not show dialog when connecting to a desktop or application check box.</p> <p>If this check box is deselected, the Sharing dialog box appears the first time you connect to a remote desktop or published application. For example, if you log in to a server and connect to a remote desktop, you see the Sharing dialog box. If you then connect to another remote desktop or published application, you do not see the dialog box. To see the dialog box again, you must disconnect from the server and log in again.</p>

3 Configure settings for published applications.

- a Click the **Settings** button (gear icon) in the upper-right corner of the desktop and application selector window and select **Applications** in the left pane.
- b To turn on the ability to open local files with published applications from the local file system, select **Open local files in hosted applications**.
- c To turn on the ability to run published applications from the Applications folder on the client system, select **Run hosted applications from your local Applications folder**.

What to do next

Verify that you can see the shared folders from within the remote desktop or published application.

- In a Windows remote desktop, open File Explorer and look in the **This PC** folder, or open Windows Explorer and look in the **Computer** folder, depending on the Windows operating system version.
- In a published application, select **File > Open** or **File > Save As** and navigate to the folder or drive.

The folders and drives that you selected for sharing might use one (or more) of the following naming conventions.

Naming Convention	Example
<i>folder-name on desktop-name</i>	jsmith on JSMITH-W03
<i>folder-name (drive-number:)</i>	jsmith (Z:)
<i>folder-name on desktoptop-name (drive-number:)</i>	jsmith on JSMITH-W03 (Z:)

For some Horizon Agent versions, a redirected folder can have two entrances, such as under **Devices and drives** and **Network locations** in Windows 10, and both entrances can appear at the same time. If all the volume labels (from A: through Z:) are already in use, the redirected folder has only one entrance.

Clicking URL Links That Open Outside of Horizon Client

A Horizon administrator can configure URL links that you click inside a remote desktop or published application to open in the default browser on the local client system. The URL link might be to a Web page, a phone number, an email address, or another type of link. This feature is called URL Content Redirection.

A Horizon administrator can also configure URL links that you click inside a browser or application on the local client system to open in a remote desktop or published application. If Horizon Client is not already open you click the URL link, it starts and prompts you to log in.

A Horizon administrator might set up the URL Content Redirection feature for security purposes. For example, if you are at work and click a link that points to a URL outside your company network, the link might be more safely opened in a published application. An administrator can configure which published application opens the link.

Responding to URL Content Redirection Prompts

The first time you start Horizon Client and connect to a server on which the URL Content Redirection feature is configured, Horizon Client prompts you to open the VMware Horizon URL Filter application when you click a link for redirection. Click **Open** to allow the URL to be redirected.

Depending on how the URL Content Redirection feature is configured, Horizon Client might display an alert message that asks you to change your default Web browser to VMware Horizon URL Filter. If you see this prompt, click the **Use "VMware Horizon URL Filter"** button to allow VMware Horizon URL Filter to become the default browser. This prompt appears only once, unless you change your default browser after clicking **Use "VMware Horizon URL Filter"**.

Horizon Client might also display an alert message that asks you to select an application when you click a URL. If you see this prompt, you can click **Choose Application** to search for an application on the local client system, or click **Search App Store** to search for and install a new application. If you click **Cancel**, the URL is not opened.

Using URL Content Redirection with Chrome

If the Chrome browser prompts you to enable the VMware Horizon URL Content Redirection Helper extension, click **Enable Extension** to use the URL Content Redirection feature with the Chrome browser. If you click **Remove from Chrome**, the extension is removed and URLs clicked in Chrome are not redirected. You can still install the extension manually from the Chrome Web Store.

The first time a URL is redirected from the Chrome browser on the client system, you are prompted to open the URL in Horizon Client. If you select the **Remember my choice for VMware Horizon Client links** check box (recommended) and then click **Open VMware Horizon Client**, this prompt does not appear again.

Open a Recent Remote Desktop or Published Application

You can open recent remote desktops and published applications in Horizon Client.

Recent remote desktops and published applications appear in the order in which they were opened. If you are not already connected to the server when you open a recent remote desktop or published application, the server login screen appears and you must provide your credentials.

Prerequisites

To use this feature, you must have previously opened a remote desktop or published application. If you plan to open a recent desktop or published application from the Dock, VMware Horizon Client must be in the Dock. See [Add Horizon Client to the Dock](#).

Procedure

- ◆ To open a remote desktop or published application from the Dock, Ctrl-click **VMware Horizon Client** in the Dock and select the remote desktop or published application from the menu.
- ◆ To open a remote desktop or published application from the **File** menu, start Horizon Client, select **File > Open Recent**, and select the remote desktop or published application from the menu.

Using a Touch Bar with Server, Desktop, and Application Connections

If the Mac has a Touch Bar, you can use the Touch Bar to add a server, disconnect from a server, or connect to a recent remote desktop or published application. This feature requires macOS Sierra (10.12) or later.

Before you connect to a server, you can touch the plus (+) icon to add a server. After you connect to a server, you can touch the **Disconnect** icon to disconnect from the server.

If you previously connected to a remote desktop or published application, its name appears on the Touch Bar before you connect to a server. You can touch the remote desktop or application name to log in to the server and start the remote desktop or published application.

You can add, remove, and reorder the items in the Horizon Client app Touch Bar by selecting **VMware Horizon Client > Customize Touch Bar**.

For information about using the Touch Bar after you connect to a remote desktop or published application, see [Using a Touch Bar with Remote Desktops and Published Applications](#).

Connecting to a Server When Horizon Client Starts

After you connect to a server for the first time, Horizon Client connects automatically to that server the next time you start Horizon Client.

To disable this feature, select the server shortcut on the Horizon Client Home window, press Control-click, and deselect the **Always connect at launch** setting.

If there are other server shortcuts on the Horizon Client Home window, you can enable the **Always connect at launch** setting for a different server. You can enable the **Always connect at launch** setting for only one server at a time.

Configure Horizon Client to Forget the Server User Name and Domain

By default, Horizon Client stores the user name and domain that you enter when you log in to a server. For increased security, you can configure Horizon Client so that it never remembers the server user name and domain.

Procedure

- 1 Select **VMware Horizon Client > Preferences** from the menu bar.
- 2 Click **General** in the Preferences dialog box.
- 3 Deselect **Remember username and domain**.
- 4 Close the Preferences dialog box.

Your changes take effect when the dialog box is closed.

Hide the VMware Horizon Client Window

You can hide the VMware Horizon Client window after you open a remote desktop or published application.

Procedure

- ◆ To hide the VMware Horizon Client window after you open a remote desktop or published application, click the **Close** button in the corner of the VMware Horizon Client window.

The VMware Horizon Client icon remains in the Dock.

- ◆ To configure a setting that always hides the VMware Horizon Client window after you open a remote desktop or published application, perform these steps before you connect to a server.
 - a Select **VMware Horizon Client > Preferences** from the menu bar and click **General** in the Preferences dialog box.
 - b Select **Hide client window after desktop/application launched**.
 - c Close the Preferences dialog box.

Your changes take effect when the dialog box is closed.

- ◆ To show the VMware Horizon Client window after it has been hidden, select **Window > Open Selection Window** from the menu bar, or right-click the VMware Horizon Client icon in the Dock and select **Show All Windows**.

Create Keyboard Shortcut Mappings

You can customize how remote desktops and published applications interpret Apple keyboard shortcuts by creating keyboard shortcut mappings.

When you create a keyboard shortcut mapping, you map an Apple keyboard shortcut to a Windows keyboard shortcut. A keyboard shortcut consists of one or more key modifiers, such as Control and Shift, and a key code. A key code can be any key on your keyboard, except for a modifier key. When you press a mapped keyboard shortcut on your Apple keyboard, the corresponding Windows keyboard shortcut or action occurs in the remote desktop or application.

If you attempt to map an operating system keyboard shortcut, the results can be unpredictable. For more information, see [Considerations for Mapping Operating System Keyboard Shortcuts](#).

Procedure

- 1 Select **VMware Horizon Client > Preferences** and click **Keyboard & Mouse**.
- 2 Select the **Key Mappings** tab.
- 3 Configure the keyboard shortcut mappings.

Option	Action
Delete a keyboard shortcut mapping	Select the mapping to delete and click the minus (-) button.
Add a keyboard shortcut mapping	<ol style="list-style-type: none"> a Click the plus (+) button. b Specify the Apple keyboard shortcut sequence by clicking one or more keyboard modifiers and typing a key code in the text box. You can also select a key from the drop-down menu. The From: field shows the keyboard shortcut that you created. c Specify the corresponding Windows keyboard shortcut sequence by clicking one or more keyboard modifiers and typing a key code in the text box. You can also select a key from the drop-down menu. The To: field shows the keyboard shortcut that you created. d To save your changes, click OK. <p>The keyboard shortcut mapping is enabled by default (the On check box next to the keyboard shortcut mapping is selected).</p>
Modify a keyboard shortcut mapping	<p>Double-click the mapping and make your changes.</p> <ul style="list-style-type: none"> ■ To modify the Apple keyboard shortcut sequence, click one or more keyboard modifiers and type a key code in the text box. You can also select a key from the drop-down menu. ■ To modify the corresponding Windows keyboard shortcut sequence, click one or more keyboard modifiers and type a key code in the text box. You can also select a key from the drop-down menu. <p>To save your changes, click OK.</p>
Disable a keyboard shortcut mapping	Deselect the On check box next to the keyboard shortcut mapping. When you disable a keyboard shortcut mapping, Horizon Client does not send the Apple keyboard shortcut to the remote desktop or application.
Enable or disable language-specific key mappings	Select or deselect the Enable Language Specific Key Mappings check box. The check box is selected by default.
Restore the default mappings	Click Restore Defaults . Any changes that you made to the default keyboard shortcut mappings are deleted and the default mappings are restored.

4 Close the Preferences dialog box.

Your keyboard shortcut mapping changes take effect immediately. You do not need to restart open remote desktops or published applications to make the changes take effect.

Considerations for Mapping Operating System Keyboard Shortcuts

Mac and Windows both include default keyboard shortcuts. For example, Command-Tab and Command-Space bar are common keyboard shortcuts on Mac systems and Ctrl+Esc and Alt+Enter are common keyboard shortcuts on Windows systems. If you attempt to map one of these operating system keyboard shortcuts in Horizon Client, the behavior of the shortcut on the Mac client system and in the remote desktop or published application can be unpredictable.

- If you map a keyboard shortcut, how the shortcut behaves on the Mac client system depends on how the operating system manages the shortcut. For example, the keyboard shortcut might trigger an action in the operating system and Horizon Client might not respond to the shortcut. Alternatively, the keyboard shortcut might trigger an action in both the operating system and Horizon Client.
- Before you map a Mac keyboard shortcut in Horizon Client, you must disable the shortcut in System Preferences on the Mac client system. Not all Mac keyboard shortcuts can be disabled.
- If you map a Windows keyboard shortcut in Horizon Client, the mapped action occurs when you use the shortcut in the remote desktop or published application.
- For published applications, Windows shortcuts that include the Windows key are disabled by default and do not appear on the Horizon Client Keyboard Preferences dialog box. If you create a mapping for one of these disabled keyboard shortcuts, the shortcut appears in the Keyboard Preferences dialog box.

For a list of the default Mac keyboard shortcuts, go to the Apple support website (<http://support.apple.com>). For a list of the default Windows shortcuts, go to the Microsoft Windows website (<http://windows.microsoft.com>).

Modify the Horizon Client Mouse Shortcut Mappings

You can configure a single-button Apple mouse to send a right-click and a middle-click to remote desktops and published applications. You can modify, enable, or disable the default mouse shortcut mappings. You cannot create mouse shortcut mappings, or delete the default mouse shortcut mappings.

Procedure

- 1 Select **VMware Horizon Client > Preferences** and click **Keyboard & Mouse**.
- 2 Select the **Mouse Shortcuts** tab.

3 Modify the mouse shortcut mappings.

Option	Action
Modify a mouse shortcut mapping	Double-click the mapping and make your changes. To save your changes, click OK .
Disable a mouse shortcut mapping	Deselect the On check box next to the mouse shortcut mapping. When you disable a mouse shortcut mapping, Horizon Client does not send the mouse shortcut to the remote desktop or published application.
Enable a mouse shortcut mapping	Select the On check box next to the mouse shortcut mapping. When you enable a mouse shortcut mapping, Horizon Client sends the mouse shortcut to the remote desktop or published application.
Restore the default settings	Click Restore Defaults . Any changes that you made to the default mouse shortcut mappings are deleted and the default mappings are restored.

4 Close the Preferences dialog box.

Your mouse shortcut mapping changes take effect immediately. You do not need to restart open remote desktops or published applications to make the changes take effect.

Modify the Horizon Client Shortcuts for Windows Actions

Horizon Client includes preconfigured shortcut mappings for common Windows actions, including Toggle Full Screen, Quit, Hide Application, Cycle Through Windows, and Cycle Through Windows in Reverse. It also includes a preconfigured shortcut mapping for Toggle Exclusive Mode. You can enable or disable the default shortcuts. You cannot create shortcuts or delete the default shortcuts.

Procedure

- 1 Select **VMware Horizon Client > Preferences** and click **Keyboard & Mouse**.
- 2 Select the **Horizon Shortcuts** tab.
- 3 Modify the default shortcuts.

Option	Action
Enable a shortcut	Select the On check box next to the shortcut. When you enable a shortcut, Horizon Client does not send the shortcut to the remote desktop or published application.
Disable a shortcut	Deselect the On check box next to the shortcut. When you disable a shortcut, Horizon Client sends the shortcut to the remote desktop or published application. Note The behavior of the shortcut on the remote desktop or published application can be unpredictable.
Restore the default settings	Click Restore Defaults . Any changes that you made are deleted and the default settings are restored.

4 Close the Preferences dialog box.

Your changes take effect immediately. You do not need to restart open remote desktops or published applications to make the changes take effect.

Searching for Remote Desktops and Published Applications

After you connect to a server, the available remote desktops and published applications on that server appear in the desktop and application selection window. You can search for a particular remote desktop or published application by typing in the window.

When you begin to type, Horizon Client highlights the first matching remote desktop or published application name. To connect to a highlighted remote desktop or published application, press the Enter key. If you continue to type after the first match is found, Horizon Client continues to search for matching remote desktops and published applications. If Horizon Client finds multiple matching remote desktops or published applications, you can press the Tab key to switch to the next match. If you stop typing for two seconds and then begin to type again, Horizon Client assumes that you are starting a new search.

Select a Favorite Remote Desktop or Published Application

You can select favorite remote desktops and published applications. Shortcuts for favorite items are identified by a star and appear on the **Favorites** tab. Favorite items are saved after you log off from the server.

Prerequisites

Obtain the credentials for connecting to the server, such as a user name and password or RSA SecurID and passcode.

Procedure

- 1 On the Horizon Client Home window, double-click the server icon.
- 2 If prompted, supply your RSA user name and passcode, your Active Directory user name and password, or both.
- 3 To select or deselect a favorite remote desktop or published application, perform these steps.

Option	Action
Select a favorite	Select the remote desktop or published application shortcut, press Control-click, and select Mark as Favorite from the context menu. A star appears in the upper-right corner of the remote desktop or published application shortcut.
Deselect a favorite	Select the remote desktop or published application shortcut, press Control-click, and deselect Mark as Favorite from the context menu. A star no longer appears in the upper-right corner of the remote desktop or published application shortcut.

- 4 (Optional) To display only favorite remote desktops or published applications, click the **Favorites** button (star icon) in the upper-right corner of the desktop and application selection window.

You can click the **Favorites** button again to display all the available remote desktops and published applications.

Switch Remote Desktops or Published Applications

If you are connected to a remote desktop, you can switch to another remote desktop. You can also connect to a published application while you are connected to a remote desktop.

Procedure

- ◆ Select a remote desktop or published application from the same server or from a different server.

Option	Action
Choose a different remote desktop or published application on the same server	<p>Perform one of the following actions:</p> <ul style="list-style-type: none"> ■ To keep the current remote desktop and also connect to another remote desktop, select Window > VMware Horizon Client from the menu bar and double-click the shortcut for the other remote desktop. That remote desktop opens in a new window so that you have multiple remote desktops open. You can switch between remote desktops from the Window menu on the menu bar. ■ To close the current remote desktop and connect to another remote desktop, select Connection > Disconnect from the menu bar and double-click the shortcut for the other remote desktop. ■ To open another published application, double-click the shortcut for the other published application. That published application opens in a new window. You now have multiple published applications open, and you can switch between them by clicking in an application window.
Choose a different remote desktop or published application on a different server	<p>If you are entitled to multiple remote desktops or published applications, so that the desktop and application selection window is open, click the Disconnect from Server button in the left side of the toolbar in the desktop and application selection window and disconnect from the server. If you are entitled to only one remote desktop or published application, and the desktop and application selection window is not open, you can select File > Disconnect from Server from the menu bar and then connect to a different server.</p>

Log Off or Disconnect

If you disconnect from a remote desktop without logging off, applications in the remote desktop might remain open. You can also disconnect from a server and leave published applications running.

You can log off from a remote desktop even if you do not have the remote desktop open. This feature has the same result as sending Ctrl+Alt+Del to the remote desktop and then clicking **Log Off**.

Note The Windows key combination Ctrl+Alt+Del is not supported in remote desktops. Instead, select **Connection > Send Ctrl-Alt-Del** from the menu bar. Alternatively, press Fn-Control-Option-Delete on an Apple keyboard.

Procedure

- ◆ Disconnect from a remote desktop without logging off.

Option	Action
Disconnect and quit Horizon Client	<ol style="list-style-type: none"> Click the Close button in the corner of the window, or select File > Close from the menu bar. Select VMware Horizon Client > Quit VMware Horizon Client from the menu bar.
Disconnect and remain in Horizon Client	Click the Disconnect button in the toolbar, or select Connection > Disconnect from the menu bar.

Note A Horizon administrator can configure a remote desktop to log off when it is disconnected. In this case, any open applications in the remote desktop are closed.

- ◆ Log off and disconnect from a remote desktop.

Option	Action
From within the remote desktop	Use the Windows Start menu to log off.
From the menu bar	<p>Select Connection > Log Off from the menu bar.</p> <p>If you use this procedure, files that are open on the remote desktop are closed without being saved first.</p>

- ◆ Disconnect from a published application.

Option	Action
Disconnect from the server and leave the published application running	<p>Perform one of the following actions:</p> <ul style="list-style-type: none"> ■ Click the Disconnect from Server button in the left side of the toolbar in the desktop and application selection window. ■ Select File > Disconnect from Server from the menu bar.
Close the published application and disconnect from the server	<ol style="list-style-type: none"> Quit the published application in the usual manner, for example, click the Close button in the corner of the application window. Click the Disconnect from Server button in the left side of the toolbar in the desktop and application selection window, or select File > Disconnect from Server from the menu bar.

- ◆ Log off when you do not have a remote desktop open.

If you use this procedure, files that are open on the remote desktop are closed without first being saved.

Option	Action
From the Home window	a Double-click the server shortcut and supply credentials. b Select the remote desktop and select Connection > Log Off from the menu bar.
From the desktop and application selection window	Select the remote desktop and select Connection > Log Off from the menu bar.

Autoconnect to a Remote Desktop

You can configure a server to open a particular remote desktop when you connect to that server. You cannot configure a server to open a published application.

If you are entitled to only one remote desktop on the server, Horizon Client always opens that remote desktop when you connect to the server.

Prerequisites

Obtain credentials for connecting to the server, such as a user name and password, RSA SecurID user name and passcode, RADIUS authentication user name and passcode, or smart card personal identification number (PIN).

Procedure

- 1 On the Horizon Client Home window, double-click the server icon.
- 2 If prompted, supply your credentials.
- 3 Click the **Settings** button (gear icon) in the upper-right corner of the desktop and application selection window.
- 4 Select the remote desktop in the left pane of the Settings dialog box.
- 5 Select **Autoconnect to this desktop**.

Configure Reconnect Behavior for Published Applications

If you disconnect from a server without closing a published application, Horizon Client prompts you to reopen that published application the next time you connect to the server. You can change this behavior by modifying the Reconnect Behavior setting in Horizon Client.

Prerequisites

Obtain credentials for connecting to the server, such as a user name and password, RSA SecurID user name and passcode, RADIUS authentication user name and passcode, or smart card personal identification number (PIN).

Procedure

- 1 On the Horizon Client **Home** window, double-click the server icon.
- 2 If prompted, supply your credentials.
- 3 Click the **Settings** button (gear icon) in the upper-right corner of the desktop and application selection window.
- 4 Select **Applications** in the left pane of the Settings dialog box.
- 5 Select an application reconnect behavior option.

These options determine how Horizon Client behaves when a user connects to the server and published applications are still running.

Option	Description
Ask to reconnect to open applications	Horizon Client shows the message You have one or more remote applications running. Would you like to open them now? You can respond by clicking Reconnect to Applications or Not Now . You can also select the Don't show this message again check box to suppress the message in the future. This setting is enabled by default.
Reconnect automatically to open applications	Horizon Client immediately reopens any running published applications.
Do not ask to reconnect and do not automatically reconnect	Horizon Client does not prompt you to reopen running published applications, nor does it reopen running published applications. This setting has the same effect as the Don't show this message again check box.

The new setting takes effect the next time you connect to the server.

Removing a Server Shortcut from the Home Window

After you connect to a server, Horizon Client saves a server shortcut to the Home window.

You can remove a server shortcut by selecting the shortcut and pressing the **Delete** key. Alternatively, you can Control-click or right-click the shortcut on the Horizon Client Home window and select **Delete**.

You cannot remove remote desktop or published application shortcuts that appear after you connect to a server.

Reordering Shortcuts

You can reorder server, remote desktop, and published application shortcuts.

Each time you connect to a server, Horizon Client saves a server shortcut to the Home window. You can reorder these server shortcuts by selecting a shortcut and dragging it to a new position on the Home window.

After you connect to a server, the available remote desktops and published applications on that server appear in the desktop and application selection window. Remote desktop shortcuts appear first, followed by published application shortcuts. Remote desktop shortcuts and published application shortcuts are arranged alphabetically and cannot be rearranged.

When you are in the Favorites view (you clicked the **Favorites** button in the upper-right corner of the desktop and application selection window), you can reorder remote desktop and published application shortcuts by selecting a shortcut and dragging it to a new position on the window.

Dragging Shortcuts and URIs

You can drag server, remote desktop, and published application shortcuts and Uniform Resource Identifiers (URIs).

You can drag a server shortcut from the Horizon Client Home window into another app, such as Notes. The server shortcut appears as a URI in the other app, for example, `vmware-view://server-address`. You can also drag a server address or URI from another app into the Home window.

After you connect to a server, you can drag a remote desktop or published application shortcut from the Horizon Client desktop and application selection window into another app, such as Notes. The shortcut appears as a URI in the other app, for example, `vmware-view://server-name/item-name`.

If you drag a server, remote desktop, or published application shortcut from Horizon Client into a folder on the Mac, Horizon Client creates a shortcut file in the folder. You can double-click this shortcut file to start Horizon Client and connect to the server, remote desktop, or published application.

For information about URI syntax, see [Syntax for Creating vmware-view URIs](#).

Disconnecting from a Server

After you have finished using a remote desktop or published application, you can disconnect from the server.

To disconnect from a server, click the **Disconnect from Server** icon in the upper-left corner of the Horizon Client menu bar.

Using a Microsoft Windows Desktop or Application on a Mac

4

Horizon Client for Mac provides a familiar, personalized desktop and application environment. End users can access USB and other devices connected to their local computer, send documents to any printer that their local computer can detect, authenticate with smart cards, and use multiple display monitors.

This chapter includes the following topics:

- [Feature Support Matrix for Mac Clients](#)
- [Internationalization](#)
- [Keyboard Input Source Language Synchronization](#)
- [Monitors and Screen Resolution](#)
- [Use USB Redirection to Connect USB Devices](#)
- [Using the Real-Time Audio-Video Feature for Webcams and Microphones](#)
- [Using the Session Collaboration Feature](#)
- [Copying and Pasting Text and Images](#)
- [Dragging and Dropping](#)
- [Using Published Applications](#)
- [Using a Touch Bar with Remote Desktops and Published Applications](#)
- [Printing From a Remote Desktop or Published Application](#)
- [PCoIP Client-Side Image Cache](#)

Feature Support Matrix for Mac Clients

When planning which display protocol and features to make available to your end users, use the following information to determine which guest operating systems support the feature.

Table 4-1. Features Supported for Windows Virtual Desktops

Feature	Windows 10 Desktop	Windows 8.x Desktop	Windows 7 Desktop	Windows Server 2008/2012 R2, Windows Server 2016, or Windows Server 2019 Desktop
RSA SecurID or RADIUS	X	X	X	X
Single sign-on	X	X	X	X
PCoIP display protocol	X	X	X	X
RDP display protocol				
VMware Blast display protocol	X	X	X	X
USB redirection	X	X	X	X
Client drive redirection	X	X	X	X
Real-Time Audio-Video (RTAV)	X	X	X	X
Windows 7 MMR				
Virtual printing	X	X	X	X
VMware Integrated Printing	X	X	X	X
Location-based printing	X	X	X	X
Smart cards	X	X	X	X
Multiple monitors	X	X	X	X

Windows Server 2016 remote desktops require Horizon Agent 7.0.2 or later. Windows Server 2019 remote desktops require Horizon Agent 7.7 or later.

For descriptions of these features, see the *Horizon 7 Architecture Planning* document.

Feature Support for Published Desktops on RDS Hosts

RDS hosts are server computers that have Windows Remote Desktop Services and View Agent or Horizon Agent installed. Multiple users can have remote desktop sessions on an RDS host simultaneously. An RDS host can be either a physical machine or a virtual machine.

Note The following table contains rows only for the features that are supported. Where the text specifies a minimum version of View Agent, the text "and later" is meant to include Horizon Agent 7.0.x and later.

Table 4-2. Features Supported for RDS Hosts

Feature	Windows Server 2008 R2 RDS Host	Windows Server 2012 R2 RDS Host	Windows Server 2016 RDS Host	Windows Server 2019 RDS Host
RSA SecurID or RADIUS	X	X	Horizon Agent 7.0.2 and later	Horizon Agent 7.7 and later
Smart card	X	X	Horizon Agent 7.0.2 and later	Horizon Agent 7.7 and later

Feature	Windows Server 2008 R2 RDS Host	Windows Server 2012 R2 RDS Host	Windows Server 2016 RDS Host	Windows Server 2019 RDS Host
Single sign-on	X	X	Horizon Agent 7.0.2 and later	Horizon Agent 7.7 and later
PCoIP display protocol	X	X	Horizon Agent 7.0.2 and later	Horizon Agent 7.7 and later
VMware Blast display protocol	Horizon Agent 7.0 and later	Horizon Agent 7.0 and later	Horizon Agent 7.0.2 and later	Horizon Agent 7.7 and later
HTML Access	X (virtual machine only)	X (virtual machine only)	Horizon Agent 7.0.2 and later	Horizon Agent 7.7 and later
USB redirection		X	Horizon Agent 7.0.2 and later	Horizon Agent 7.7 and later
Client drive redirection	X	X	Horizon Agent 7.0.2 and later	Horizon Agent 7.7 and later
Virtual Printing	View Agent 6.2.x through Horizon Agent 7.6 (virtual machine only) Horizon Agent 7.7 and later (virtual machine and physical machine)	View Agent 6.2.x through Horizon Agent 7.6 (virtual machine only) Horizon Agent 7.7 and later (virtual machine and physical machine)	Horizon Agent 7.0.2 through Horizon Agent 7.6 (virtual machine only) Horizon Agent 7.7 and later (virtual machine and physical machine)	Horizon Agent 7.7 and later
VMware Integrated Printing	Horizon Agent 7.9 or later	Horizon Agent 7.9 or later	Horizon Agent 7.9 or later	Horizon Agent 7.9 or later
Location-based printing	View Agent 6.2.x through Horizon Agent 7.6 (virtual machine only) Horizon Agent 7.7 and later (virtual machine and physical machine)	View Agent 6.2.x through Horizon Agent 7.6 (virtual machine only) Horizon Agent 7.7 and later (virtual machine and physical machine)	Horizon Agent 7.0.2 through Horizon Agent 7.6 (virtual machine only) Horizon Agent 7.7 and later (virtual machine and physical machine)	Horizon Agent 7.7 and later
Multiple monitors	X	X	Horizon Agent 7.0.2 and later	Horizon Agent 7.7 and later
Real-Time Audio-Video (RTAV)	Horizon Agent 7.0.2 and later	Horizon Agent 7.0.2 and later	Horizon Agent 7.0.3 and later	Horizon Agent 7.7 and later

For information about which editions of each guest operating system are supported, see the *Horizon 7 Installation* document.

Limitations for Specific Features

Specific features that are supported on Windows desktops for Horizon Client for Mac have certain restrictions.

Table 4-3. Requirements for Specific Features

Feature	Requirements
Real-Time Audio-Video	See System Requirements for Real-Time Audio-Video .
Virtual Printing (including location-based printing) for published desktops and published applications	<p>For Windows Server 2016 RDS hosts, requires Horizon Agent 7.0.2 or later.</p> <p>For Windows Server 2019 RDS hosts, requires Horizon Agent 7.7 or later.</p> <p>With Horizon Agent 7.7 and later, both virtual machine and physical machine RDS hosts are supported. With Horizon Agent 7.6 and earlier, only virtual machine RDS hosts are supported.</p>
VMware Integrated Printing	Requires Horizon Agent 7.9 or later.

Feature Support for Linux Desktops

Some Linux guest operating systems are supported. For a list of supported Linux operating systems and information about supported features, see the *Setting Up Horizon 7 for Linux Desktops* document.

Internationalization

The user interface and documentation are available in English, Japanese, French, German, Simplified Chinese, Traditional Chinese, Korean, and Spanish.

Keyboard Input Source Language Synchronization

When you connect to a remote desktop, the keyboard input source language on the Mac client system is synchronized in the remote desktop.

For example, if the keyboard input source language on the Mac client system (**System Preferences > Keyboard > Input Sources**) is Japanese, Japanese appears in the language bar in the remote desktop.

This feature supports the following keyboard input source languages on the Mac client system.

- Japanese
- English
- Chinese
- Korean
- French
- German
- Spanish

Synchronization does not occur if the keyboard input source language is not supported.

Monitors and Screen Resolution

When you use the VMware Blast display protocol or the PCoIP display protocol, you can extend a remote desktop to multiple monitors. If you have a Mac with Retina Display, you can see the remote desktop in full resolution.

With the VMware Blast display protocol or the PCoIP display protocol, a remote desktop screen resolution of 4K (3840 x 2160) is supported. The number of 4K displays that are supported depends on the hardware version of the desktop virtual machine and the Windows version.

Hardware Version	Windows Version	Number of 4K Displays Supported
10 (ESXi 5.5.x compatible)	7, 8, 8.x, 10	1
11 (ESXi 6.0 compatible)	7 (3D rendering feature disabled and Windows Aero disabled)	3
11	7 (3D rendering feature enabled)	1
11	8, 8.x, 10	1
13 or 14	7, 8, 8.x, 10 (3D rendering feature enabled)	1
13 or 14	7, 8, 8.x, 10	3

For the best performance, the virtual machine should have at least 2 GB of RAM and 2 vCPUs. This feature might require good network conditions, such as a bandwidth of 1000 Mbps with low network latency and a low package loss rate.

Using Full-Screen Mode with Multiple Monitors

When a remote desktop window is open, you can use the **Window > Enter Full Screen** menu item or the expander arrows in the upper-right corner of the remote desktop window to extend the remote desktop across multiple monitors. You can select the **Window > Use Single Display in Full Screen** menu item to make the remote desktop fill only one monitor.

The monitors do not have to be in the same mode. For example, if you are using a laptop that is connected to an external monitor, the external monitor can be in portrait mode or landscape mode.

You can select a full-screen option from the Settings dialog box after you connect to a server and before you open a remote desktop. Click the **Settings** button (gear icon) in the upper-right corner of the desktop and application selection window, select the remote desktop, and select a full-screen option from the **Full Screen** drop-down menu.

You can use the selective multiple-monitor feature to display a remote desktop window on a subset of your monitors. For more information, see [Select Specific Monitors to Display a Remote Desktop](#).

Using Remote Desktops with Split View

With Split View, which is supported in El Capitan (10.11) and later, you can fill your Mac screen with two applications without manually moving and resizing windows. You can use Split View with remote desktops in full-screen mode (**Full Screen** or **Use Single Display in Full Screen** option).

Using a High-Resolution Mac with Retina Display

If you use the VMware Blast display protocol or the PCoIP display protocol, Horizon Client supports high resolutions for client systems that support Retina Display. After you connect to a remote desktop, you can select the **Connection > Resolution > Full Resolution** menu item to enable high-resolution mode. This menu item appears only if the client system supports Retina Display.

In high-resolution mode, the DPI Synchronization feature ensures that the remote desktop's DPI setting matches the client system's DPI setting. For more information, see [Using DPI Synchronization](#).

Using DPI Synchronization

The DPI Synchronization feature ensures that the DPI setting in a remote desktop matches the client system's DPI setting.

The DPI Synchronization feature has the following requirements.

- The client system must support Retina Display.
- Full-resolution mode (**Connection > Resolution > Full Resolution**) must be selected in the remote desktop.
- If you use multiple monitors, the Retina Display must be the primary window in system preferences. You cannot have more than one display in full-screen mode.

If DPI synchronization is disabled, display scaling is used. The Display Scaling feature scales the remote desktop appropriately.

The **DPI Synchronization** agent group policy setting determines whether the DPI Synchronization feature is enabled. The feature is enabled by default. With DPI Synchronization, the DPI value in the remote session changes to match the DPI value of the client machine when you connect to a remote desktop. The DPI Synchronization feature requires Horizon Agent 7.0.2 or later.

If the **DPI Synchronization Per Connection** agent group policy setting is enabled in addition to the **DPI Synchronization** group policy setting, DPI Synchronization is supported when you reconnect to a remote desktop. This feature is disabled by default. The DPI Synchronization Per Connection feature requires Horizon Agent 7.8 or later.

For more information about the **DPI Synchronization** and **DPI Synchronization Per Connection** group policy settings, see the *Configuring Remote Desktop Features in Horizon 7* document.

For virtual desktops, the DPI Synchronization feature is supported on the following guest operating systems:

- 32-bit or 64-bit Windows 7
- 32-bit or 64-bit Windows 8.x

- 32-bit or 64-bit Windows 10
- Windows Server 2008 R2 configured as a desktop
- Windows Server 2012 R2 configured as a desktop
- Windows Server 2016 configured as a desktop
- Windows Server 2019 configured as a desktop

For published desktops, the DPI Synchronization feature is supported on the following RDS hosts:

- Windows Server 2012 R2
- Windows Server 2016
- Windows Server 2019

For virtual desktops, the DPI Synchronization Per Connection feature is supported on the following guest operating systems:

- Windows 10 version 1607 and later
- Windows Server 2016 and later configured as a desktop

The DPI Synchronization Per Connection feature is not supported for published applications.

Following are tips for using the DPI Synchronization feature.

- If you change the DPI setting on the client system, but the DPI setting does not change in the remote desktop, you might need to log out and log in again to make Horizon Client aware of the new DPI setting on the client system.
- If you start a remote session on a client system that has a DPI setting of more than 100 percent, and then use the same session on another client system that has a different DPI setting of more than 100 percent, you might need to log out and log back in to the remote session on the second client system to make DPI synchronization work on the second client system.
- If you connect to an active remote session in full-resolution mode, Horizon Client scales the resolution to be similar to when DPI Synchronization is enabled, but icons are not as clear. If you switch from normal to full-resolution mode in an active remote session, Horizon Client prompts you to log off from the remote session for the resolution change to take effect.
- If you use a non-Retina Display computer when you start a remote session, and then use a Retina Display computer to connect to the same session, the remote session cannot change to the new DPI setting until after you log off.
- If a Horizon administrator changes the **DPI Synchronization** group policy setting value for Horizon Agent, you must log out and log in again to make the new setting take effect.

Select Specific Monitors to Display a Remote Desktop

If you have multiple monitors, you can select the monitors on which to display a remote desktop window. For example, if you have three monitors, you can specify that the remote desktop window appears on only two of those monitors.

You can select up to four adjacent monitors.

Prerequisites

You must have two or more monitors.

Procedure

- 1 Start Horizon Client and connect to a server.
- 2 In the desktop and application selector window, right-click the remote desktop and select **Settings**.
- 3 From the **Connect Via** drop-down menu, select **PCoIP** or **VMware Blast**.
- 4 Select **Use Selective Displays** from the **Full Screen** drop-down menu.

Thumbnails of the monitors that are currently connected to the client system appear under Display Arrangement. The display topology matches the display settings on the client system.

- 5 To select or deselect a monitor on which to display the remote desktop window, click a thumbnail.

When you select a monitor, its thumbnail changes color. If you violate a display selection rule, a warning message appears.

- 6 Connect to the remote desktop.

Your changes are applied immediately when you connect to the remote desktop. The remote desktop enters full-screen mode on the displays that you selected.

Select Specific Monitors to Display Published Applications

You can select the monitors on which to display published application windows. For example, if you have three monitors, you can specify that published application windows appear on only two of those monitors.

You can select up to four adjacent monitors. The monitors can be side by side, or stacked vertically. For example, you might configure two rows of two monitors each.

Procedure

- 1 Start Horizon Client and connect to a server.
- 2 Click the **Settings** button (gear icon) in the upper-right corner of the desktop and application selection window.
- 3 Select **Applications** in the left pane of the Settings dialog box.
- 4 Click the **Display** tab.

Thumbnails of the monitors that are currently connected to the client system appear under Display Arrangement. The display topology matches the display settings on the client system.

- 5 To select or deselect a monitor on which to display published applications, click a thumbnail.

When you select a monitor, its thumbnail changes color. If you violate a display selection rule, a warning message appears.

Using Exclusive Mode

Exclusive mode is similar to full-screen mode in that the remote desktop fills the screen. With exclusive mode, unlike full-screen mode, the VMware Horizon Client menu bar and Dock do not appear when you move your pointer to the edges of the screen.

To enter exclusive mode, open a remote desktop in windowed mode, press and hold down the Option key, and select **Window > Enter Exclusive Mode**.

When a remote desktop is in windowed mode, you can also press Command-Control-Option-F to enter exclusive mode. To exit exclusive mode, press Command-Control-Option-F again.

Note If you do not press and hold down the Option key, the **Enter Full Screen** menu item appears instead of the **Enter Exclusive Mode** menu item. If the remote desktop is in full-screen mode, you cannot select the **Enter Exclusive Mode** menu item.

To use exclusive mode with two monitors, before you open the remote desktop, select **Use All Displays** from the Settings dialog box, and then open the desktop and enter exclusive mode. To use exclusive mode with a single monitor, before you open the remote desktop, select **Use Single Display** from the Settings dialog box, and then connect to the remote desktop and enter exclusive mode.

To open the Settings dialog box, click the **Settings** button (gear icon) in the upper-right corner of the desktop and application selection window, select the remote desktop, and select an option from the **Full Screen** drop-down menu.

Use USB Redirection to Connect USB Devices

With the USB redirection feature, you can use locally attached USB devices, such as thumb flash drives, in a remote desktop or published application.

When you use the USB redirection feature, most USB devices that are attached to the local client system become available from menus in Horizon Client. You use these menus to connect and disconnect the devices.

With View Agent 6.2.x and later, or Horizon Agent 7.0 and later, you can redirect locally connected USB thumb flash drives and hard disks for use in published desktops and applications. Beginning with Horizon Agent 7.0.2, published desktops and applications can also support more generic USB devices, including TOPAZ Signature Pad, Olympus Dictation Foot pedal, and Wacom signature pad. Other types of USB devices, including security storage drives and USB CD-ROM drives, are not supported in published desktops and applications.

If you use the client drive redirection feature to share a USB storage device or a folder on a USB storage device, you cannot use the USB redirection feature to redirect the device to a remote desktop or published application because the device is already shared.

You can connect USB devices to a remote desktop or published application either manually or automatically.

Prerequisites

- To use USB devices with a remote desktop or published application, a Horizon administrator must enable the USB redirection feature.

This task includes installing the USB Redirection component of Horizon Agent, and can include setting policies regarding USB redirection. For more information, see the *Configuring Remote Desktop Features in Horizon 7* document.

- The first time you attempt to connect a USB device, you must provide the Administrator password. Horizon Client prompts you for the password.

Some components required for USB redirection that Horizon Client installs must be configured, and configuration of these components requires Administrator privileges.

- Become familiar with [USB Redirection Limitations](#).

Procedure

- ◆ Manually connect the USB device to a remote desktop.
 - The first time you use the USB feature, from the VMware Horizon Client menu bar, click **Connection > USB > Start remote USB services** and provide the Administrator password when prompted.
 - Connect the USB device to the local client system.
 - From the VMware Horizon Client menu bar in the remote desktop, click **Connection > USB > Connect to a desktop to list USB devices**.
 - Connect to a remote desktop to list the connected USB devices and select a USB device.

The device is manually redirected from the local system to the remote desktop.

- ◆ Connect the USB device to a published application.
 - The first time you use the USB feature, from the VMware Horizon Client menu bar, click **Connection > USB > Start remote USB services** and provide the Administrator password when prompted.
 - Plug in the USB device.
 - Open the published application.
 - Click the **Settings** button (gear icon) in the upper-right corner of the desktop and application selection window.
 - Select **Applications** in the left pane of the Settings dialog box.
 - Click **USB** at the top of the right pane of the Settings dialog box.

The available USB devices appear in the left pane.

- Select a USB device and click **Connect Device**.

If a USB device is already connected to a remote desktop or application, you must disconnect the device from the desktop or application before you can select it.

- h Select a published application and click **Continue**.

You can select any running published application. After you select a published application, you can use the USB device with the published application.

- i After you finish using the published application, open the Settings dialog box again, select **USB**, and select **Disconnect** to release the USB device from the published application.

You can now use the USB device with your local client system, a remote desktop, or another published application.

- ◆ Configure Horizon Client to connect USB devices automatically to a remote desktop when you plug them in to the local system.

Use the autoconnect feature if you plan to connect devices that use MTP drivers, such as Android-based Samsung smart phones and tablets.

- a Before you plug in the USB device, start Horizon Client and connect to the remote desktop.
- b The first time you use the USB feature, from the VMware Horizon Client menu bar, click **Connection > USB > Start remote USB services** and provide the Administrator password when prompted.
- c From the VMware Horizon Client menu bar in the remote desktop, click **Connection > USB > Automatically connect when inserted**.
- d Plug in the USB device.

USB devices that you connect to your local system after you start Horizon Client are redirected to the remote desktop.

- ◆ Configure Horizon Client to connect USB devices automatically to a remote desktop when Horizon Client starts.
 - a The first time you use the USB feature, from the VMware Horizon Client menu bar in the remote desktop, click **Connection > USB > Start remote USB services** and provide the Administrator password when prompted.
 - b From the VMware Horizon Client menu bar in the remote desktop, click **Connection > USB > Automatically connect at startup**.
 - c Plug in the USB device and restart Horizon Client.

USB devices that are connected to the local client system when you start Horizon Client are redirected to the remote desktop.

The USB device appears in the remote desktop or published application. A USB device might take up to 20 seconds to appear in the remote desktop or published application. The first time you connect the device to a remote desktop you might be prompted to install drivers.

If the USB device does not appear in the remote desktop or published application after several minutes, disconnect and reconnect the device to the client computer.

What to do next

If you have problems with USB redirection, see the topic about troubleshooting USB redirection problems in the *Configuring Remote Desktop Features in Horizon 7* document.

USB Redirection Limitations

The USB redirection feature has certain limitations.

- When you access a USB device from a menu in Horizon Client and use the device in a remote desktop, you cannot access the device on the local computer.
- USB devices that do not appear in the menu, but are available in a remote desktop, include human interface devices such as keyboards and pointing devices. The remote desktop and the local computer use these devices at the same time. Interaction with these devices can sometimes be slow because of network latency.
- Large USB disk drives can take several minutes to appear in the remote desktop.
- Some USB devices require specific drivers. If a required driver is not already installed on a remote desktop, you might be prompted to install it when you connect the USB device to the remote desktop.
- If you plan to attach USB devices that use MTP drivers, such as Android-based Samsung smart phones and tablets, configure Horizon Client so that it automatically connects USB devices to the remote desktop. Otherwise, if you try to manually redirect the USB device by using a menu item, the device is not redirected unless you unplug the device and then plug it in again.
- Webcams are not supported for USB redirection.
- The redirection of USB audio devices depends on the state of the network and is not reliable. Some devices require a high data throughput even when they are idle. Audio input and output devices work well with the Real-Time Audio-Video feature. You do not need to use USB redirection for those devices.
- You cannot format a redirected USB drive in a published desktop unless you connect as an administrator user.

Note Do not redirect USB Ethernet devices to a remote desktop. The remote desktop can connect to the network if the local system is connected. If you have set the remote desktop to autoconnect USB devices, you can add an exception to exclude the Ethernet connection. See [Configuring USB Redirection on a Mac Client](#).

Configuring USB Redirection on a Mac Client

You can configure which USB devices are redirected to a remote desktop.

You can configure USB policies for View Agent or Horizon Agent on the remote desktop, and for Horizon Client on the Mac client system, to achieve the following goals.

- Restrict the types of USB devices that Horizon Client makes available for redirection.

- Make View Agent or Horizon Agent prevent certain USB devices from being forwarded from a client computer.
- Specify whether Horizon Client splits composite USB devices into separate components for redirection.

Composite USB devices consist of a combination of two or more devices, such as a video input device and a storage device.

Configuration settings on the client might be merged with or overridden by corresponding policies set for View Agent or Horizon Agent on the remote desktop. For information about how USB settings on the client work together with View Agent or Horizon Agent USB policies, see the topics about using policies to control USB redirection in the *Configuring Remote Desktop Features in Horizon 7* document.

Using Rules from a Previous Horizon Client Release

In previous Horizon Client releases, you had to use `sudo` to configure USB filtering and splitting rules. You can use the following procedure to move rules that use `sudo` to new rules that do not use `sudo`.

- 1 On the Mac client, open Terminal (/Applications/Utilities/Terminal.app) and run the following command:

```
sudo defaults export com.vmware.viewusb /tmp/usb.plist
```

- 2 Open a Terminal window (press command+N) and run the following command:

```
defaults import com.vmware.viewusb /tmp/usb.plist
```

- 3 In the first Terminal window, run the following command:

```
sudo rm -rf /tmp/usb.plist
```

- 4 Close both Terminal windows.

You can now use `defaults write com.vmware.viewusb property value` to update the rules.

Syntax for Configuring USB Redirection

You can configure filtering and splitting rules to include USB devices, or to exclude USB devices from being redirected. On a Mac client, you configure USB functionality by using Terminal (/Applications/Utilities/Terminal.app) and running a command as root.

- To list the rules:

```
# defaults read domain
```

For example:

```
# defaults read com.vmware.viewusb
```

- To remove a rule:

```
# defaults delete domain property
```

For example:

```
# defaults delete com.vmware.viewusb ExcludeVidPid
```

- To set or replace a filter rule:

```
# defaults write domain property value
```

For example:

```
# defaults write com.vmware.viewusb ExcludeVidPid vid-1234_pid-5678
```

Important Some configuration parameters require the VID (vendor ID) and PID (product ID) for a USB device. To find the VID and PID, you can search on the Internet for the product name combined with vid and pid. Alternatively, you can look in the USB Log file after you plug in the USB device to the Mac client when Horizon Client is running. For more information, see [Turn on Logging for USB Redirection](#).

- To set or replace a splitting rule for a composite device:

```
# defaults write domain property value
```

For example:

```
# defaults write com.vmware.viewusb AllowAutoDeviceSplitting true
# defaults write com.vmware.viewusb SplitExcludeVidPid vid-03f0_Pid-2a12
# defaults write com.vmware.viewusb SplitVidPid "'vid-0911_Pid-149a(exintf:03)'"
# defaults write com.vmware.viewusb IncludeVidPid vid-0911_Pid-149a
```

Composite USB devices consist of a combination of two or more devices, such as a video input device and a storage device. The first line in this example turns on automatic splitting of composite devices. The second line excludes the specified composite USB device (Vid-03f0_Pid-2a12) from splitting.

The third line instructs Horizon Client to treat the components of a different composite device (Vid-0911_Pid-149a) as separate devices, but to exclude the component that has interface number 03 from being redirected. This component is kept local.

Because this composite device includes a component that is ordinarily excluded by default, such as a mouse or keyboard, the fourth line is necessary so that the other components of the composite device Vid-0911_Pid-149a can be redirected to the remote desktop.

The first three properties are splitting properties. The last property is a filtering property. Filtering properties are processed before splitting properties.

Example: Excluding a USB Ethernet Device

You might want to exclude a USB Ethernet device from redirection. For example, if the Mac client uses a USB Ethernet device to connect the network for the Mac client to a remote desktop, and you redirect that USB Ethernet device, the Mac client loses its connection to both the network and the remote desktop.

To hide a device from the USB connection menu permanently, or if you have set the remote desktop to autoconnect USB devices, you can add an exception to exclude the Ethernet connection as follows.

```
defaults write com.vmware.viewusb ExcludeVidPid vid-xxxx_pid-yyyy
```

In this example, xxxx is the vendor ID and yyyy is the product ID of the USB Ethernet adapter.

USB Redirection Properties

When creating filtering rules, you can use the USB redirection properties.

Table 4-4. Configuration Properties for USB Redirection

Policy Name and Property	Description
Allow Auto Device Splitting Property: AllowAutoDeviceSplitting	Allow the automatic splitting of composite USB devices. The default value is undefined, which equates to false .
Exclude Vid/Pid Device From Split Property: SplitExcludeVidPid	Excludes a composite USB device specified by vendor and product IDs from splitting. The format of the setting is as follows: <pre>vid-xxx1_pid-yyy1[;vid-xxx2_pid-yyy2]...</pre> <p>You must specify ID numbers in hexadecimal. You can use the wildcard character (*) in place of individual digits in an ID. For example: vid-0781_pid-55**</p> <p>The default value is undefined.</p>
Split Vid/Pid Device Property: SplitVidPid	Treats the components of a composite USB device specified by vendor and product IDs as separate devices. The format of the setting is as follows: <pre>vid-xxxx_pid-yyyy([exintf:zz[;exintf:ww]])[;...]</pre> <p>You can use the exintf keyword to exclude components from redirection by specifying their interface number. You must specify ID numbers in hexadecimal, and interface numbers in decimal including any leading zero. You can use the wildcard character (*) in place of individual digits in an ID. For example: vid-0781_pid-554c(exintf:01;exintf:02)</p> <p>Note If the composite device includes components that are automatically excluded, such as mouse and keyboard components, then Horizon does not include the components that you have not explicitly excluded automatically. You must specify a filter policy such as Include Vid/Pid Device to include those components.</p> <p>The default value is undefined.</p>

Policy Name and Property	Description
Allow Audio Input Devices Property: AllowAudioIn	Allows audio input devices to be redirected. The default value is undefined, which equates to true .
Allow Audio Output Devices Property: AllowAudioOut	Allows audio output devices to be redirected. The default value is undefined, which equates to false .
Allow HID Property: AllowHID	Allows input devices other than keyboards or mice to be redirected. The default value is undefined, which equates to true .
Allow HIDBootable Property: AllowHIDBootable	Allows input devices other than keyboards or mice that are available at startup time (also known as hid-bootable devices) to be redirected. The default value is undefined, which equates to true .
Allow Device Descriptor Failsafe Property: AllowDevDescFailsafe	Allows devices to be redirected even if the Horizon Client fails to get the config/device descriptors. To allow a device even if it fails the config/desc, include it in the Include filters, such as IncludeVidPid or IncludePath. The default value is undefined, which equates to false .
Allow Keyboard and Mouse Devices Property: AllowKeyboardMouse	Allows keyboards with integrated pointing devices (such as a mouse, trackball, or touch pad) to be redirected. The default value is undefined, which equates to false .
Allow Smart Cards Property: AllowSmartcard	Allows smart-card devices to be redirected. The default value is undefined, which equates to false .
Allow Video Devices Property: AllowVideo	Allows video devices to be redirected. The default value is undefined, which equates to true .
Disable Remote Configuration Download Property: DisableRemoteConfig	Disables the use of View Agent or Horizon Agent settings when performing USB device filtering. The default value is undefined, which equates to false .
Exclude All Devices Property: ExcludeAllDevices	Excludes all USB devices from being redirected. If set to true , you can use other policy settings to allow specific devices or families of devices to be redirected. If set to false , you can use other policy settings to prevent specific devices or families of devices from being redirected. If you set the value of Exclude All Devices to true on View Agent or Horizon Agent, and this setting is passed to Horizon Client, the View Agent or Horizon Agent setting overrides the Horizon Client setting. The default value is undefined, which equates to false .

Policy Name and Property	Description
Exclude Device Family Property: ExcludeFamily	<p>Excludes families of devices from being redirected. The format of the setting is <i>family_name_1[;family_name_2]...</i></p> <p>For example: bluetooth;smart-card</p> <p>The default value is undefined.</p> <hr/> <p>Note If you have enabled automatic device splitting, Horizon examines the device family of each interface of a composite USB device to decide which interfaces to exclude. If you have disabled automatic device splitting, Horizon examines the device family of the whole composite USB device.</p>
Exclude Vid/Pid Device Property: ExcludeVidPid	<p>Excludes devices with specified vendor and product IDs from being redirected. The format of the setting is <i>vid-xxx1_pid-yyy2[;vid-xxx2_pid-yyy2]...</i></p> <p>You must specify ID numbers in hexadecimal. You can use the wildcard character (*) in place of individual digits in an ID.</p> <p>For example: vid-0781_pid-****;vid-0561_pid-554c</p> <p>The default value is undefined.</p>
Exclude Path Property: ExcludePath	<p>Exclude devices at specified hub or port paths from being redirected. The format of the setting is <i>bus-x1[/y1]..._port-z1[;bus-x2[/y2]..._port-z2]...</i></p> <p>You must specify bus and port numbers in hexadecimal. You cannot use the wildcard character in paths.</p> <p>For example: bus-1/2/3_port-02;bus-1/1/4_port-ff</p> <p>The default value is undefined.</p>
Include Device Family Property: IncludeFamily	<p>Includes families of devices that can be redirected. The format of the setting is <i>family_name_1[;family_name_2]...</i></p> <p>For example: storage</p> <p>The default value is undefined.</p>
Include Path Property: IncludePath	<p>Include devices at a specified hub or port paths that can be redirected. The format of the setting is <i>bus-x1[/y1]..._port-z1[;bus-x2[/y2]..._port-z2]...</i></p> <p>You must specify bus and port numbers in hexadecimal. You cannot use the wildcard character in paths.</p> <p>For example: bus-1/2_port-02;bus-1/7/1/4_port-0f</p> <p>The default value is undefined.</p>
Include Vid/Pid Device Property: IncludeVidPid	<p>Includes devices with specified vendor and product IDs that can be redirected. The format of the setting is <i>vid-xxx1_pid-yyy2[;vid-xxx2_pid-yyy2]...</i></p> <p>You must specify ID numbers in hexadecimal. You can use the wildcard character (*) in place of individual digits in an ID.</p> <p>For example: vid-0561_pid-554c</p> <p>The default value is undefined.</p>

USB Device Families

You can specify a USB device family when you create USB filtering rules for Horizon Client or for View Agent or Horizon Agent.

Note Some devices do not report a device family.

Table 4-5. USB Device Families

Device Family Name	Description
audio	Any audio-input or audio-output device.
audio-in	Audio-input devices such as microphones.
audio-out	Audio-output devices such as loudspeakers and headphones.
bluetooth	Bluetooth-connected devices.
comm	Communications devices such as modems and wired networking adapters.
hid	Human interface devices excluding keyboards and pointing devices.
hid-bootable	Human interface devices that are available at startup time, excluding keyboards and pointing devices.
imaging	Imaging devices such as scanners.
keyboard	Keyboard device.
mouse	Pointing device such as a mouse.
other	Family not specified.
pda	Personal digital assistants.
physical	Force feedback devices such as force feedback joysticks.
printer	Printing devices.
security	Security devices such as fingerprint readers.
smart-card	Smart-card devices.
storage	Mass storage devices such as flash drives and external hard disk drives.
unknown	Family not known.
vendor	Devices with vendor-specific functions.
video	Video-input devices.
wireless	Wireless networking adapters.
wusb	Wireless USB devices.

Turn on Logging for USB Redirection

You can use USB logs to troubleshoot and to determine the product ID and vendor ID of various devices that you plug in to the Mac client.

Procedure

- 1 On the Mac client, use a text editor to open the config file in the `~/Library/Preferences/VMware Fusion/` directory.

- 2 To set the log level for USB redirection, add the `view-usbd.logLevel` parameter to the config file.

For example:

```
#[or info, debug, error]. Info level by default.  
view-usbd.logLevel=trace
```

Using the Real-Time Audio-Video Feature for Webcams and Microphones

With the Real-Time Audio-Video feature, you can use the local client system's webcam or microphone in a remote desktop or published application. Real-Time Audio-Video is compatible with standard conferencing applications and browser-based video applications. It supports standard webcams, audio USB devices, and analog audio input.

For information about setting up the Real-Time Audio-Video feature and configuring the frame rate and image resolution on the agent machine, see the *Configuring Remote Desktop Features in Horizon 7* document. For information about configuring these settings on client systems, see the VMware knowledge base article *Setting Frame Rates and Resolution for Real-Time Audio-Video on Horizon View Clients*, at <http://kb.vmware.com/kb/2053644>.

To download a test application that verifies the correct installation and operation of the Real-Time Audio-Video functionality, go to <http://labs.vmware.com/flings/real-time-audio-video-test-application>. Because this test application is available as a VMware fling, technical support is not available.

When You Can Use a Webcam

If a Horizon administrator has configured the Real-Time Audio-Video feature, and if you use the VMware Blast display protocol or the PCoIP display protocol, you can use a webcam that is built in or connected to the local client computer in a remote desktop or published application. You can use the webcam in conferencing applications such as Skype, Webex, or Google Hangouts.

During the setup of an application such as Skype, Webex, or Google Hangouts on a remote desktop, you can select input and output devices from menus in the application. For virtual desktops, you can select VMware Virtual Microphone and VMware Virtual Webcam. For published desktops and applications, you can select Remote Audio Device and VMware Virtual Webcam.

For many applications, you do not need to select an input device.

When the local client computer uses the webcam, the remote session can use it at the same time. Also, if the remote session uses the webcam, the local client computer can use it at the same time.

Note If you use a USB webcam, do not connect it from the **Connection > USB** menu in Horizon Client. Doing so routes the device through USB redirection and the performance is not usable for video chat.

If more than one webcam is connected to the local client computer, you can configure a preferred webcam to use in remote sessions.

Select a Default Microphone on the Mac Client

If you have multiple microphones on the Mac client, the remote desktop uses only one microphone. You can use the System Preferences on the Mac client to specify the default microphone in the remote desktop.

With the Real-Time Audio-Video feature, audio input devices and audio output devices work without using USB redirection and the required network bandwidth is greatly reduced. Analog audio input devices are also supported.

This procedure describes how to select a microphone from the user interface of the Mac client. You can also configure a preferred microphone by using the Mac defaults system. See [Configure a Preferred Webcam or Microphone on a Mac Client](#).

Important When you use a USB microphone, do not connect it from the **Connection > USB** menu in Horizon Client. Doing so routes the device through USB redirection and the device cannot use the Real-Time Audio-Video feature.

Prerequisites

- Verify that you have a USB microphone, or another type of microphone, installed and operational on the Mac client.
- Use the VMware Blast display protocol or the PCoIP display protocol for the remote desktop.

Procedure

- 1 On the Mac client, select **Apple menu > System Preferences** and click **Sound**.
- 2 Open the Input pane of Sound preferences.
- 3 Select the microphone that you prefer to use.

The next time that you connect to a remote desktop and start a call, the remote desktop uses the default microphone that you selected on the Mac client.

Configuring Real-Time Audio-Video on a Mac Client

You can configure Real-Time Audio-Video settings at the command line by using the Mac defaults system. With the defaults system, you can read, write, and delete Mac user defaults by using Terminal (/Applications/Utilities/Terminal.app).

Mac defaults belong to domains, and domains typically correspond to individual applications. The domain for the Real-Time Audio-Video feature is com.vmware.rtav.

Syntax for Configuring Real-Time Audio-Video

You can use the following commands to configure the Real-Time Audio-Video feature.

Table 4-6. Command Syntax for Real-Time Audio-Video Configuration

Command	Description
<code>defaults write com.vmware.rtav srcWCamId "webcam-userid"</code>	Sets the preferred webcam to use on remote desktops. When this value is not set, the webcam is selected by system enumeration automatically. You can specify any webcam connected to (or built into) the client system.
<code>defaults write com.vmware.rtav srcAudioInId "audio-device-userid"</code>	Sets the preferred microphone (audio-in device) to use on remote desktops. When this value is not set, remote desktops use the default recording device set on the client system. You can specify any microphone connected to (or built into) the client system.
<code>defaults write com.vmware.rtav srcWCamFrameWidth <i>pixels</i></code>	Sets the image width. The value defaults to a hardcoded value of 320 pixels. You can change the image width to any pixel value.
<code>defaults write com.vmware.rtav srcWCamFrameHeight <i>pixels</i></code>	Sets the image height. The value defaults to a hardcoded value of 240 pixels. You can change the image height to any pixel value.
<code>defaults write com.vmware.rtav srcWCamFrameRate <i>fps</i></code>	Sets the frame rate. The value defaults to 15 fps. You can change the frame rate to any value.
<code>defaults write com.vmware.rtav LogLevel "<i>level</i>"</code>	Sets the logging level for the Real-Time Audio-Video log file (~/.Library/Logs/VMware/vmware-RTAV- <i>pid</i> .log). You can set the logging level to trace or debug.
<code>defaults write com.vmware.rtav IsDisabled <i>value</i></code>	Determines whether Real-Time Audio-Video is enabled or disabled. Real-Time Audio-Video is enabled by default. (This value is not in effect.) To disable Real-Time Audio-Video on the client, set the value to true.
<code>defaults read com.vmware.rtav</code>	Displays Real-Time Audio-Video configuration settings.
<code>defaults delete com.vmware.rtav <i>setting</i></code>	Deletes a Real-Time Audio-Video configuration setting, for example: <code>defaults delete com.vmware.rtav srcWCamFrameWidth</code>

Note You can adjust frame rates from 1 fps up to a maximum of 25 fps and resolution up to a maximum of 1920x1080. A high resolution at a fast frame rate might not be supported on all devices or in all environments.

Configure a Preferred Webcam or Microphone on a Mac Client

If you have multiple webcams or microphones on the Mac client, you can use only one webcam and one microphone in a remote desktop with the Real-Time Audio-Video feature. You specify the preferred webcam and microphone at the command line by using the Mac defaults system.

With the Real-Time Audio-Video feature, webcams, audio input devices, and audio output devices do not require USB redirection to work and the required network bandwidth is reduced. Analog audio input devices are also supported.

In most environments, you do not need to configure a preferred microphone or webcam. If you do not set a preferred microphone, remote desktops use the default audio device set in the client system's System Preferences. See [Select a Default Microphone on the Mac Client](#). If you do not configure a preferred webcam, the remote desktop selects the webcam by enumeration.

Prerequisites

- If you are configuring a preferred USB webcam, verify that the webcam is installed and operational on the client system.
- If you are configuring a preferred USB microphone or another type of microphone, verify that the microphone is installed and operational on the Mac client.
- Use the VMware Blast display protocol or the PCoIP display protocol for the remote desktop.

Procedure

- 1 On the Mac client, start a webcam or microphone application to trigger an enumeration of camera devices or audio devices to the Real-Time Audio-Video log file.
 - a Attach the webcam or audio device.
 - b In the **Applications** folder, double-click **VMware Horizon Client** to start Horizon Client.
 - c Start a call and then stop the call.

- 2 Find log entries for the webcam or microphone in the Real-Time Audio-Video log file.

- a In a text editor, open the Real-Time Audio-Video log file.

The Real-Time Audio-Video log file is named `~/Library/Logs/VMware/vmware-RTAV-pid.log`, where *pid* is the process ID of the current session.

- b Search the Real-Time Audio-Video log file for entries that identify the attached webcams or microphones.

The following example shows how webcam entries might appear in the Real-Time Audio-Video log file:

```
2013-12-16T12:18:17.404Z| vthread-3| I120: RTAV: static void VideoInputBase::LogDevEnum() - 1
Device(s) found
2013-12-16T12:18:17.404Z| vthread-3| I120: RTAV: static void VideoInputBase::LogDevEnum() -
Name=FaceTime HD Camera (Built-in)   UserId=FaceTime HD Camera (Built-in)#0xfa20000005ac8509
SystemId=0xfa20000005ac8509
```

The following example shows how microphone entries might appear in the Real-Time Audio-Video log file:

```
2013-12-16T12:18:17.404Z| vthread-3| I120: RTAV: int
AVCaptureEnumerateAudioDevices(MMDev::DeviceList&) -
2013-12-16T12:18:17.404Z| vthread-3| I120: RTAV: static void AudioCaptureBase::LogDevEnum() - 2
Device(s) found
2013-12-16T12:18:17.404Z| vthread-3| I120: RTAV: static void AudioCaptureBase::LogDevEnum() -
Index=255   Name=Built-in Microphone   UserId=Built-in
Microphone#AppleHDAEngineInput:1B,0,1,0:1   SystemId=AppleHDAEngineInput:1B,0,1,0:1
2013-12-16T12:18:17.404Z| vthread-3| I120: RTAV: static void AudioCaptureBase::LogDevEnum() -
Index=255   Name=Built-in Input   UserId=Built-in Input#AppleHDAEngineInput:1B,0,1,1:2
SystemId=AppleHDAEngineInput:1B,0,1,1:2
```


- 3 Find the webcam or microphone that you prefer in the Real-Time Audio-Video log file and make a note of its user ID.

The user ID appears after the string `UserId=` in the log file. For example, the user ID of the internal face time camera is `FaceTime HD Camera (Built-in)` and the user ID of the internal microphone is `Built-in Microphone`.

- 4 In Terminal (`/Applications/Utilities/Terminal.app`), use the `defaults write` command to set the preferred webcam or microphone.

Option	Action
Set the preferred webcam	<p>Type <code>defaults write com.vmware.rtav srcWCamId "<i>webcam-userid</i>"</code>, where <i>webcam-userid</i> is the user ID of the preferred webcam, which you obtained from the Real-Time Audio-Video log file. For example:</p> <pre>defaults write com.vmware.rtav srcWCamId "HD Webcam C525"</pre>
Set the preferred microphone	<p>Type <code>defaults write com.vmware.rtav srcAudioInId "<i>audio-device-userid</i>"</code>, where <i>audio-device-userid</i> is the user ID of the preferred microphone, which you obtained from the Real-Time Audio-Video log file. For example:</p> <pre>defaults write com.vmware.rtav srcAudioInId "Built-in Microphone"</pre>

- 5 (Optional) Use the `defaults read` command to verify your changes to the Real-Time Audio-Video feature.

For example: `defaults read com.vmware.rtav`

The command lists all the Real-Time Audio-Video settings.

The next time you connect to a remote desktop and start a new call, the remote desktop uses the preferred webcam or microphone that you configured, if it is available. If the preferred webcam or microphone is not available, the remote desktop can use another available webcam or microphone.

Allowing Access to Webcams and Microphones

When you first use a webcam or microphone in a remote session on a macOS Mojave (10.14) client system, you are prompted to grant access to the system's camera and microphone features.

If you do not grant access at that time, you can grant access later by going to System Preferences, selecting **Security & Privacy**, clicking the **Privacy** tab, and selecting **Camera** or **Microphone**.

Using the Session Collaboration Feature

You can use the Session Collaboration feature to invite other users to join an existing remote desktop session.

Invite a User to Join a Remote Desktop Session

When the Session Collaboration feature is enabled for a remote desktop, you can invite other users to join an existing remote desktop session.

By default, you can send Session Collaboration invitations by email, in an instant message (Windows remote desktops only), or by copying a link to the clipboard and forwarding the link to users. To use the email invitation method, an email application must be installed. To use the IM invitation method for a Windows remote desktop, Skype for Business must be installed and configured. You can invite only users that belong to a domain that the server allows for authentication. You can invite up to five users by default.

The Session Collaboration feature has the following limitations.

- If you have multiple monitors, only the primary monitor is shown to session collaborators.
- You must select the VMware Blast display protocol when you create a remote desktop session. The Session Collaboration feature does not support PCoIP or RDP sessions.
- H.264 hardware encoding is not supported. If the session owner is using hardware encoding and a collaborator joins the session, both fall back to software encoding.
- Anonymous collaboration is not supported. Session collaborators must be identifiable through Horizon-supported authentication mechanisms.
- Session collaborators must have Horizon Client 4.7 or later for Windows, Mac, or Linux installed, or they must use HTML Access 4.7 or later.
- If a session collaborator has an unsupported version of Horizon Client, an error message appears when the user clicks a collaboration link.
- You cannot use the Session Collaboration feature to share published application sessions.

Prerequisites

To invite users to join a remote desktop session, a Horizon administrator must enable the Session Collaboration feature.

For Windows desktops, this task includes enabling the Session Collaboration feature at the desktop pool or farm level. It can also include using group policies to configure Session Collaboration features, such as the available invitation methods. For complete requirements, see [Requirements for the Session Collaboration Feature](#).

For information about enabling the Session Collaboration feature for Windows desktops, see the *Setting Up Virtual Desktops in Horizon 7* document. For information about enabling the Session Collaboration feature for a farm, see the *Setting Up Published Desktops and Applications in Horizon 7* document. For information about using group policy settings to configure the Session Collaboration feature, see the *Configuring Remote Desktop Features in Horizon 7* document.

For information about enabling the Session Collaboration feature for Linux desktops, see the *Setting Up Horizon 7 for Linux Desktops* document.

Procedure

- 1 Connect to a remote desktop for which the Session Collaboration feature is enabled.

You must use the VMware Blast display protocol.

- 2 In the system tray in the remote desktop, click the **VMware Horizon Collaboration** icon, for example,



The collaboration icon might look different, depending on the operating system version.

- 3 When the VMware Horizon Collaboration dialog box opens, enter the user name (for example, **testuser** or **domain\testuser**) or the email address of the user that you want to join the remote desktop session.

The first time you enter the user name or email address of a particular user, you must click **Look up "user"**, enter a comma (,), or press the **Enter** key to validate the user. For Windows remote desktops, the Session Collaboration feature remembers the user the next time you enter the user's user name or email address.

You can invite up to five users by default. A Horizon administrator can change the maximum number of users that you can invite.

- 4 Select an invitation method.

Not all invitation methods might be available.

Option	Action
Email	Copies the collaboration invitation to the clipboard and opens a new email message in the default email application. An email application must be installed to use this invitation method.
IM	(Windows remote desktops only) Copies the collaboration invitation to the clipboard and opens a new window in Skype for Business. Press Ctrl+V to paste the link into the Skype for Business window. Skype for Business must be installed and configured to use this invitation method.
Copy Link	Copies the collaboration invitation to the clipboard. You must manually open another application, such as Notepad, and press Ctrl+V to paste the invitation.

After you send an invitation, the VMware Horizon Collaboration icon also appears on the desktop and the Session Collaboration user interface turns into a dashboard that shows the current state of the collaboration session and enables you to take certain actions.

When a session collaborator accepts your invitation to join a Windows remote desktop session, the Session Collaboration feature notifies you and a red dot appears on the VMware Horizon Collaboration icon in the system tray. When a session collaborator accepts your invitation to join a Linux remote desktop session, a notification appears in the primary session desktop.

What to do next

Manage the collaborative session in the VMware Horizon Collaboration dialog box. See [Manage a Collaborative Session](#).

Manage a Collaborative Session

After you send a session collaboration invitation, the Session Collaboration user interface turns into a dashboard that shows the current state of the collaborative session and enables you to take certain actions.

A Horizon administrator can prevent the hand off of control to a session collaborator. For Windows remote desktops, see the **Allow control passing to collaborators** group policy setting in the *Configuring Remote Desktop Features in Horizon 7* document. For Linux remote desktops, see the `collaboration.enableControlPassing` parameter in the *Setting Up Horizon 7 for Linux Desktops* document.

Prerequisites

Start a collaborative session. See [Invite a User to Join a Remote Desktop Session](#).

Procedure

- 1 In the remote desktop, click the **VMware Horizon Collaboration** icon in the system tray.
The names of all session collaborators appear in the Name column and their status appears in the Status column.
- 2 Use the VMware Horizon Session Collaboration dashboard to manage the collaborative session.

Option	Action
Revoke an invitation or remove a collaborator	Click Remove in the Status column.
Hand off control to a session collaborator	<p>After the session collaborator joins the session, toggle the switch in the Control column to On.</p> <p>To resume control of the session, double-click or press any key. The session collaborator can also give back control by toggling the switch in the Control column to Off, or by clicking the Give Back Control button.</p>
Add a collaborator	Click Add Collaborators .
End the collaborative session	<p>Click End Collaboration. All active collaborators are disconnected.</p> <p>In Windows remote desktops, you can also end the collaborative session by clicking the Stop button next to the VMware Horizon Session Collaboration icon. The Stop button is not available in Linux remote desktops.</p>

Join a Collaborative Session

To join a collaborative session, you can click the link in a collaboration invitation. The link might be in an email or instant message, or in a document that the session owner forwards to you. Alternatively, you can log in to the server and double-click the icon for the collaborative session in the remote desktop and application selector window.

This procedure describes how to join a collaborative session from a collaboration invitation.

Note In a Cloud Pod Architecture environment, you cannot join a collaborative session by logging in to the server unless you log in to the session owner's pod.

You cannot use the following remote desktop features in a collaborative session.

- USB redirection
- Real-Time Audio-Video (RTAV)
- Multimedia redirection
- Client drive redirection
- Smart card redirection
- Virtual Printing
- Microsoft Lync redirection
- File redirection and Keep in Dock functionality
- Clipboard redirection

You cannot change the remote desktop resolution in a collaborative session.

Prerequisites

To join a collaborative session, you must have Horizon Client 4.7 for Windows, Mac, or Linux installed on the client system, or you must use HTML Access 4.7 or later.

Procedure

- 1 Click the link in the collaboration invitation.
Horizon Client opens on the client system.
- 2 Enter your credentials to log in to Horizon Client.
After you are successfully authenticated, the collaborative session begins and you can see the session owner's remote desktop. If the session owner transfers mouse and keyboard control to you, you can use the remote desktop.
- 3 To return mouse and keyboard control to the session owner, click the **VMware Horizon Collaboration** icon in the system tray and toggle the switch in the Control column to **Off**, or click the **Give Back Control** button.
- 4 To leave the collaborative session, click **Options > Disconnect**.

Copying and Pasting Text and Images

By default, you can copy and paste from the client system to a remote desktop or published application. You can also copy and paste from a remote desktop or published application to the client system, or

between two remote desktops or published applications, if a Horizon administrator enables these features.

You can copy and paste text and images, including Rich Text Format (RTF).

For example, to copy text on the client system, select the text and press Command-C. To paste the text into a remote desktop, press Command-V in the remote desktop.

A Horizon administrator configures the ability to copy and paste by setting agent group policies. Depending on the Horizon server and agent version, a Horizon administrator might also be able to use group policies to restrict clipboard formats during copy and paste operations, or use Smart Policies to control the copy and paste behavior in remote desktops. For more information, see the *Configuring Remote Desktop Features in Horizon 7* document.

The copy and paste feature has the following limitations.

- You cannot copy and paste files between a remote desktop and the file system on the local client computer.
- If you are copying formatted text, some of the data is text and some of the data is formatting information. If you copy a large amount of formatted text or text and an image, when you attempt to paste the text and image, you might see some or all the plain text, but no formatting or image. This problem occurs because the three types of data are sometimes stored separately. For example, depending on the type of document, images might be stored as images or as RTF data.
- If the text and RTF data together use less than the maximum clipboard size, the formatted text is pasted. Often, the RTF data cannot be truncated, so that if the text and formatting use more than the maximum clipboard size amount, the RTF data is discarded, and the plain text is pasted.
- If you are unable to paste all the formatted text and images that you selected in one operation, you might need to copy and paste smaller amounts in each operation.

Configuring the Client Clipboard Memory Size

You can configure the client clipboard memory size by creating a file named `config` in the `%HomeDir%/Library/Preferences/VMware Horizon View/` directory on the Mac client.

To set the client clipboard memory size, add the following parameter to the `config` file.

```
mksvchan.clipboardSize=value
```

value is the client clipboard memory size in kilobytes. You can specify a minimum value of 512 kilobytes and a maximum value of 16384 kilobytes. If you specify 0, or do not specify a value, the default client clipboard memory size is 8192 kilobytes (8 MB).

A large clipboard memory size can negatively affect performance, depending on your network. Do not set the clipboard memory size to a value greater than 16 MB.

Logging Copy and Paste Activity

When you enable the clipboard audit feature, Horizon Agent records information about copy and paste activity in an event log on the agent machine. The clipboard audit feature is disabled by default.

To enable the clipboard audit feature, you must configure the **Configure clipboard audit** group policy setting for VMware Blast or PCoIP.

You can optionally configure the **Whether block clipboard redirection to client side when client doesn't support audit** group policy setting for VMware Blast or PCoIP to specify whether to block clipboard redirection to clients that do not support the clipboard audit feature.

For information about configuring these group policy settings, see the "VMware Blast Policy Settings" and "PCoIP Clipboard Settings" topics in the *Configuring Remote Desktop Features in Horizon 7* document.

The event log where information about copy and paste activity is recorded is named VMware Horizon RX Audit. To view the event log on the agent machine, use the Windows event viewer. To view the event log from a centralized location, configure VMware Log Insight or Windows Event Collector. For information about Log Insight, go to <https://docs.vmware.com/en/vRealize-Log-Insight/index.html>. For information about Windows Event Collector, see the Microsoft documentation.

Dragging and Dropping

The drag and drop feature works differently depending on the Horizon Agent version and how it is configured.

With Horizon Agent 7.9 and later, you can drag and drop files, folders, text, rich text, and images between the client system and remote desktops and published applications. With earlier Horizon Agent versions, you can drag and drop text, rich text, and images from the client system to a remote desktop through clipboard redirection, and you can drag and drop files from the client system to a published application through file association.

Depending on the Horizon Agent version, a Horizon administrator can use certain group policy settings or Smart Policies to configure drag and drop behavior. For complete information about configuring the drag and drop feature, see the *Configuring Remote Desktop Features in Horizon 7* document for your Horizon 7 version.

Dragging Text and Images

You can drag text and images from the client system to an open application in a remote desktop or a published application. For example, you can drag text from a browser on the client system and drop it into the WordPad application in a remote desktop. Depending on how the drag and drop feature is configured, you might also be able to drag text and images from an open application in a remote desktop or a published application to the client system.

The following data formats are supported.

- Plain Text (NSPasteboardTypeString)
- Rich Text (NSPasteboardTypeRTF)
- Image (kUTTypeImage)

A Horizon administrator can configure drag and drop behavior by configuring group policy settings. The settings to configure depend on the Horizon Agent version. For complete information, see the *Configuring Remote Desktop Features in Horizon 7* document for your Horizon 7 version.

Dragging Files and Folders

With Horizon Agent 7.9 and later, you can drag and drop files and folders between the Mac client system and remote desktops and published applications. You can drag and drop multiple files and folders at the same time. A progress bar shows the status of the drag and drop operation.

If you drag a file or folder between the client system and a remote desktop, the file or folder appears in the file system on the target system. If you drag a file and drop it into an open application, such as Notepad, the text appears in the application. If you drag a file into a new email message, the file becomes an attachment to the email message.

By default, dragging and dropping from the client system to remote desktops and published applications is enabled, and dragging and dropping from remote desktops and published applications to the client system is disabled. A Horizon administrator can control the drag and drop direction by configuring group policy settings.

Dragging and dropping files and folders requires that the client drive redirection feature is enabled in Horizon Agent by selecting the **Client Drive Redirection** option during Horizon Agent installation. For complete information about configuring the drag and drop feature, including feature requirements, see the *Configuring Remote Desktop Features in Horizon 7* document for your Horizon 7 version.

Tips for Using the Drag and Drop Feature

When using the drag and drop feature, follow these tips.

Note Depending on the Horizon Agent version, some tips might not apply to your environment.

- You must use the VMware Blast or PCoIP display protocol.
- When a drag and drop operation is in progress, you cannot start a new drag and drop operation until after the first drag and drop operation has finished.
- You cannot drag and drop between remote desktops.
- You cannot drag and drop between published applications from different farms.
- If you drag and drop a file or folder between the client system and a remote desktop, the file or folder appears in the file system on the target system. If you drag a file and drop it into an open application, such as Notepad, the text appears in the application. If you drag a file into a new email message, the file becomes an attachment to the email message.
- You can drag and drop multiple files and folders at the same time. A progress bar shows the status of the drag and drop operation.
- By default, dragging and dropping from the client system to remote desktops and published applications is enabled, and dragging and dropping from remote desktops and published applications to the client system is disabled.
- When you drag a file from the client system and drop it into a published application, you cannot click **Save as** to copy the file back to a different file on the client system. You can click **Save** to copy the file back to the same file on the client system.

- If you drag a file from the client system to an application in a remote desktop, the file is copied to the remote desktop and you can only edit the copy of the file.
- If you are dragging formatted text, some of the data is text and some of the data is formatting information. If you drag a large amount of formatted text, or text and an image, when you attempt to drop the text and image, you might see some or all the plain text, but no formatting or image. This problem occurs because the three types of data are sometimes stored separately. For example, depending on the type of document, images might be stored as images or as RTF data.
- If you are dragging both plain text and RTF data, and the total data size is less than the drag and drop size threshold, the formatted text is copied. Because RTF data cannot be truncated, if the total data size is greater than the drag and drop size threshold, the RTF data is discarded and only the plain text (or part of the plain text) is copied.
- If you are unable to drag all the formatted text and images in one operation, you might need to drag smaller amounts in each operation.

Using Published Applications

You can use many Mac functions with published applications.

- When you run a published application, its icon appears in the Dock. You can maximize a minimized published application by clicking its icon in the Dock.
- You can keep, open, and quit a published application from its context menu in the Dock. If you select **Keep in Dock**, the published application icon remains in the Dock, even after you close all application windows.
- You can open a published application by clicking its icon in the Dock.
- You can open local files in published applications and run published applications from the Applications folder on the client system. To enable these features, see [Share Access to Local Folders and Drives with Client Drive Redirection](#).
- Flashing Windows taskbar items are forwarded to Horizon Client. For example, if the published application is an IM client and you receive a new message, a flashing red dot appears on the IM client icon in the Dock.
- You can start voice dictation, minimize, and zoom a published application from the menu bar.
- You can use the Exposé feature to see open published applications, and you can press Command-Tab to switch between open published applications.
- You can use standard Mac keyboard shortcuts to interact with published applications. For example, you can press Command-W to close an individual application window and Command-S to save the current file. You can also use standard Mac keyboard shortcuts to copy, cut, and paste text between applications on the Mac and published applications. You can customize keyboard shortcut mappings. See [Create Keyboard Shortcut Mappings](#).

- If a published application creates a Windows System Tray item, that item appears in the notification area on the menu bar on the Mac client system. You can interact with this item from the notification area on the Mac in the same way that you interact with it from the System Tray on a Windows system.

Note When you reclick a redirected System Tray item in the notification area on the Mac, the context menu does not disappear.

Saving Documents in a Published Application

With certain published applications, such as Microsoft Word or WordPad, you can create and save documents. Where these documents are saved depends on your company's network environment. For example, your documents might be saved to a home share mounted on your local computer.

A Horizon administrator can use the RDS Profiles group policy setting called **Set Remote Desktop Services User Home Directory** to specify where documents are saved. For more information, see the *Configuring Remote Desktop Features in Horizon 7* document.

Enable Multi-Session Mode for Published Applications

When multi-session mode is enabled for a published application, you can use multiple sessions of the same published application when you log on to the server from different client devices.

For example, if you open a published application in multi-session mode on client A, and then open the same published application on client B, the published application remains open on client A and a new session of the published application opens on client B. By comparison, when multi-session mode is disabled (single-session mode), the published application session on client A disconnects and reconnects on client B.

The multi-session mode feature has the following limitations.

- Multi-session mode does not work for applications that do not support multiple instances, such as Skype for Business.
- If the application session is disconnected while you are using a published application in multi-session mode, you are logged off automatically and any unsaved data is lost.
- If the Mac client system goes to sleep while you are connected to a published application in multi-session mode, the published application session is not resumed.
- You cannot use the same published application in both single-session mode and multi-session mode. For example, if you are using a published application in single-session mode, you must quit the application before you can change it to multi-session mode.

Prerequisites

A Horizon administrator must enable multi-session mode for the application pool. Users cannot modify the multi-session mode for a published application unless a Horizon administrator allows it. See *Setting Up Published Desktops and Applications in Horizon 7*. This feature requires Horizon 7 version 7.7 or later.

Procedure

- 1 Connect to a server.
- 2 Click the **Settings** button (gear icon) in the upper-right corner of the desktop and application selector window and select **Multi-Launch**.

If no published applications are available to use in multi-session mode, the **Multi-Launch** setting does not appear.

- 3 Select the published applications that you want to use in multi-session mode.

If a Horizon administrator has enforced multi-session mode for a published application, you cannot change this setting.

Run Published Applications from the Applications Folder

You can configure Horizon Client so that published applications appear in the Applications folder on the client system.

If a Horizon administrator has configured one or more category folders for a published application, you can optionally configure Horizon Client to show the published application in those folders in the Applications folder on the client system.

For information about configuring shortcuts and category folders for published applications, see the *Setting Up Published Desktops and Applications in Horizon 7* document.

Prerequisites

Connect to a server.

Procedure

- 1 Click the **Settings** button (gear icon) in the upper-right corner of the desktop and application selector window and select **Applications** in the left pane.
- 2 To turn on the ability to run published applications from the Applications folder on the client system, select **Run hosted applications from your local Applications folder**.
- 3 (Optional) To show the category folders that are configured for published applications in the Applications folder, select **Allow automatic shortcuts from the server**.

Use a Local IME with Published Applications

If you use non-English keyboards and locales, you can use an IME (input method editor) that is installed in the local client system to send non-English characters to a published application.

You can use the **Input** menu in the menu bar on the Mac or keyboard shortcuts to switch to a different IME. You do not need to install an IME on the server that hosts the published application.

Note On a Mac, an IME is called an input source.

When this feature is enabled, the local IME is used. If an IME is installed and configured on the server that hosts the published application, that remote IME is ignored.

Prerequisites

- Verify that one or more IMEs are installed in the client system.

Procedure

- 1 In the Horizon Client desktop and application selection window, Control-click a published application and select **Settings**.
- 2 In the Remote Applications pane, select the **Extend the local IME to hosted applications** check box.
- 3 Use the local IME as you might use it with locally installed applications.

The **Input** menu appears in the menu bar on the Mac client. When you use a published application, you can switch to a different language or IME by using the **Input** menu or keyboard shortcuts. Key combinations that perform certain actions, such as Command-C to copy and Command-V to paste, work correctly.

Using a Touch Bar with Remote Desktops and Published Applications

You can use a Touch Bar to interact with remote desktops and published applications. This feature requires macOS Sierra (10.12) or later.

After you connect to a remote desktop, you can use icons on the Touch Bar to perform the following tasks.

- Disconnect, log out, restart or reset, and send Ctrl+Alt+Delete to the remote desktop.
- Enter or exit full-screen mode.
- Bring the desktop and application selection window to the foreground.
- View a list of all the currently open remote desktops and published applications.
- Switch to another open remote desktop or published application.

You can add, remove, and reorder the items in the Horizon Client app Touch Bar by selecting **VMware Horizon Client > Customize Touch Bar**.

Note The log out, reset, and restart features are available only if a Horizon administrator has enabled them. If the remote desktop is in exclusive mode, you cannot use the Touch Bar to enter or exit full-screen mode or bring the desktop and application selection window to the foreground.

After you connect to a published application, the following icons appear on the Touch Bar.



From left to right, you can use these icons to perform the following tasks:

- Display a list of function keys.
- View the list of open windows for the current published application. You can click a window title to switch to that window.
- Zoom (toggles between maximize and restore).
- Hide all windows of the current published application.
- Minimize the current published application window.
- Bring the application selection window to the foreground.
- View a list of all currently open remote desktops and published applications. You can click the remote desktop or published application to bring it to the foreground.

Printing From a Remote Desktop or Published Application

You can print to a network printer or a locally attached printer from a remote desktop or published application.

You can use the Virtual Printing feature or the VMware Integrated Printing feature, depending on which feature is enabled in Horizon Agent.

For information about the types of remote desktops that support Virtual Printing and VMware Integrated Printing, see [Feature Support Matrix for Mac Clients](#).

Enabling Virtual Printing in Horizon Client

When you use the VMware Blast display protocol or the PCoIP display protocol, you can use printers configured for the Mac client from a remote desktop or published application. You do not need to install printer drivers on a remote desktop to use the virtual printing feature.

Note You do not need to enable the VMware Integrated Printing feature. This feature is enabled by default.

You typically enable Virtual Printing the first time you start Horizon Client. Click **Continue** when Horizon Client prompts you to start remote desktop USB and printing services and type your system credentials.

If you do not enable Virtual Printing the first time you start Horizon Client, you can use the **Connection** menu to enable Virtual Printing.

- To enable Virtual Printing before you connect to a remote desktop or published application, select **VMware Horizon Client > Connection > Start Printing Services**. Click **Continue** and type your system credentials.

- To enable Virtual Printing after you connect to a remote desktop or published application, select **VMware Horizon Client > Connection > Start Printing Services**. Click **Continue**, type your system credentials, and reconnect to the remote desktop or published application. If you cancel the reconnection, you can select **Connection > Enable Printing** and Horizon Client prompts you to reconnect again.

When the Virtual Printing feature is enabled, the **Connection** menu displays **Printing Enabled**.

Note If you install Horizon Client on a Mac on which VMware Fusion was previously started, printing services are already enabled when you start Horizon Client. This behavior occurs because VMware Fusion and Horizon Client use some of the same files to implement Virtual Printing.

Set Printing Preferences for the Virtual Printing Feature

You can set printing preferences in a remote desktop for the Virtual Printing feature. With the Virtual Printing feature, you can use network or locally attached printers from a remote desktop without having to install additional printer drivers in the remote desktop. For each printer available through this feature, you can set preferences for data compression, print quality, double-sided printing, color, and other settings.

After a printer is added on the local client computer, Horizon Client adds that printer to the list of available printers in the remote desktop. No further configuration is required. If you have administrator privileges, you can install printer drivers on the remote desktop without creating a conflict with the Virtual Printing component.

Changes to printing preferences are not persistent. Printing preferences revert to the default settings the next time a user connects to a remote desktop.

Important This feature is not available for the following types of printers.

- USB printers that use the USB redirection feature to connect to a virtual USB port in the remote desktop.

You must disconnect the USB printer from the remote desktop to use the Virtual Printing feature with it.

- The Windows feature for printing to a file.

Selecting the **Print to file** check box in a Print dialog box does not work. Using a printer driver that creates a file does work. For example, you can use a PDF writer to print to a PDF file.

Prerequisites

To use Virtual Printing, a Horizon administrator must enable the Virtual Printing feature in the remote desktop. This task involves enabling the **Virtual Printing** setup option in the agent installer, and can include setting policies that control Virtual Printing behavior. For information about installing Horizon Agent, see the *Setting Up Virtual Desktops in Horizon 7* or *Setting Up Published Desktops and Applications in Horizon 7* document. For information about configuring policies, see the *Configuring Remote Desktop Features in Horizon 7* document.

To determine whether the Virtual Printing feature is installed in a remote desktop, verify that the C:\Program Files\Common Files\ThinPrint folder exists in the remote desktop file system.

Procedure

- 1 In the Windows remote desktop, go to **Control Panel > Hardware and Sound > Devices and Printers**.
- 2 In the **Devices and Printers** window, right-click the virtual printer and select **Printer properties** from the context menu.

In a single-user virtual machine desktop, each virtual printer appears as <printer_name>. In a published desktop, Each virtual printer appears as <printer_name>(s<session_ID>).

- 3 On the **General** tab, click **Preferences**.
- 4 In the Printing Preferences dialog box, select the different tabs and specify which settings to use.
- 5 To save your changes, click **OK**.

Set Printing Preferences for the VMware Integrated Printing Feature

You can set printing preferences in a remote desktop for the VMware Integrated Printing feature. With the VMware Integrated Printing feature, you can use local or network printers from a remote desktop without having to install additional printer drivers in the Windows remote desktop. For each printer available through this feature, you can set preferences for data compression, print quality, double-sided printing, color, and other settings.

Prerequisites

To use VMware Integrated Printing, a Horizon administrator must enable the VMware Integrated Printing feature in the remote desktop. This task involves enabling the **VMware Integrated Printing** option in the Horizon Agent installer and setting policies that control virtual printing behavior. For information about installing Horizon Agent, see the *Setting Up Virtual Desktops in Horizon 7* or *Setting Up Published Desktops and Applications in Horizon 7* document. For information about configuring policies, see the *Configuring Remote Desktop Features in Horizon 7* document.

To determine whether the VMware Integrated Printing feature is installed in a remote desktop, verify that the C:\Program Files\Common Files\VMware\Remote Experience\x64\vmware-print-redir-server.exe and C:\Program Files\Common Files\VMware\Remote Experience\x64\vmware-print-redir-service.exe files exist in the remote desktop file system.

This feature requires Horizon Agent 7.9 or later.

Procedure

- 1 In the Windows remote desktop, go to **Control Panel > Hardware and Sound > Devices and Printers**.

- 2 In the **Devices and Printers** window, right-click the virtual printer and select **Printer properties** from the context menu.

In a single-user virtual machine desktop, each virtual printer appears as `<printer_name>(vdi)`. In a published desktop or published application, each virtual printer appears as `<printer_name>(v<session_ID>)`.

- 3 On the **General** tab, click **Preferences**.
- 4 In the Printing Preferences dialog box, select the different tabs and specify which settings to use.
- 5 To save your changes, click **OK**.

Using USB Printers

A USB printer is a printer that is attached to a USB port on the local client system. You can send print jobs to a USB printer attached to the local client system from a remote desktop.

- You can use the USB redirection feature to attach a USB printer to a virtual USB port in the remote desktop, but only if the required drivers are also installed on the remote desktop.

If you use the USB redirection feature, the printer is no longer logically attached to the physical USB port on the client, and it does not appear in the list of local printers on the local client machine. You can print to the USB printer from the remote desktop, but you cannot print to the USB printer from the local client machine. In the remote desktop, redirected USB printers appear as `<printer_name>`.

For information about how to connect a USB printer, see [Use USB Redirection to Connect USB Devices](#).

- You can alternatively use the Virtual Printing feature or the VMware Integrated Printing feature to send print jobs to a USB printer. You can print to the USB printer from both the remote desktop and the client system, and you do not need to install printer drivers in the remote desktop.

Virtual printers and redirected USB printers can work together without conflict.

PCoIP Client-Side Image Cache

PCoIP client-side image caching stores image content on the client to avoid retransmitting data. This feature reduces bandwidth use.

The PCoIP image cache captures spatial and temporal redundancy. For example, when you scroll through a PDF document, new content appears from the bottom of the window and the oldest content disappears from the top of the window. The remaining content is constant and moves upward. The PCoIP image cache can detect this spatial and temporal redundancy.

During scrolling, because the display information sent to the client is primarily a sequence of cache indexes, using the image cache saves a significant amount of bandwidth. This efficient scrolling has benefits both on the LAN and over the WAN.

- On the LAN, where the bandwidth is relatively unconstrained, using client-side image caching delivers significant bandwidth savings.

- Over the WAN, to stay within the available bandwidth constraints, scrolling performance is degraded without client-side caching. Over the WAN, client-side caching saves bandwidth and ensures a smooth, highly responsive scrolling experience.

With client-side caching, the client stores portions of the display that were previously transmitted. The cache size is 250 MB.

Troubleshooting Horizon Client

You can solve most problems with Horizon Client by restarting or resetting remote desktops or published applications, or by reinstalling Horizon Client.

This chapter includes the following topics:

- [Restart a Remote Desktop](#)
- [Reset Remote Desktops or Published Applications](#)
- [Uninstalling Horizon Client](#)
- [Connecting to a Server in Workspace ONE Mode](#)
- [Collecting Support Data](#)

Restart a Remote Desktop

If the remote desktop operating system stops responding, you might need to restart a remote desktop. Restarting a remote desktop is similar to using the Windows operating system restart command. The remote desktop operating system usually prompts you to save any unsaved data before it restarts.

You can restart a remote desktop only if a Horizon administrator has enabled the restart feature for the remote desktop.

For information about enabling the desktop restart feature, see the *Setting Up Virtual Desktops in Horizon 7* or *Setting Up Published Desktops and Applications in Horizon 7* document.

Procedure

- ◆ In the desktop and application selection window, select the remote desktop shortcut, press Control-click, and select **Restart** from the context menu.

The operating system in the remote desktop restarts and Horizon Client disconnects and logs off from the remote desktop.

What to do next

Wait an appropriate amount of time for the system to restart before you attempt to reconnect to the remote desktop.

If restarting the remote desktop does not solve the problem, you might need to reset the remote desktop. See [Reset Remote Desktops or Published Applications](#).

Reset Remote Desktops or Published Applications

You might need to reset a remote desktop if the desktop operating system stops responding and restarting the remote desktop does not solve the problem.

Resetting a remote desktop is the same as pressing the Reset button on a physical PC to force the PC to restart. Any files that are open on the remote desktop are closed and are not saved.

Resetting published applications quits all open applications.

You can reset a remote desktop only if a Horizon administrator has enabled the reset feature for the remote desktop.

For information about enabling the desktop reset feature, see the *Setting Up Virtual Desktops in Horizon 7* or *Setting Up Published Desktops and Applications in Horizon 7* document.

Procedure

- ◆ Use the **Reset** command.

Option	Action
Reset a remote desktop from the desktop and application selection window	Select the remote desktop name, press Control-click, and select Reset from the context menu.
Reset published applications from the desktop and application selection window	Click the Settings button (gear icon) in the upper-right corner of the window, select Applications in the left pane, click Reset , and click Continue .

When you reset a remote desktop, the operating system in the remote desktop restarts and Horizon Client disconnects and logs off from the remote desktop. When you reset published applications, the published applications quit.

What to do next

Wait an appropriate amount of time for system to restart before attempting to reconnect to the remote desktop or published application.

Uninstalling Horizon Client

Sometimes you can resolve problems with Horizon Client by uninstalling and reinstalling Horizon Client.

To uninstall Horizon Client, use the same method that you use to uninstall any application.

Drag the **VMware Horizon Client** application from the **Applications** folder to the **Trash** and empty the trash.

After Horizon Client is uninstalled, you can reinstall it.

See [Install Horizon Client on a Mac](#).

Connecting to a Server in Workspace ONE Mode

You cannot connect to a server directly through Horizon Client, or your remote desktop and published application entitlements are not visible in Horizon Client.

Problem

- When you try to connect to the server directly through Horizon Client, Horizon Client redirects you to the Workspace ONE portal.
- When you open a remote desktop or published application through a URI or shortcut, or when you open a local file through file association, the request redirects you to the Workspace ONE portal for authentication.
- After you open a remote desktop or published application through Workspace ONE and Horizon Client starts, you cannot see or open other entitled remote desktops or published applications in Horizon Client.

Cause

Beginning with Horizon 7 version 7.2, a Horizon administrator can enable Workspace ONE mode on a Connection Server instance. This behavior is normal when Workspace ONE mode is enabled on a Connection Server instance.

Use Workspace ONE to connect to a Workspace ONE enabled server and access your remote desktops and published applications.

Collecting Support Data

The log collection feature creates log files that contain support data that can help VMware troubleshoot problems with Horizon Client.

To collect support data, select **VMware Horizon Client > About VMware Horizon Client** and click **Collect Support Data**. Horizon Client saves log files in a ZIP file in the Desktop folder.