



# Citrix Workspace app for Linux

## Contents

<b>About this release</b>	<b>3</b>
<b>Prerequisites to install Citrix Workspace app</b>	<b>16</b>
<b>Install, Uninstall, and Update</b>	<b>26</b>
<b>Get started</b>	<b>32</b>
<b>Configure</b>	<b>40</b>
<b>Authenticate</b>	<b>83</b>
<b>Secure</b>	<b>85</b>
<b>Troubleshoot</b>	<b>93</b>
<b>SDK and API</b>	<b>110</b>

## About this release

November 8, 2019

### What's new

#### What's new in 1910

##### Language support

Citrix Workspace app for Linux is now available in the Brazilian Portuguese language.

##### Appindicator icon

The appindicator is an icon that embeds in your system tray, and starts when you launch Citrix Workspace app. With the introduction of the appindicator, the Citrix Workspace app for Linux logon performance is significantly improved.

You can observe performance improvement when you:

- launch Citrix Workspace app for the first time
- close and relaunch the app
- quit and relaunch the app

##### Note:

The `libappindicator` package is required for the appindicator to appear. Install the `libappindicator` package suitable for your Linux distribution from the web.

##### Transparent User Interface

The Citrix ICA protocol uses the Transparent User Interface [TUI] Virtual Channel [VC] protocol to transmit data between Citrix Virtual Apps and Desktop clients and host servers. The TUI protocol transmits user interface [UI] component messages for remote connections.

In earlier releases, Citrix Workspace app for Linux did not support the TUI VC feature. As a result, the client system could not handle UI component data from the server properly. Due to this drawback, when you were attempting to launch a seamless app session, the “Starting <Application>” dialog box overlay would render on top of other application windows, covering the login prompt. Resizing and moving the overlay screen was difficult.

Starting with this release, Citrix Workspace app for Linux supports the TUI VC feature. This enhancement helps the client system to receive the TUI packets sent by the server, and the client can access

the UI related components. This functionality helps you to control the display of the default overlay screen. You can toggle the VDTUI flag in the module.ini file: `VDTUI - On/Off`

For more information on Virtual Channels, see [Citrix ICA virtual channels](#) in Citrix Virtual Apps and Desktops documentation.

### What's new in 1908

This release addresses a number of issues that help to improve overall performance and stability. Also, the [Platform Optimization SDK](#) includes UI Dialog libraries using libwebkit2gtk (2.16.6). The newly added libraries are UIDialogLibWebKit3.so and UIDialogLibWebKit3\_ext.so. For instructions on getting started with the UI Dialog library, see the Readme in the UIDialogLib3 directory.

### What's new in 1906

#### Improved UI experience with latest webkit support

In earlier releases, the self-service UI required libwebkitgtk Version 1.0. Because Version 1.0 of the webkit has been deprecated, most Linux distributions no longer support or require it. Going forward, Citrix Workspace App for Linux requires libwebkit2gtk (2.16.6+).

libwebkit2gtk has the following advantages:

- Improved UI experience. webkit2gtk is compatible with the browser content redirection feature. Use webkit2gtk Version 2.24 or later for an even better YouTube viewing experience.
- webkit2gtk Version 2.16.6 and later improves the sign-in experience with respect to the user interface and the time it takes to sign in.
- The app works better with newer Linux distributions and provides with the latest webkit security fixes.

#### Note:

webkit2gtk is not available on some Linux distributions. As a workaround for those distributions, consider the following options:

- Build webkit2gtk from the source before installing Citrix Workspace app 1906.
- Download the web package from the [Downloads page](#). Only web launches are supported in this package.
- Move to a later Linux distribution that supports webkit2gtk 2.16.6 or later.

### Language support

Citrix Workspace app for Linux is now available in the Dutch language.

### **VDA keyboard layout**

The VDA keyboard layout feature helps you use the VDA keyboard layout regardless of the client's keyboard layout settings. It supports the following types of keyboard: PC/XT 101, 102, 104, 105, 106. To use the feature, modify the KeyboardLayout=(Server Default) section of the wfclient.ini file and relaunch the session.

### **Secure SaaS with Citrix Embedded Browser [Experimental]**

Secure access to SaaS applications provides a unified user experience that delivers published SaaS applications to the users. SaaS apps are available with single sign-on. Administrators can now protect the organization's network and end-user devices from malware and data leaks by filtering access to specific websites and website categories.

Citrix Workspace app for Linux support the use of SaaS apps using the Access Control Service. The service enables administrators to provide a cohesive experience, integrating single sign-on, and content inspection.

#### **Prerequisite:**

To launch the SaaS applications, ensure libgtkglext1 package is available.

Delivering SaaS apps from the cloud has the following benefits:

- Simple configuration – Easy to operate, update, and consume.
- Single sign-on – Hassle-free log on with single sign-on.
- Standard template for different apps – Template-based configuration of popular apps.

#### **Note:**

SaaS with Citrix Browser Engine is supported only on x64 and x86 platforms and not on ArmHard-FloatPort (armhf) hardware.

For information on how to configure SaaS apps using Access Control Services, see the [Access Control](#) documentation.

For more information about SaaS apps with Citrix Workspace app, see [Workspace configuration](#) in in Citrix Workspace app for Windows documentation.

### **What's new in 1903**

#### **Cryptographic update**

This feature is an important change to the secure communication protocol. Cipher suites with the prefix TLS\_RSA\_ do not offer forward secrecy and are considered weak. These cipher suites were deprecated in Citrix Receiver version 13.10 with an option for backward compatibility.

In this release, the TLS\_RSA\_ cipher suites have been removed entirely. Instead, this release supports the advanced TLS\_ECDHE\_RSA\_ cipher suites. If your environment is not configured with the TLS\_ECDHE\_RSA\_ cipher suites, client launches are not supported due to weak ciphers. This release supports 1536-bit RSA keys for client authentication.

The following advanced cipher suites are supported:

- TLS\_ECDHE\_RSA\_WITH\_AES\_256\_GCM\_SHA384 (0xc030)
- TLS\_ECDHE\_RSA\_WITH\_AES\_256\_CBC\_SHA384 (0xc028)
- TLS\_ECDHE\_RSA\_WITH\_AES\_128\_CBC\_SHA (0xc013)

For more information see, [cipher suites](#).

**Note:**

From version 1903 and later, DTLS is supported from Citrix Gateway 12.1 and later. For information on DTLS supported cipher suites for Citrix Gateway, see [Support for DTLS protocol](#)

### **Bloomberg audio redirection**

This feature allows the use of Bloomberg v4 audio interfaces across multiple sessions. The audio from the sessions now goes through the optimized channel to the Bloomberg interface. The fingerprint interface is redirected to a single session as before.

**Note:**

By default, this feature is disabled for the x86, x64, and for ARMHF platforms.

For more information on how to configure Bloomberg audio redirection, follow the steps mentioned under [selective redirection](#).

### **Sign-on page**

This release introduces a new sign-on page in the self-service user interface.

### **Disconnect time**

This release addresses issues that help to significantly improve the disconnect time.

### **What's new in 1901**

#### **Support for Citrix Analytics**

Citrix Workspace app for Linux is instrumented to securely transmit logs to Citrix Analytics when certain events are triggered by the app. The logs are analyzed and stored on Citrix Analytics servers when enabled. For more information about Citrix Analytics, see [Citrix Analytics](#).

### **Workspace launcher with Citrix Gateway**

Citrix introduced Workspace launcher (WebHelper) in version 1809. In version 1901, Citrix Workspace launcher works not only with direct connections to StoreFront, but also through Citrix Gateway. This feature helps to launch the ICA file automatically and to detect the Citrix Workspace app installation.

### **Logging enhancements II**

Logging enhancements II is an extension of the Logging enhancements and Better logging features. The feature introduces support for logging for many modules and simplifies the process of collecting logs. It helps users troubleshoot, and - in cases of complicated issues - facilitates support by providing detailed logs.

For information about enabling logging, see [Enabling logging](#).

### **Keyboard layout synchronization between client and VDA**

Previously, the keyboard layouts on the Windows or Linux VDA and on the client device were synchronized manually. For example, when the keyboard layout changed from English to French on the client device but not on the VDA, key mapping issues could occur and persist until the keyboard layout on the VDA was changed to French too.

Starting with this release, Citrix is addressing the issue by automatically synchronizing the keyboard layout of the VDA with that of the client device. Anytime the keyboard layout on the client device changes, the layout on the VDA follows automatically.

**Note:**

This feature requires version 7.16 or later of the VDA.

For more information, see [Keyboard layout synchronization](#).

### **What's new in 1810**

This release addresses a number of issues that help to improve overall performance and stability.

### **What's new in 1809**

Connecting this version of Citrix Workspace app for Linux to Citrix Workspace services is an experimental feature.

## Introducing Workspace launcher

Previously, the browser plug-in provided along with Citrix Workspace app for Linux enabled users to launch published desktops and applications. This plug-in was based on the Netscape Plugin Application Programming Interface (NPAPI).

Mozilla Corporation has announced that NPAPI support is deprecated as of version 52 of the Firefox browser. Other browsers, too, have deprecated support for NPAPI.

As a solution, Citrix is introducing Workspace launcher (WebHelper). To enable this feature, configure StoreFront to send requests to Workspace launcher in order to detect the Citrix Workspace app installation.

For information about configuring StoreFront, see **Solution – 2 > a) Administrator configuration** in Knowledge Center article [CTX237727](#).

### Note:

Citrix Workspace launcher currently works only with direct connections to StoreFront. It is not supported in other cases such as connections through Citrix Gateway.

## Disabling new workspace web UI mode

When you launch the Citrix Workspace app for Linux using self-service executable file from third-party thin client vendors, the application can become unresponsive due to 100% CPU utilization.

As a workaround, to switch back to the old UI mode:

1. Remove cached files by using the command:  

```
rm -r ~/.ICAClient
```
2. Go to \$ICAROOT/config/AuthManconfig.xml file.
3. Change CWACapableEnabled key value to false.
4. Launch Citrix Workspace app for Linux. Observe that the self-service executable file loads the old UI.

## What's new in 1808

### Citrix Workspace app

Citrix Receiver is now Citrix Workspace app.

Citrix Workspace app extends the user experience you have enjoyed with Citrix Receiver, making it easier for you to stay productive. Citrix Workspace app incorporates the full capabilities of Citrix Receiver and lays the groundwork for new capabilities for future Citrix Virtual Apps and Desktops releases as well as the comprehensive Citrix Workspace.



Citrix Workspace app has simplified versioning based on the YYMM format, which makes this release of Citrix Workspace app 1808. The previous release had file version number 13.10.0.20.

Existing users or endpoints of Citrix Receiver for Linux can seamlessly transition to this new version of Citrix Workspace app for Linux by doing an in-place upgrade.

Upgrading to Citrix Workspace app:

- Download the Citrix Workspace app from the [Citrix download page](#) and install the app to upgrade from Citrix Receiver to Citrix Workspace app.

Citrix Workspace app has a new icon set in a blue theme. It replaces the earlier Citrix Receiver icon that had a black theme.

The **Citrix Workspace** screen overlay appears on the first launch of the app or when you upgrade and when you uninstall and reinstall the app, to inform you about the transition. You can either click **Got it** to continue using the Workspace app, or click **Learn more** to find out more details.

Connecting this version of Citrix Workspace app for Linux to Citrix Workspace services is an experimental feature.

### **Bloomberg v4 keyboard selective redirection support**

This feature allows the use of the Bloomberg v4 keyboard interface across multiple sessions. This functionality provides flexibility to use the keyboard in all remote sessions except the fingerprint and audio interfaces. The fingerprint and audio interfaces are redirected to single sessions as before.

#### **Note:**

By default, this feature is enabled for x86 and x64 platforms and is disabled for ARMHF platforms.

For more details, see [selective redirection](#).

### **Fixed issues**

#### **Fixed issues in 1910**

- Citrix Workspace app for Linux was dependent on libcurl3 for installation. With this fix, the dependency has been removed for easier installation. [RFLNX-3487]
- Rendering H.264 encoded data with Video Decode and the Presentation API for Unix (VDP AU) optimization pack might not work as expected. [RFLNX-2892]
- When using Citrix Workspace app for Linux versions 1906 or 1908, the sign-in page might not appear when shared users sign out of their workspace. Instead, the following sign-in prompt appears: Sign in to access your Workspace. [RFLNX-3519]
- When a desktop session spans multiple monitors, the toolbar might disappear. [RFLNX-3248]

### Fixed issues in 1908

- In a multi-monitor setup, you cannot save the multi-monitor layout if you set another monitor as the primary monitor. [RFLNX-2918]
- When you switch between **Window** and **Full-screen** modes, special keys on the English keyboard might not map to the VDA. [RFLNX-2796]
- USB mass storage devices might disconnect from user sessions when you copy files to the USB devices. The issue occurs when you use Citrix Workspace app for Linux with generic USB redirection and the size of the files is greater than 1 GB. [LC9699]
- With the Browser Content Redirection policy enabled, pages might return a 413 error message when you play a video on YouTube. The issue occurs after you access multiple video links. [LD1761]
- When you set the Use Video Codec for Compression policy to For the entire screen for VDA version 1903, the VDA session might disconnect. [LD1842]
- In browser content redirection, certain websites (for example, SAP Fiori Launchpad) might fail to load contents properly and errors might occur when you log on to the server on the Linux client devices. [LD1843]
- USB redirection might fail when there is USB traffic on endpoints. [LD1636]

### Fixed issues in 1906

- This fix addresses double authentication prompts when the internal beacons are not configured properly. [RFLNX-2573]
- When using storebrowse in a PNAgent site, the app enumeration fails. [RFLNX-2712]
- Applications using the webcam inside a session becomes unresponsive if the webcam is also in use by the native application running on the endpoint. [RFLNX-2870]
- When you move any office 365 apps from **Windowed mode** to **Full screen mode**, the app turns unresponsive. [RFLNX-2904]
- When using Citrix Workspace app for Linux, you might be asked to authenticate twice. The issue occurs when you connect using Citrix Gateway. [LD1440]
- Incorrect DNS polling for CAS data collection might occur for a direct ICA launch and for CAS disabled stores. [LD1418]
- The clipboard redirection might not work correctly when you attempt to copy and paste text from a published to a local application. [LD0809]
- Citrix Workspace app for Linux might not show all the resources in the **Favorites** tab even after you refresh the app enumeration. [LD1261]
- When you attempt to reset the password in Citrix Receiver for Linux or Citrix Workspace app for Linux, the password reset option might not appear. An incorrect error message appears. [LD0613]

- Session reliability might not work with NetScaler High Availability failover for on-prem stores. [LD1213]
- When you attempt to reconnect to a seamless application session on an Ubuntu client, an extra gray window might appear. [LD1578]
- A protocol error might occur when attempting to communicate with the Authentication Service while adding the gateway address from an external network. [LD0258]
- Attempts to use the **storebrowse -K** command in Citrix Receiver for Linux or Citrix Workspace app for Linux might fail. [LD1705]
- When using client drive mapping, you cannot delete the folders on the USB flash drive. [LD1778]
- Session Reliability might fail on the Cloud Connector due to a SIGPIPE error. This error terminates the wfica process and disconnects the session. [LD1824]
- The list of recently launched SaaS and Web apps might not appear under the **Recent** tab. [RFLNX-3200]
- On a HTTP-configured StoreFront set up, the Storebrowse utility might exit unexpectedly when communicating with Citrix Gateway. [RFLNX-3144]
- The Citrix Workspace app becomes unresponsive after you right-click and select **Quit** on the system tray window. [RFLNX-2898]
- When you expand the Chrome embedded PowerPoint application to full screen mode from **Windowed mode**, the screen might freeze. This issue occurs when the vertical scaling is incorrect. [RFLNX-2904]
- The authentication dialog box appears repeatedly after you click **Cancel** on the **Log On** page. This issue occurs when you launch self-service, add an account, log on, and then log off the account. [RFLNX-3111]
- When using more than one smart card certificate (for example, Logon, Signature, Encipherment etc) , the logon certificate fails to appear. [RFLNX-2917]
- When using storebrowse with PNA url and an expired password, the **Change Expired Password** screen does not appear. [LC9129]
- When using Fedora 29 and later, the Citrix Workspace app for Linux exits unexpectedly with an error message “SIGSEGV”. This issue occurs because Fedora Version 29 and later are not currently supported due to incompatibility in the libidn package provided by the operating system. [LD0705]
- The Citrix Optimization SDK package contains in incorrect version of the UIDialogLibWebKit.so. As a workaround, perform the follow the steps:
  1. Download Citrix Optimization SDK package version 18.10 from the [Downloads](#) page.
  2. Go to the path CitrixPluginSDK/UIDialogLib/GTK:

```
cd CitrixPluginSDK/UIDialogLib/GTK
```
  3. Delete all the object files:

```
rm -rf *.o
```

4. Go to WebKit folder:

```
cd ../WebKit
```

5. Remove the existing UIDialogLibWebKit.so:

```
rm -rf UIDialogLibWebKit.so
```

6. Use the following command in the WebKit directory:

```
make all
```

The new UIDialogLibWebKit.so is generated.

7. Copy the new library into the **\$ICAROOT/lib** directory.

**Note:**

Before launching the self-service, kill the AuthManagerDaemon and ServiceRecord processes.  
[RFLNX-2822]

### Fixed issues in 1903

- When a Microsoft Office 365 PowerPoint presentation running in a seamless published Chrome browser completes, the display might not refresh. There can be a duplication of elements on the screen and mouse clicks do not work as expected. [LD0777]
- Several unwanted windows that do not correspond to any process or application might appear on the taskbar. [LD1176]
- Citrix Workspace app for Linux might fail with connection error 0.0.0.2. [LD1122]

For more information, see [Cryptographic update](#).

### Fixed issues in 1901

- USB devices that are attached to an endpoint and mapped into a VDA session can fail to redirect into the session. The issue occurs if you rename a USB device within the session and then detach and reattach it. [LD0111]
- Certain third-party applications might not function correctly when you launch them from Citrix Workspace app for Linux. The issue occurs when the applications do not pass the checks for the main application window, and then taskbar icons are not created for those applications. [LD0545]
- Client-to-server File Type Association (FTA) works only once per user and login. To open a local file with the associated published application, see [Associating a published application with file types](#) and [File Type Association](#). [RFLNX-1363]

### Fixed issues in 1810

- For certain time zones, an incorrect time for calendar appointments might be shown when using Versions 1808 or 1809 of Citrix Workspace app for Linux. [LD0467]
- Attempts to send data from Citrix Receiver for Linux over a custom virtual channel might fail. [RFLNX-2288]

### Fixed issues in 1809

- When you attempt to start published applications, the wfica.exe process might exit unexpectedly. The issue occurs when multiple users share the Linux host where Citrix Receiver for Linux 13.10 is installed. [LD0176]

### Fixed issues in 1808

- When full-screen H264 encoding is enabled, the text carets on some applications such as the command prompt and text editors disappear. To mitigate this issue (until it is resolved in the Citrix Workspace app), small frames support - a feature of HDX “DeepCompressionV2” codec - is disabled on the VDA. [RFLNX-2172]
- The **udtMSS** flag is enabled by default in the All\_Regions.ini file to allow the Citrix Workspace app to honor the value set in StoreFront’s default.ica file. [RFLNX-2228]
- The authentication dialog box is hidden behind the full-screen session window when you click anywhere within the session without entering your credentials.
- The desktop viewer that disappeared randomly on certain monitors appears fine now.
- When you save a session on specific monitors, upon relaunch, the session spreads across all monitors.
- When you purge user subscription details, the session fails to launch successfully.
- When you click **Save Layout**, the session becomes unresponsive. This issue occurs when you launch multiple sessions from different instances of StoreFront that are configured with or without Save Layout support.

### Known issues

#### Known issues in 1910

- When you use the self-service user interface, the **Preferences** option might not work as expected. The issue occurs when the libwebkit1 package is unavailable as is the case with Debian

10 buster clients. As a workaround, remove the **UIDialogLibWebKit.so** library located inside the `install/path/lib` directory. [RFLNX-3596]

### Known issues in 1908

No new issues have been observed in this release.

### Known issues in 1906

- After disconnecting the ICA session, the `wifca` process may exit after a couple of minutes. This is because, the `wifca` process tries to contact the network during exit. [RFLNX-3025]
- When you connect to a PNAgent store, not all the subscribed resources appear when you use the command `./util/storebrowse -S`. [RFLNX-2944]
- When using Skype, occasionally a webcam might not establish video when you log on consecutive times. As a workaround, close and restart the Skype session. [RFLNX-2897]
- The DynamicCDM feature might not work on CentOS 7.6, and the USB flash disk is not mapped to the desktop session. [RFLNX-3117]
- The first time launch of a session on an ArmHardFloatPort (`armhf`) device that is based on Raspbian GNU/Linux 8.0 (jessie) might fail. The subsequent launches succeed. [RFLNX-3211]
- Citrix Workspace app for Linux does not support 32-bit cursors. If a 32-bit cursor is used on the VDA, it appears as black. This issue has been observed in earlier releases too. [RFLNX-1296]
- ICA launch might fail on Fedora 29/30. As a workaround, follow the steps:
  1. Install `openssl10` by using the command

```
sudo yum install compat-openssl10.x86_64
```

1. Set the environment variable in `~/.bashrc` to load for every session. This action points to the older `libcrypto` library.

```
export LD_PRELOAD=/lib64/libcrypto.so.1.0.2o
```

#### Note:

The app works fine in X.Org server as compared to the Wayland compositor. For distributions that have Wayland as the default graphics protocol, uncomment either of the following:

```
WaylandEnable=false in /etc/gdm/custom.conf or
```

```
/et/gdm3/custome.conf. Log off and log on to point to the X.Org server. [RFLNX-3114]
```

### Known issues in 1903

- When using Fedora 29 and later, the Citrix Workspace app for Linux exits unexpectedly with an error message “SIGSEGV”. This issue occurs because Fedora Version 29 and later are not currently supported due to incompatibility in the libidn package provided by the operating system. [LD0705]
- The Citrix Optimization SDK package contains in incorrect version of the UIDialogLibWebKit.so. As a workaround, perform the follow the steps:
  1. Download Citrix Optimization SDK package version 18.10 from the [Downloads](#) page.
  2. Go to the path CitrixPluginSDK/UIDialogLib/GTK:

```
cd CitrixPluginSDK/UIDialogLib/GTK
```
  3. Delete all the object files:

```
rm -rf *.o
```
  4. Go to WebKit folder:

```
cd ../WebKit
```
  5. Remove the existing UIDialogLibWebKit.so:

```
rm -rf UIDialogLibWebKit.so
```
  6. Use the following command in the WebKit directory:

```
make all
```

The new UIDialogLibWebKit.so is generated.
  7. Copy the new library into the **\$ICAROOT/lib** directory.

#### Note:

Before launching the self-service, kill the AuthManagerDaemon and ServiceRecord processes. [RFLNX-2822]

### Known issues in 1901

- No new issues have been observed in this release.

### Known issues in 1810

- Sessions might fail to connect to StoreFront through the Citrix Gateway. The issue occurs when client authentication is mandatory. As a workaround, set client authentication to **Optional** or disable it. [RFLNX-2431]

### **Known issues in 1809**

- “Automatically move pointer to the default button in a dialog box” does not work randomly. [LD0843]

### **Known issues in 1808**

- When using storebrowse with PNA url and an expired password, the **Change Expired Password** screen does not appear. [LC9129]

### **Third party notices**

Citrix Workspace app might include third party software licensed under the terms defined in the following document:

[Citrix Workspace app for Linux Third Party Notices](#)

## **Prerequisites to install Citrix Workspace app**

October 21, 2019

### **System requirements and compatibility**

See the following list for system requirements:



<b>Hardware</b>	<b>Requirements</b>
Linux kernel	- Version 2.6.29 or later
Disk Space	- A minimum of 55 MB - Additional 110 MB if you expand/extract the installation package on the disk - A minimum of 1 GB RAM for system-on-a-chip (SoC) devices that use HDX MediaStream Flash Redirection
Color video display	- 256 color video display or higher

<b>Libraries and Codec</b>	<b>Requirements</b>
Libraries	- glibcxx 3.4.15 or later - glibc 2.11.3 or later - gtk 2.20.1 or later - libcap1 or libcap2 - libjson-c ( for instrumentation) - GCC 4.8 for x64 * - GCC 4.9 for Armhf * - X11 or X.Org - udev support
Self-service user interface	- webkit2gtk 2.16.6 or later - libxml2 2.7.8 - libxerces-c 3.1
Codec libraries	- Advanced Linux Sound Architecture (ALSA) libasound2 - Speex - Vorbis codec libraries

<b>Network</b>	<b>Requirements</b>
Network protocol	- TCP/IP

Components	Requirements
H.264	For x86 devices: <ul style="list-style-type: none"> <li>- A minimum processor speed of 1.6 GHz</li> <li>- Single-monitor sessions</li> <li>- Display resolutions for example, 1280 x 1024 pixels</li> </ul>
	For the HDX 3D Pro feature: <ul style="list-style-type: none"> <li>- A minimum processor speed of 2 GHz</li> <li>- A native hardware with accelerated graphics driver</li> </ul>
	For ARM devices: <ul style="list-style-type: none"> <li>- A hardware H.264 decoder is required for both general H.264 support and HDX 3D Pro</li> </ul> <p><b>Note:</b> Performance improves after using faster processor clock speeds.</p>
HDX MediaStream Flash Redirection	For all HDX MediaStream Flash Redirection requirements, see Knowledge Center article <a href="http://support.citrix.com/article/CTX134786">http://support.citrix.com/article/CTX134786</a> .  Citrix recommends testing with the latest plug-in before deploying a new version to take advantage of the latest functionality and security-related fixes.
Customer Experience Improvement Program (CEIP) integration	<ul style="list-style-type: none"> <li>- zlib 1.2.3.3</li> <li>- libtar 1.2 and later</li> <li>- libjson 7.6.1 or later</li> </ul>

Components	Requirements
HDX RealTime Webcam Video Compression	<ul style="list-style-type: none"> <li>- A Video4Linux compatible Webcam</li> <li>- GStreamer 0.10.25 (or a later 0.10.x version), including the distribution's "plugins-good" package</li> </ul> <p style="text-align: center;">Or</p> <p>GStreamer 1.0 (or a later 1.x version), including the distribution's "plugins-base," "plugins-good," "plugins-bad," "plugins-ugly," and "gstreamer-libav" packages</p>
HDX MediaStream Windows Media Redirection	<ul style="list-style-type: none"> <li>- GStreamer 0.10.25 (or a later 0.10.x version), including the distribution's "plugins-good" package. In general, version 0.10.15 or later is sufficient for HDX MediaStream Windows Media Redirection</li> </ul> <p style="text-align: center;">Or</p> <p>GStreamer 1.0 (or a later 1.x version), including the distribution's "plugins-base," "plugins-good," "plugins-bad," "plugins-ugly," and "gstreamer-libav" packages</p> <p><b>Note:</b> If GStreamer is not included in your Linux distribution, you can download it from <a href="https://gstreamer.freedesktop.org/download/">https://gstreamer.freedesktop.org/download/</a>.</p> <p>Use of certain codes (for example, those in "plugins-ugly") might require a license from the manufacturer of that technology. Contact your system administrator for help.</p>
Components	Requirements
Browser content redirection	<ul style="list-style-type: none"> <li>- webkit2gtk version 2.16.6</li> <li>- glibcxx 3.4.20 or later</li> </ul>
Philips SpeechMike	<ul style="list-style-type: none"> <li>- Visit the Philips web site to install the relevant drivers</li> </ul>

\* Following the 1910 release, Citrix Workspace app for Linux might not work as expected unless the operating system meets the following GCC version criteria:

- GCC version for x64 architecture: 4.8 or later
- GCC version for ARMHF architecture: 4.9 or later

## Compatibility matrix

Citrix Workspace app for Linux is compatible with all currently supported versions of the Citrix products. For information about the Citrix product lifecycle, and to find out when Citrix stops supporting specific versions of products, see the [Citrix Product Lifecycle Matrix](#).

## Server requirements

### StoreFront

You can use Citrix Workspace app for Linux 1808 and later browser-based access with StoreFront Citrix Workspace app for Web and Web Interface, with - or without - the Citrix Gateway plug-in.

StoreFront:

- StoreFront 3.x, 2.6, 2.5 and 2.1  
Provides direct access to StoreFront stores.
- StoreFront configured with Workspace for Web  
Provides access to StoreFront stores from a web browser. For the limitations of this deployment, see “Important considerations” in [Citrix Receiver for Web sites](#).

### Web Interface

Web Interface with the NetScaler VPN client:

- Web Interface 5.4 for Windows web sites.  
Provides access to virtual desktops and apps from a web browser.
- Web Interface 5.4 for Linux with XenApp services or Citrix Virtual Desktops services sites

## Connections and Certificates

### Connections

Citrix Workspace app for Linux supports HTTPS and ICA-over-TLS connections through any one of the following configurations.

- For LAN connections:
  - StoreFront using StoreFront services or Workspace for Web
  - Web Interface 5.4 for Windows, using Web Interface or XenApp services
- For secure remote or local connections:

- Citrix Gateway 12.0
- Netscaler Gateway 10.1 and later
- Netscaler Access Gateway Enterprise Edition 10
- Netscaler Access Gateway Enterprise Edition 9.x
- Netscaler Access Gateway VPX

For information about the Citrix Gateway versions supported by StoreFront, see [System requirements](#) of StoreFront.

## Certificates

To ensure secure transactions between server and client, use the following certificates:

### Private (self-signed) certificates

If a private certificate is installed on the remote gateway, the root certificate for the organization's certificate authority must be installed on the user device to access Citrix resources using Citrix Workspace app.

#### Note:

If the remote gateway's certificate cannot be verified upon connection (because the root certificate is not included in the local key store), an untrusted certificate warning appears. If a user chooses to continue through the warning, the apps are displayed but cannot be launched. The root certificate must be installed in the client's certificate store.

### Root certificates

For domain-joined machines, you can use Group Policy Object administrative template to distribute and trust CA certificates.

For non-domain joined machines, the organization can create a custom install package to distribute and install the CA certificate. Contact your system administrator for assistance.

### Install root certificates on user devices

To use TLS, you need a root certificate on the user device that can verify the signature of the Certificate Authority on the server certificate. By default, Citrix Workspace app supports the following certificates.

---

Certificate	Issuing Authority
Class4PCA_G2_v2.pem	VeriSign Trust Network

---

---

Certificate	Issuing Authority
Class3PCA_G2_v2.pem	VeriSign Trust Network
BTCTRoot.pem	Baltimore Cyber Trust Root
GTECTGlobalRoot.pem	GTE Cyber Trust Global Root
Pcs3ss_v4.pem	Class 3 Public Primary Certification Authority
GeoTrust_Global_CA.pem	GeoTrust
DigiCertGlobalRootCA.pem	DigiCert Global Root CA

---

You are not required to obtain and install root certificates on the user device to use the certificates from these Certificate Authorities. However, if you choose to use a different Certificate Authority, you must obtain and install a root certificate from the Certificate Authority on each user device.

Citrix Workspace app for Linux supports RSA keys of 1024, 2048, and 3072-bit lengths. Root certificates with RSA keys of 4096-bit length are also supported.

**Note:**

Citrix Workspace app for Linux 1808 and above uses the `ctx_rehash` tool as described in the following steps.

If you authenticate a server certificate that was issued by a certificate authority and is not yet trusted by the user device, follow these instructions before adding a StoreFront store:

1. Obtain the root certificate in PEM format.  
Tip: If you cannot find a certificate in this format, use the `openssl` utility to convert a certificate in CRT format to a `.pem` file.
2. As the user who installed the package (usually root):
  - a) Copy the file to `$(ICAROOT)/keystore/cacerts`.
  - b) Run the following command:

```
$(ICAROOT)/util/ctx_rehash
```

**Wildcard certificates**

Wildcard certificates are used in place of individual server certificates for any server within the same domain. Citrix Workspace app for Linux supports wildcard certificates, however they should only be used in accordance with your organization's security policy. In practice, alternatives to wildcard certificates, such as a certificate containing the list of server names within the Subject Alternative Name (SAN) extension, could be considered. Such certificates can be issued by both private and public certificate authorities.

## Intermediate certificates and the Citrix Gateway

If your certificate chain includes an intermediate certificate, the intermediate certificate must be appended to the Citrix Gateway server certificate. For information, see [Configuring Intermediate Certificates](#) in Citrix Gateway documentation.

If your StoreFront server is not able to provide the intermediate certificates that match the certificate it is using, or you install intermediate certificates to support smart card users, follow these steps before adding a StoreFront store:

1. Obtain one or more intermediate certificates separately in PEM format.

**Tip:**

If you cannot find a certificate in PEM format, use the openssl utility to convert a certificate in CRT format to a .pem file.

2. As the user install the package (usually root):
  - a) Copy one or more files to \$ICAROOT/keystore/intcerts.
  - b) Run the following command as the user who installed the package:

```
$ICAROOT/util/ctx_rehash
```

## Joint Server Certificate Validation Policy

Citrix Workspace app for Linux has a stricter validation policy for server certificates.

**Important:**

Before installing Citrix Workspace app for Linux, confirm that the certificates at the server or gateway are correctly configured as described here. Connections may fail if:

- the server or gateway configuration includes a wrong root certificate
- the server or gateway configuration does not include all intermediate certificates
- the server or gateway configuration includes an expired or otherwise invalid intermediate certificate
- the server or gateway configuration includes a cross-signed intermediate certificate

When validating a server certificate, Citrix Workspace app for Linux now uses **all** the certificates supplied by the server (or gateway) when validating the server certificate. As in previous Citrix Workspace app for Linux releases, it then also checks that the certificates are trusted. If the certificates are not all trusted, the connection fails.

This policy is stricter than the certificate policy in web browsers. Many web browsers include a large set of root certificates that they trust.

The server (or gateway) must be configured with the correct set of certificates. An incorrect set of certificates might cause Citrix Workspace app for Linux's connection to fail.

Suppose that a gateway is configured with these valid certificates. This configuration is recommended for customers who require stricter validation, by determining exactly which root certificate is used by Citrix Workspace app for Linux:

- “Example Server Certificate”
- “Example Intermediate Certificate”
- “Example Root Certificate”

Then, Citrix Workspace app for Linux checks that all these certificates are valid. Citrix Workspace app for Linux also checks that it already trusts “Example Root Certificate.” If Citrix Workspace app for Linux does not trust “Example Root Certificate,” the connection fails.

**Important:**

- Some certificate authorities have more than one root certificate. If you require this stricter validation, make sure that your configuration uses the appropriate root certificate. For example, there are currently two certificates (“DigiCert”/“GTE CyberTrust Global Root,” and “DigiCert Baltimore Root”/“Baltimore CyberTrust Root”) that can validate the same server certificates. On some user devices, both root certificates are available. On other devices, only one is available (“DigiCert Baltimore Root”/“Baltimore CyberTrust Root”). If you configure “GTE CyberTrust Global Root” at the gateway, Citrix Workspace app for Linux connections on those user devices will fail. Consult the certificate authority’s documentation to determine which root certificate should be used. Also note that root certificates eventually expire, as do all certificates.
- Some servers and gateways never send the root certificate, even if configured. Stricter validation is then not possible.

Now suppose that a gateway is configured with these valid certificates. This configuration, omitting the root certificate, is normally recommended:

- “Example Server Certificate”
- “Example Intermediate Certificate”

Then, Citrix Workspace app for Linux uses these two certificates. It then searches for a root certificate on the user device. If it finds one that validates correctly, and is also trusted (such as “Example Root Certificate”), the connection succeeds. Otherwise, the connection fails. This configuration supplies the intermediate certificate that Citrix Workspace app for Linux needs, but also allows Citrix Workspace app for Linux to choose any valid, trusted, root certificate.

Now suppose that a gateway is configured with these certificates:

- “Example Server Certificate”
- “Example Intermediate Certificate”
- “Wrong Root Certificate”



A web browser may ignore the wrong root certificate. However, Citrix Workspace app for Linux will not ignore the wrong root certificate, and the connection will fail.

Some certificate authorities use more than one intermediate certificate. In this case, the gateway is normally configured with all the intermediate certificates (but not the root certificate) such as:

- “Example Server Certificate”
- “Example Intermediate Certificate 1”
- “Example Intermediate Certificate 2”

**Important:**

- Some certificate authorities use a cross-signed intermediate certificate. This is intended for situations there is more than one root certificate, and an earlier root certificate is still in use at the same time as a later root certificate. In this case, there will be at least two intermediate certificates. For example, the earlier root certificate “Class 3 Public Primary Certification Authority” has the corresponding cross-signed intermediate certificate “VeriSign Class 3 Public Primary Certification Authority - G5.” However, a corresponding later root certificate “VeriSign Class 3 Public Primary Certification Authority - G5” is also available, which replaces “Class 3 Public Primary Certification Authority.” The later root certificate does not use a cross-signed intermediate certificate.
- The cross-signed intermediate certificate and the root certificate have the same Subject name (Issued To). But the cross-signed intermediate certificate has a different Issuer name (Issued By). This distinguishes the cross-signed intermediate certificate from an ordinary intermediate certificate (such “Example Intermediate Certificate 2”).

This configuration, omitting the root certificate and the cross-signed intermediate certificate, is normally recommended:

- “Example Server Certificate”
- “Example Intermediate Certificate”

Avoid configuring the gateway to use the cross-signed intermediate certificate, as it selects the earlier root certificate:

- “Example Server Certificate”
- “Example Intermediate Certificate”
- “Example Cross-signed Intermediate Certificate” [not recommended]

It is not recommended to configure the gateway with only the server certificate:

- “Example Server Certificate”

In this case, if Citrix Workspace app for Linux cannot locate all the intermediate certificates, the connection fails.

## Install, Uninstall, and Update

October 21, 2019

You can install the Citrix Workspace app using any of the following methods:

- Download the Citrix Workspace app from the [Citrix Downloads page](#), configure using an email or services address with StoreFront.
- Deploy Citrix Workspace app for Linux using Citrix Workspace for Web (configured with StoreFront).
- Deploy Citrix Workspace app for Linux from Citrix Web Interface 5.4.

### Install manually

Download the following packages from the Citrix Downloads page.

### Using Debian packages

Package name	Contents
<b>Debian packages (Ubuntu, Debian, Linux Mint etc.)</b>	
icaclient_19.10.0.15_amd64.deb	Self-service support, 64-bit x86_64
icaclient_19.10.0.15_i386.deb	Self-service support, 32-bit x86
icaclient_19.10.0.15_armhf.deb	Self-service support, ARM HF
icaclientWeb_19.10.0.15_amd64.deb	Web Receiver only, 64-bit x86_64
icaclientWeb_19.10.0.15_i386.deb	Web Receiver only, 32-bit x86
icaclientWeb_19.10.0.15_armhf.deb	Web Receiver only, ARM HF
ctxusb_2.7.15_amd64.deb	USB package, 64-bit x86_64
ctxusb_2.7.15_i386.deb	USB package, 32-bit x86
ctxusb_2.7.15_armhf.deb	USB package, ARM HF

### Install using a Debian package

If you are installing the Citrix Workspace app from the Debian package on Ubuntu, you might find it convenient to open the packages in the Ubuntu Software Center.

In the following instructions, replace

***packagename*** with the name of the package that you are installing.

This procedure uses a command line and the native package manager for Ubuntu/Debian/Mint. You can also install the package by double-clicking the downloaded .deb package in a file browser. This typically starts a package manager that downloads any missing required software. If no package manager is available, Citrix recommends

**gdebi**, a command-line tool that performs this function.

To install the package using the command line:

1. Log on as a privileged (root) user.
2. Open a terminal window.
3. Run the installation for the following three packages by typing `gdebi packagename.deb`. For example:

- `gdebi icaclient\\_19.0.6.6\\_amd64.deb`
- `gdebi icaclientWeb\\_19.0.6.6\\_i386.deb`
- `gdebi ctxusb\\_2.7.6\\_amd64.deb`

**Note:**

To use `dpkg` in the above examples, replace `gdebi` with `dpkg -i`.

You must install the `icaclient` package or the `icaclientWeb` package. The `ctxusb` package is optional to support the generic USB redirection feature.

4. If using `dpkg`, install any missing dependencies by typing `sudo apt-get -f install`.
5. Accept the EULA.

## Using Redhat packages

Package name	Contents
<b>Redhat packages (Redhat, SUSE, Fedora etc.)</b>	
ICAClient-rhel-19.10.0.15-0.x86_64.rpm	Self-service support, RedHat (including Linux VDA) based, 64-bit x86_64
ICAClient-rhel-19.10.0.15-0.i386.rpm	Self-service support, RedHat based, 32-bit x86
ICAClientWeb-rhel-19.10.0.15-0.x86_64.rpm	Web Receiver only, RedHat based, 64-bit x86_64
ICAClientWeb-rhel-19.10.0.15-0.i386.rpm	Web Receiver only, RedHat based, 32-bit x86

Package name	Contents
ICAClient-suse-19.10.0.15-0.x86_64.rpm	Self-service support, SUSE based, 64-bit x86_64
ICAClient-suse-19.10.0.15-0.i386.rpm	Self-service support, SUSE based, 32-bit x86
ICAClientWeb-suse-19.10.0.15-0.x86_64.rpm	Web Receiver only, SUSE based, 64-bit x86_64
ICAClientWeb-suse-19.10.0.15-0.i386.rpm	Web Receiver only, SUSE based, 32-bit x86
ctxusb-2.7.15-1.x86_64.rpm	USB package, 64-bit x86_64
ctxusb-2.7.15-1.i386.rpm	USB package, 32-bit x86

**Note:**

Following the 1908 release of Citrix Workspace app for Linux the *SuSE 11 SP3 Full Package (Self-Service Support)* RPM package will be deprecated. It will no longer be available from the [Citrix Downloads page](#).

### Install using an RPM package

If you are installing Citrix Workspace app from the RPM package on SUSE, use the YaST or Zypper utility, not the RPM utility. The RPM utility does not download or install any necessary dependencies, it only installs the .rpm package. If the required dependencies are missing, you will receive an error.

**Note:**

To follow an example of an installation using a RPM package, see the Citrix Blog article [Installing Citrix Receiver for Linux 13.2.1 on SUSE Linux Enterprise Desktop](#).

In the following instructions, replace

**<packagename>** with the name of the package that you are installing.

**Note:**

If you receive an error indicating that the installation "... requires libwebkitgtk-1.0.so.0" on Red Hat based distributions (RHEL, CentOS, Fedora, etc.), add the EPEL repository (details can be found at <https://fedoraproject.org/wiki/EPEL>), which can provide the missing package, or switch to the Web variant of the package.

### EPEL repository

To set up the EPEL repository on Red Hat:

1. Download the appropriate source RPM package from here:

[https://fedoraproject.org/wiki/EPEL#How\\_can\\_I\\_use\\_these\\_extra\\_packages.3F](https://fedoraproject.org/wiki/EPEL#How_can_I_use_these_extra_packages.3F)

2. For example, for Red Hat Enterprise 7.x:

**yum localinstall epel-release-latest-7 .noarch.rpm**

**Tip:**

RPM Package Manager does not install any missing required software. To download and install the software, Citrix recommends using **zypper install <file name>** at a command line on OpenSUSE or **yum localinstall <filename>** on Fedora/Red Hat.

After setting up the EPEL repository, install Workspace app from the RPM package:

1. Log on as a privileged (root) user.
2. Run the installation for the following three packages by typing zypper in packagename.rpm.

**Note:**

A user must install the icaclient package or the icaclientWeb package. The ctxusb package is an optional to support Generic USB Redirection.

3. Open a terminal window.

For SUSE installations:

```
zypper in ICAClient-suse-18.9.0.6-0.x86_64.rpm
```

```
zypper in ICAClient-suse-18.9.0.6-0.i386.rpm
```

```
zypper in ctxusb-2.7.6-1.x86_64.rpm
```

For Red Hat installations:

```
yum localinstall ICAClient-rhel-18.9.0.6-0.i386.rpm
```

```
yum localinstall ICAClientWeb-rhel-18.9.0.6-0.i386.rpm
```

```
yum localinstall ctxusb-2.7.6-1.i386.rpm
```

4. Accept the EULA.

## Using Tarball packages

---

Package name	Contents
<b>Tarballs (Script install for any distribution)</b>	
linuxx64-19.10.0.15.tar.gz	64-bit Intel
linuxx86-19.10.0.15.tar.gz	32-bit Intel

---

Package name	Contents
linuxarmhf-19.10.0.15.tar.gz	ARM HF

The difference between packages that offer support for Web Workspace app and those packages that support self-service is that the latter packages include dependencies required for self-service in addition to those needed for the Web Workspace app. Dependencies for self-service are a superset of those required for Web Workspace app, but the files installed are identical.

If you require only Web Workspace app support, or your distribution does not have the necessary packages to support self-service, install the Web Workspace app only package.

**Note:**

If your distribution allows, install Citrix Workspace app from the Debian package or from the RPM package. These files are easier to use because they automatically install any required packages.

If you want to control the installation location, install Citrix Workspace app from the tarball package.

Do not use both installation methods on the same machine. If you do, for example, if you install Citrix Workspace app for Linux from a tarball package on a machine where Citrix Workspace app for Linux was already installed from a Debian package, you are likely to see error messages and unwanted behaviors.

### Install using a tarball package

**Note:**

The tarball package does not perform dependency checking or installation of dependencies. All system dependencies must be resolved separately.

1. Open a terminal window.
2. Decompress the .tar.gz file and extract the contents into an empty directory. For example, type:  
`tar xvfz packagename.tar.gz`.
3. Type `./setupwfc` and then press Enter to run the setup program.
4. Accept the default of 1 (to install the Workspace app) and press Enter.
5. Type the path and name of the required installation directory and then press Enter, or press Enter to install Workspace app in the default location.

The default directory for privileged (root) user installations is `/opt/Citrix/ICAClient`.

The default directory for non-privileged user installations is `$HOME/ICAClient/platform`. Platform is a system-generated identifier for the installed operating system. For example, `$HOME/ICAClient/linuxx86` for the Linux/x86 platform).

**Note:**

If you specify a non-default location, set it in `$ICAROOT` in `$HOME/.profile` or `$HOME/.bash_profile`.

6. When prompted to proceed, type `y` and then press Enter.
7. You can choose whether to integrate Citrix Workspace app into your desktop environment. The installation creates a menu option from which users can start Citrix Workspace app. Type `y` at the prompt to enable the integration.
8. If you have previously installed GStreamer, you can choose whether to integrate GStreamer with Citrix Workspace app and so support HDX Mediasream Multimedia Acceleration. To integrate Citrix Workspace app with GStreamer, type `y` at the prompt.

**Note:**

On some platforms, installing the client from a tarball distribution may cause the system to hang after prompting you to integrate with KDE and GNOME. This issue occurs with the first time initialization of `gststreamer-0.10`. If you encounter this issue, terminate the installation process (using `ctrl+c`) and run the command `gst-inspect-0.10 -gst-disable-registry-fork -version`. After executing this command, you can rerun the tarball setup without experiencing a system hang.

9. If you log on as a privileged user (root), choose to install USB support for Citrix Virtual Apps and Desktops published VDI applications. Type `y` at the prompt to install USB support.

**Note:**

If you are not logged on as a privileged user (root), the following warning appears: “USB support cannot be installed by non-root users. Run the installer as root to access this install option.”

10. When the installation is complete, the main installation menu appears again. To exit from the setup program, type `3` and then press Enter.

## Uninstall

This procedure has been tested with the tarball package. Remove the RPM and Debian packages using your operating system’s standard tools.

The environment variable `ICAROOT` must be set to the installation directory of the client. The default directory for non-privileged user installations is `$HOME/ICAClient/platform`. The platform variable is

a system-generated identifier for the installed operating system. For example, `$HOME/ICAClient/linuxx86` for the Linux/x86 platform. Privileged user installation defaults to `/opt/Citrix/ICAClient`.

1. Run the setup program by typing `$ICAROOT/setupwfc` and press Enter.
2. To remove the client, type 2 and press Enter.

**Note:**

To uninstall Citrix Workspace app for Linux, you must be logged in as the same user who performed the installation.

### Update

Download the Citrix Workspace app from the [Citrix Downloads page](#) and install the app to upgrade from Citrix Receiver to Citrix Workspace app.

Citrix Workspace app has a new icon set in a blue theme. It replaces the earlier Citrix Receiver icon that had a black theme.

The **Citrix Workspace** screen overlay appears on the first launch of the app or when you upgrade and when you uninstall and reinstall the app, to inform you about the transition. You can either click **Got it** to continue using the Workspace app, or click **Learn more** to find out more details.

### Get started

October 21, 2019

### Set up

After you download the installation package, you can customize the configuration before installation by modifying the contents of the Citrix Workspace app package. You can then repackage the files. Your changes are included in every version installed using the modified package.

### Customize installation

1. Expand the Citrix Workspace app package file into an empty directory. The package file is called `platform.major.minor.release.build.tar.gz` (for example, `linuxx86.13.2.0.nnnnnn.tar.gz` for the Linux/x86 platform).



2. Make the required changes to the Citrix Workspace app package. For example, you might add a TLS root certificate to the package if you want to use a certificate from a Certificate Authority that is not part of the standard Citrix Workspace app installation. To add a TLS root certificate to the package, see [Install root certificates on user devices on the Citrix Product Documentation site](#).

For more information about built-in certificates, see [Configure and enable SSL and TLS on the Citrix Product Documentation site](#).

3. Open the `PkgID` file.
4. Add the following line to indicate that the package was modified: `MODIFIED=traceinfo` where `traceinfo` is information indicating who made the change and when. The exact format of this information is not important.
5. Save and close the file.
6. Open the package file list, `platform/platform.psf` (for example, `linuxx86/linuxx86.psf` for the Linux/x86 platform).
7. Update the package file list to reflect the changes you made to the package. If you do not update this file, errors can occur when installing your new package. Changes could include updating the size of any files you modified, or adding new lines for any files you added to the package. The columns in the package file list are:
  - File type
  - Relative path
  - Subpackage (which must always be set to `cor`)
  - Permissions
  - Owner
  - Group
  - Size
8. Save and close the file.
9. Use the `tar` command to rebuild Citrix Workspace app package file. For example, `tar czf ../newpackage.tar.gz *`, where `newpackagez` is the name of the new Citrix Workspace app package file.

## Launch

You can start Citrix Workspace app either at a terminal prompt or from one of the supported desktop environments.

If Citrix Workspace app was not installed in the default installation directory, ensure that the environment variable `ICAROOT` is set to point to the actual installation directory.

### Tip:

The following instruction does not apply to installations made from the Web packages, or where the tarball is used but where the requirements for self-service have not been met.

### Terminal prompt

To start the Citrix Workspace app at the terminal prompt, type:

```
/opt/Citrix/ICAClient/selfservice
```

and press Enter (where /opt/Citrix/ICAClient is the directory in which you installed Citrix Workspace app).

### Linux desktop

You can start the Citrix Workspace app from a desktop environment for Linux by navigating to it using a file manager.

On some desktops, you can also start Citrix Workspace app from a menu. Citrix Workspace app is located in different menus depending on your Linux distribution.

### Preferences

To set preferences, click **Preferences** from the Citrix Workspace app menu. You can control how desktops are displayed, connect to different applications and desktops, and manage file and device access.

### Manage an account

To access desktops and applications, you need an account with XenDesktop or Citrix Virtual Apps. Your IT help desk might ask you to add an account to Citrix Workspace for this purpose. Or they might ask you to use a different Citrix Gateway or Access Gateway server for an existing account. You can also remove accounts from Citrix Workspace.

1. On the Accounts page of the Preferences dialog box, do one of the following:
  - To add an account, click Add. Your help desk may alternatively provide a provisioning file with account information that you can use to create an account.
  - To change details of a store that the account uses, such as the default gateway, click Edit.
  - To remove an account, click Remove.
2. Follow the on-screen prompts. You may be required to authenticate to the server.

## Desktop display

### Note:

This feature is not available with Citrix Virtual Apps for UNIX sessions.

You can display desktops across the entire screen on your user device (full screen mode), which is the default, or in a separate window (windowed mode).

- On the General page of the Preferences dialog box, select a mode using the **Display desktop in** option.

Citrix Workspace app now has the **You can enable Desktop Viewer** toolbar functionality so it is possible dynamically modify the window configuration of your remote session from the original settings specified by the configuration mentioned here.

## Desktop viewer

Different enterprises have different corporate needs. Your requirements for the way users access virtual desktops may vary from user to user and may vary as your corporate needs evolve. The user experience of connecting to virtual desktops and the extent of user involvement in configuring the connections depend on how you set up Citrix Workspace App for Linux.

Use the Desktop Viewer when users interact with their virtual desktop. The user's virtual desktop can be a published virtual desktop, or a shared or dedicated desktop. In this access scenario, the Desktop Viewer toolbar functionality allows the user to switch a session between windowed and full-screen session window, including multi-monitor support for the intersected monitors. Users can switch between desktop sessions and work with more than one desktop using multiple Citrix Virtual Apps and Desktops connections on the same user device. Buttons to minimize all desktop sessions, send the Ctrl+Alt+Del sequence, disconnect, and log off the session are provided to manage a user's session conveniently.

As an accessibility feature of the Desktop Viewer, pressing Ctrl+Alt+Break displays the Desktop Viewer toolbar buttons in a pop-up window.

See the Linux OEM guide for advanced configuration entries to enable or disable Desktop Viewer or change the accessibility key sequence.

## Automatic session reconnect

Citrix Workspace app can reconnect to desktops and applications that you become disconnected from (for example, if there is a network infrastructure issue):

- On the **General** page of the **Preferences** dialog box, select an option in **Reconnect apps and desktops**.

## Access local files

A virtual desktop or application may need to access files on your device. You can control the extent to which this happens.

1. On the File Access page of the Preferences dialog box, select a mapped drive and then one of the following options:
  - Read and write - Allow the desktop or application to read and write to local files.
  - Read only - Allow the desktop or application to read but not write to local files.
  - No access - Do not allow the desktop or application to access local files.
  - Ask me each time - Display a prompt each time the desktop or application needs to access local files.
2. If you selected one of the options that grants access to local files, you can additionally save time when browsing to locations on your user device. Click Add, specify the location, and select a drive to map to it.

## Microphone and Webcam

To set up a microphone or a webcam, you can change the way a virtual desktop or application accesses your local microphone or webcam:

On the Mic & Webcam page of the Preferences dialog box, select one of the following options:

- Use my microphone and webcam - Allow the microphone and webcam to be used by the desktop or application.
- Don't use my microphone or webcam - Do not allow the microphone or webcam to be used by the desktop or application.

## Flash Player

You can choose how Flash content is displayed. This content is normally displayed in Flash Player and includes video, animation, and applications:

On the Flash page of the Preferences dialog box, select one of the following options:

- Optimize content - Improve playback quality at the risk of reducing security.
- Don't optimize content - Provide basic playback quality without reducing security.
- Ask me each time - Prompt me each time Flash content is displayed.

## Connect

Citrix Workspace provides users with secure, self-service access to virtual desktops and applications, and on-demand access to Windows, web, and Software as a Service (SaaS) applications. Citrix Store-

Front or legacy webpages created with Web Interface manage the user access.

### **To connect to resources using the Citrix Workspace UI**

The Citrix Workspace app home page displays virtual desktops and applications that are available to the users based on their account settings (that is, the server they connect to) and settings configured by Citrix Virtual Apps and Desktops administrators. Using the Preferences > Accounts page, users can perform that configuration themselves by entering the URL of a StoreFront server or, if email-based account discovery is configured, by entering their email address.

#### **Tip:**

If you use the same name for multiple stores on the StoreFront server, you avoid duplications by adding numbers. The names for such stores depend on the order in which they are added. For PNAgent, the store URL is displayed and uniquely identifies the store.

After connecting to a store, self-service shows the tabs: FAVORITES, DESKTOPS, and APPS. To launch a session, click the appropriate icon. To add an icon to FAVORITES, click the “Details” link next to the icon and select “Add To Favorites.”

### **Configure connection settings**

You can configure some default settings for connections between Citrix Workspace app for Linux and Citrix Virtual Apps and Desktops servers. You can also change those settings for individual connections, if necessary.

Although the tasks and responsibilities of administrators and users can overlap, the term “user” is employed to distinguish typical user tasks from those typically performed by administrators.

### **Connect to resources from a command line or browser**

You create connections to servers when you click on a desktop or application icon on the Citrix Workspace app home page. In addition, you can open connections from a command line or from a web browser.

### **To create a connection to a Program Neighborhood or StoreFront server using a command line**

#### **Prerequisite:**

Ensure that the store is known to Citrix Workspace app. If necessary, add it using the following command:

```
./util/storebrowse --addstore \
```

1. Obtain the unique ID of the desktop or application that you want to connect to. This is the first quoted string on a line acquired in one of the following commands:

- List all of the desktops and applications on the server:

```
./util/storebrowse -E <store URL>
```

- List the desktops and applications that you have subscribed to:

```
./util/storebrowse -S <store URL>
```

2. Run the following command to start the desktop or application:

```
./util/storebrowse -L <desktop or application ID> <store URL>
```

If you cannot connect to a server, your administrator might need to change the server location or SOCKS proxy details. For more information, see [proxy server](#).

### To create a connection from a web browser

Configuration for starting sessions from a web browser is typically carried out automatically during installation. Because of the wide variety of browsers and operating systems, some manual configuration can be required.

If you set up .mailcap and MIME files for Firefox, Mozilla, or Chrome manually, use the following file modifications so that .ica files start up the Citrix Workspace app executable, wfica. To use other browsers, modify the browser configuration accordingly.

1. Run the following commands for non-administrator installation of Citrix Workspace app. The settings of ICAROOT might be changed if they are installed to a non-default location. You can test the result with the command

```
xdg-mime query default application/x-ica, which must return "wfica.desktop."
```

```
setenv ICAROOT=/opt/Citrix/ICAClient
```

```
xdg-icon-resource install --size 64
```

```
$ICAROOT/icons/000\\_Receiver_64.png Citrix Workspace app
```

```
xdg-mime default wfica.desktop application/x-ica
```

```
xdg-mime default new\\_store.desktop application/vnd.citrix.receiver.  
configure
```

2. Create or extend the file /etc/xdg/mimeapps.list (for administrator installation) or \$HOME/.local/share/applications/mimeapps.list (mimeapps.list). The file must start with [Default Applications], and follow by:

```
application/x-ica=wfica.desktop;
```

```
application/vnd.citrix.receiver.configure=new\\_store.desktop;
```

You might need to configure Firefox on its Preferences/Applications setting page.

For “Citrix ICA settings file content,” select:

- “Citrix Workspace app Engine (default)” in the pull-down menu
- or
- “Use other ...” and then select the file /usr/share/applications/wfica.desktop (for an administrator installation of Citrix Workspace app)
- or
- \$HOME/.local/share/applications/wfica.desktop (for a non-administrator installation).

## Connection Center

Users can manage their active connections using the Connection Center. This feature is a useful productivity tool that enables users and administrators to troubleshoot slow or problematic connections. With Connection Center, users can manage connections by:

- Closing an application.
- Logging off a session. This step ends the session and closes any open applications.
- Disconnecting from a session. This step cuts the selected connection to the server without closing any open applications (unless the server is configured to close applications on disconnection).
- Viewing connection transport statistics.

## Manage a connection

To manage a connection using Connection Center:

1. On the Citrix Workspace app menu, click **Connection Center**.

The servers that are used are shown and, for each server, the active sessions are listed.

2. Do one of the following:
  - Select a server, and disconnect from it, log off from it, or view properties of it.
  - Select an application, and close the window it is displayed in.

## Configure

October 21, 2019

When using Citrix Workspace app for Linux, the following configuration steps allow users to access their hosted applications and desktops.

### Settings

#### Configuration files

To change advanced or less common settings, you can modify Citrix Workspace app's configuration files. These configuration files are read each time wfica starts. You can update various files depending on the effect you want the changes to have.

If session sharing is enabled, an existing session might be used instead of a newly reconfigured one. This setting might cause the session to ignore changes you made in a configuration file.

#### Default settings

If you want to change the default for all Citrix Workspace app users, modify the module.ini configuration file in the \$ICAROOT/config directory.

**Note:**

You do not need to add an entry to All\_Regions.ini for a configuration value to be read from module.ini. You can do it unless you want to allow other configuration files to override the value in module.ini. If an entry in All\_Regions.ini sets a specific value, the value in module.ini is not used.

#### Template file

If the \$HOME/.ICAClient/wfclient.ini file does not exist, wfica creates it by copying \$ICAROOT/config/wfclient.template. When you change this template file, the changes apply to all future new Citrix Workspace app users.

#### User settings

If you want the changes to apply to all connections for a particular user, modify the wfclient.ini file in that user's \$HOME/.ICAClient directory. The settings in this file apply to future connections for that user.



## Validate configuration file entries

If you want to limit the values for entries in `wfclient.ini`, you can specify allowed options or ranges of options in `All_Regions.ini`. If you specify only one possible value, that value is used. `$HOME/.ICAClient/All_Regions.ini` can only match or reduce the possible values set by `$ICAROOT/config/All_Regions.ini`, it cannot take away restrictions. See the `All_Regions.ini` file in the `$ICAROOT/config` directory for more information.

### Note:

If an entry appears in more than one configuration file, a value in `wfclient.ini` takes precedence over a value in `module.ini`.

## Parameters

The parameters listed in each file are grouped into sections. Each section begins with a name in square brackets indicating parameters that belong together; for example, `[ClientDrive]` for parameters related to client drive mapping (CDM).

Defaults are automatically supplied for any missing parameters except where indicated. If a parameter is present but is not assigned a value, the default is automatically applied. For example, if `InitialProgram` is followed by an equal sign (=) but no value, the default (not to run a program after logging in) is applied.

## Precedence

`All_Regions.ini` specifies which parameters can be set by other files. It can restrict values of parameters or set them exactly.

For any given connection, the files are checked in the following order:

1. `All_Regions.ini`. Values in this file override those in:
  - The connection's `.ica` file
  - `wfclient.ini`
2. `module.ini`. Values in this file are used if they have not been set in `All_Regions.ini`, the connection's `.ica` file, or `wfclient.ini` but they are not restricted by entries in `All_Regions.ini`.

If no value is found in any of these files, the default in the Citrix Workspace app code is used.

### Note:

There are exceptions to this order of precedence. For example, the code reads some values specifically from `wfclient.ini` for security reasons, to ensure that they are not set by a server.

## CEIP

When you participate in the Citrix Customer Experience Improvement Program (CEIP), anonymous statistics and usage information are sent to Citrix to help Citrix improve the quality and performance of Citrix products. For more information about CEIP, see [About the Citrix Customer Experience Improvement Program \(CEIP\)](#).

By default, you are automatically enrolled in CEIP when you install Citrix Workspace app for Linux. The first upload of data occurs approximately seven days after you install the Citrix Workspace app. The data collected for active users is uploaded to the CIS server every seven days.

Registry setting that controls enrollment in CEIP:

- Location: <ICAROOT>/config/module.ini
- Section: CEIP
- Entry: EnableCeip
- Value: Enable (Default) / Disable

The following anonymous information is collected. The data does not contain any details that identify you as a customer. When EnableCeip is set to Disable, only the Citrix Workspace app version information is collected.

Data point	Description
Machine ID	Identifying the machine where data originates
Linux kernel version	String denoting the machine's kernel version
Linux OS name and version	String denoting the Linux OS name and version of the machine
Data collection date	Denoting the date when data capture is done
CPU model name	Denoting the CPU model of the client machine
System memory information	Collecting system memory information involving total RAM, free RAM, buffer RAM, shared RAM, total swap, free swap, and number of current processes
Monitor resolution	Fetching the monitor resolution of the client machine
Desktop environment	Fetching details on whether the current desktop environment being used in of type -XDG_CURRENT_DESKTOP or DESKTOP_SESSION

---

Data point	Description
Browser version	Fetching information on the browser being used – firefox / chrome / and so on
USB devices information	Fetching information about USB ports available on the client system
Flash version	Fetching information on the Flash version being used
Locale version	Denoting the locale version
Language information	Mapping the keyboard and fetching this information
Schema information	Fetching Citrix Workspace app schema information
Multimedia redirection	Boolean value denoting whether this feature is enabled
Webcam redirection	Boolean value denoting whether webcam redirection is enabled
Flash redirection	Boolean value denoting whether Flash redirection is enabled
MediaStream	Boolean value denoting whether media stream feature is enabled. This includes speed screen audio and video functionality.

---

### ICA-to-X proxy

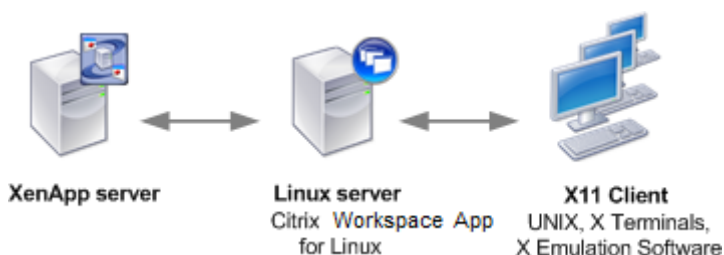
You can use a workstation running Citrix Workspace app as a server and redirect the output to another X11-capable device. You might want to do this to deliver Microsoft Windows applications to X terminals or to UNIX workstations for which Citrix Workspace app is not available.

**Note:**

Citrix Workspace app software is available for many X devices, and installing the software on these devices is the preferred solution in these cases. Running Citrix Workspace app in this way, as an ICA-to-X proxy, is also referred to as server-side ICA.

When you run Citrix Workspace app, you can think of it as an ICA-to-X11 converter that directs the X11 output to your local Linux desktop. However, you can redirect the output to another X11 display. You can run multiple copies of Citrix Workspace app simultaneously on one system with each sending its output to a different device.

This graphic shows a system with Citrix Workspace app for Linux set up as an ICA-to-X proxy:



To set up this type of system, you need a Linux server to act as the ICA-to-X11 proxy:

- If you have X terminals already, you can run Citrix Workspace app on the Linux server that usually supplies the X applications to the X terminals.
- If you want to deploy UNIX workstations for which Citrix Workspace app is not available, you need an extra server to act as the proxy. This can be a PC running Linux.

Applications are supplied to the final device using X11, using the capabilities of the ICA protocol. By default, you can use drive mapping only to access the drives on the proxy. This is not a problem if you are using X terminals (which usually do not have local drives). If you are delivering applications to other UNIX workstations, you can either:

- NFS mount the local UNIX workstation on the workstation acting as the proxy, then point a client drive map at the NFS mount point on the proxy.
- Use an NFS-to-SMB proxy such as SAMBA, or an NFS client on the server such as Microsoft Services for UNIX.

Some features are not passed to the final device:

- USB redirection
- Smart card redirection
- COM port redirection
- Audio is not delivered to the X11 device, even if the server acting as a proxy supports audio.
- Client printers are not passed through to the X11 device. You access the UNIX printer from the server manually using LPD printing, or use a network printer.
- Redirection of multimedia input is not expected to work because it requires a webcam on the machine running Citrix Workspace app, which is the server acting as a proxy. However, redirection of multimedia output works with GStreamer installed on the server acting as a proxy (untested).

To start Citrix Workspace app with server-side ICA from an X terminal or a UNIX workstation:

1. Use ssh or telnet to connect to the device acting as the proxy.
2. In a shell on the proxy device, set the **DISPLAY** environment variable to the local device. For example, in a C shell, type:

```
setenv DISPLAY <local:0>
```

**Note:**

If you use the command `ssh -X` to connect to the device acting as the proxy, you do not need to set the **DISPLAY** environment variable.

3. At a command prompt on the local device, type `xhost <proxy server name>`
4. If Citrix Workspace app is not installed in the default installation directory, ensure that the environment variable `ICAROOT` is set to point to the actual installation directory.
5. Locate the directory where Citrix Workspace app is installed. At a command prompt, type `selfservice &`.

### Server-client content redirection

Server-client content redirection enables administrators to specify that URLs in a published application are opened using a local application. For example, opening a link to a webpage while using Microsoft Outlook in a session opens the required file using the browser on the user device. Server-client content redirection enables administrators to allocate Citrix resources more efficiently, thereby providing users with better performance.

The following types of URL can be redirected:

- HTTP (Hypertext Transfer Protocol)
- HTTPS (Secure Hypertext Transfer Protocol)
- RTSP (Real Player)
- RTSPU (Real Player)
- PNM (Older Real Players)

If Citrix Workspace App for Linux does not have an appropriate application or cannot directly access the content, the URL is opened using the server application.

Server-client content redirection is configured on the server and enabled by default in Citrix Workspace app if the path includes RealPlayer and at least one of Firefox, Mozilla, or Netscape.

**Note:**

For more information about RealPlayer for Linux, see <http://www.real.com/resources/unix/>.

To enable server-client content redirection if RealPlayer and a browser are not in the path

1. Open the configuration file `wfclient.ini`.
2. In the [Browser] section, modify the following settings:  
`Path=path`  
`Command=command`

where path is the directory where the browser executable is located and command is the name of the executable used to handle redirected browser URLs, appended with the URL sent by the server. For example:

```
$ICAROOT/nslaunch netscape,firefox,mozilla
```

This setting specifies the following:

- The nslaunch utility is run to push the URL into an existing browser window
- Each browser in the list is tried in turn until content can be displayed successfully

3. In the [Player] section, modify the following settings:

Path=path

Command=command

where path is the directory where the RealPlayer executable is located and command is the name of the executable used to handle the redirected multimedia URLs, appended with the URL sent by the server.

4. Save and close the file.

**Note:**

For both Path settings, you need only specify the directory where the browser and RealPlayer executables reside. You do not need to specify the full path to the executables. For example, in the [Browser] section, Path might be set to /usr/X11R6/bin rather than /usr/X11R6/bin/netscape. In addition, you can specify multiple directory names as a colon-separated list. If these settings are not specified, the user's current \$PATH is used.

To turn off server-client content redirection from Citrix Workspace:

1. Open the configuration file module.ini.
2. Change the CREnabled setting to Off.
3. Save and close the file.

## Connection

### Citrix Virtual Apps connections using Web Interface

This topic applies only to deployments using either Citrix Virtual Apps Services on Web Interface or “legacy PNAgent” on StoreFront.

Options such as self-service, storebrowse, and pnabrowse enable users to connect to published resources (that is, published applications, and server desktops) through a server running a Citrix Virtual Apps Services. These programs can launch connections directly or can be used to create menu items

through which users can access published resources. `pnabrowse` can also create desktop items for this purpose.

Customizable options for all users running Citrix Virtual Apps on your network are defined in a configuration file, `config.xml`, which is stored on the Web Interface server. When a user starts one of these programs, it reads the configuration data from the server. After that, it updates its settings and user interface periodically, at intervals specified in the `config.xml` file.

**Important:**

The `config.xml` file affects all connections defined by the Citrix Virtual Apps Services.

### Configure connections

On devices with limited processing power or where limited bandwidth is available, there is a trade-off between performance and functionality. Users and administrators can choose an acceptable mixture of rich functionality and interactive performance. Making one or more of these changes, often on the server not the user device, can reduce the bandwidth that a connection requires and can improve performance:

- **Enable SpeedScreen Latency Reduction** - SpeedScreen Latency Reduction improves performance over high latency connections by providing instant feedback to the user in response to typed data or mouse clicks. Use SpeedScreen Latency Reduction Manager to enable this feature on the server. By default, in Citrix Workspace app, this is disabled for keyboard and only enabled for the mouse on high latency connections. See the Citrix Workspace app for Linux OEM's Reference Guide.
- **Enable data compression** - Data compression reduces the amount of data transferred across the connection. This requires more processor resources to compress and decompress the data, but it can increase performance over low-bandwidth connections. Use Citrix Audio Quality and Image Compression policy settings to enable this feature.
- **Reduce the window size** - Change the window size to the minimum that is comfortable. On the XenApp Services site set the Session Options.
- **Reduce the number of colors** - Reduce the number of colors to 256. On the Citrix Virtual Apps and Desktops Site, set the Session Options.
- **Reduce sound quality** - If audio mapping is enabled, reduce the sound quality to the minimum setting using the Citrix Audio quality policy setting.

## Font

### ClearType font smoothing

ClearType font smoothing (also known as subpixel font rendering) improves the quality of displayed fonts beyond that available through traditional font smoothing or anti-aliasing. You can turn this feature on or off. Or you specify the type of smoothing by editing the following setting in [WFClient] section of the appropriate configuration file:

FontSmoothingType = number

where number can take one of the following values:

Value	Behavior
0	The local preference on the device is used. This value is defined by the FontSmoothingTypePref setting.
1	No smoothing
2	Standard smoothing
3	ClearType (horizontal subpixel) smoothing

Both standard smoothing and ClearType smoothing can increase Citrix Workspace app's bandwidth requirements.

#### Important:

The server can configure FontSmoothingType through the ICA file. This takes precedence over the value set in [WFClient].

If the server sets the value to 0, the local preference is determined by another setting in the [WFClient]:  
FontSmoothingTypePref = number

where number can take one of the following values:

Value	Behavior
0	No smoothing
1	No smoothing
2	Standard smoothing
3	ClearType (horizontal subpixel) smoothing (default)



## Folder

### Configure special folder redirection

In this context, there are only two special folders for each user:

- The user's Desktop folder
- The user's Documents folder (My Documents on Windows XP)

Special folder redirection enables you to specify the locations of a user's special folders so that these remain fixed across different server types and server farm configurations. It is important if, for example, a mobile user logs on to servers in different server farms. For static, desk-based workstations, where the user can log on to servers that reside in a single server farm, special folder redirection is rarely necessary.

To configure special folder redirection:

A two-part procedure is as follows. First, you enable special folder redirection by making an entry in `module.ini`; then you specify the folder locations in the `[WFClient]` section, as described here:

1. Add the following text to `module.ini` (for example, `$ICAROOT/config/module.ini`):

```
[ClientDrive]
```

```
SFRAllowed = True
```

2. Add the following text to the `[WFClient]` section (for example, `$HOME/.ICAClient/wfclient.ini`):

```
DocumentsFolder = documents
```

```
DesktopFolder = desktop
```

where `documents` and `desktop` are the UNIX filenames, including the full path, of the directories to use as the users Documents and Desktop folders respectively. For example:

```
DesktopFolder = $HOME/.ICAClient/desktop
```

- You can specify any component in the path as an environment variable, for example, `$HOME`.
- Specify values for both parameters.
- The directories you specify must be available through client device mapping. That is, the directory must be in the subtree of a mapped client device.
- Use the drive letters C or higher.

## User devices

Citrix Workspace app supports client device mapping for connections to Citrix Virtual Apps and Desktops servers. Client device mapping enables a remote application running on the server to access

devices attached to the local user device. The applications and system resources appear to the user at the user device as if they are running locally. Ensure that client device mapping is supported on the server before using these features.

**Note:**

The Security-Enhanced Linux (SELinux) security model can affect the operation of the Client Drive Mapping and USB Redirection features (on both Citrix Virtual Apps and Desktops). If you require either or both of these features, disable SELinux before configuring them on the server.

### Map client drives

Client drive mapping allows drive letters on the Citrix Virtual Apps or Citrix Virtual Desktops server to be redirected to directories that exist on the local user device. For example, drive H in a Citrix user session can be mapped to a directory on the local user device running Workspace app.

Client drive mapping can make any directory mounted on the local user device, including a CD-ROM, DVD, or a USB memory stick, available to the user during a session, provided the local user has permission to access it. When a server is configured to allow client drive mapping, users can access their locally stored files, work with them during their session, and then save them again either on a local drive or on a drive on the server.

Two types of drive mapping are available:

- Static client drive mapping enables administrators to map any part of a user device's file system to a specified drive letter on the server at logon. For example, it can be used to map all or part of a user's home directory or /tmp, and the mount points of hardware devices such as CD-ROMs, DVDs, or USB memory sticks.
- Dynamic client drive mapping monitors the directories in which hardware devices such as CD-ROMs, DVDs, and USB memory sticks are typically mounted on the user device. And any new ones that appear during a session are automatically mapped to the next available drive letter on the server.

When Citrix Workspace app connects to Citrix Virtual Apps or Citrix Virtual Desktops, client drive mappings are reestablished unless client device mapping is disabled. You can use policies to give you more control over how client device mapping is applied. For more information, see the [Citrix Virtual Apps and Desktops](#) documentation.

Users can map drives using the Preferences dialog box.

**Note:**

By default, enabling static client drive mapping also enables dynamic client drive mapping. To disable the latter but enable the former, set DynamicCDM to False in wfclient.ini.

## Map client printers

Citrix Workspace app supports printing to network printers and printers that are attached locally to user devices. By default, unless you create policies to change it, Citrix Virtual Apps lets users:

- Print to all printing devices accessible from the user device
- Add printers

These settings, however, might not be the optimum in all environments. For example, the default setting that allows users to print to all printers accessible from the user device is the easiest to administer initially. But the default setting might create slower logon times in some environments. In this situation, you might want to limit the list of printers configured on the user device.

Likewise, your organization's security policies might require that you prevent users from mapping local printing ports. To do so, on the server configure the ICA policy Auto connect client COM ports setting to Disabled.

To limit the list of printers configured on the user device:

1. Open the configuration file, `wfclient.ini`, in one of the following:
  - `$HOME/.ICAClient` directory to limit the printers for a single user
  - `$ICAROOT/config` directory to limit the printers for all Workspace app users. All users in this case are those users who first use the self-service program after the change.
2. In the `[WFClient]` section of the file type:  
`ClientPrinterList=printer1:printer2:printer3`  
Where `printer1`, `printer2`, and so on, are the names of the chosen printers. Separate printer name entries by a colon (:).
3. Save and close the file.

## Map client printers on UNIX

In a UNIX environment, printer drivers defined by Citrix Workspace app are ignored. The printing system on the user device must be able to handle the print format generated by the application.

Before users can print to a client printer from Citrix Virtual Apps for UNIX, printing must be enabled by the administrator. For more information, see the Citrix Virtual Apps for UNIX section in the [Citrix Virtual Apps and Desktops](#) documentation.

## Map a local printer

The Citrix Workspace app for Linux supports the Citrix PS Universal Printer Driver. So, usually no local configuration is required for users to print to network printers or printers that are attached locally to

user devices. You might, however, manually map client printers on Citrix Virtual Apps for Windows if, for example, the user device's printing software does not support the universal printer driver.

To map a local printer on a server:

1. From Citrix Workspace app, start a server connection and log on to a computer running Citrix Virtual Apps.
2. On the Start menu, choose **Settings > Printers**.
3. On the File menu, choose **Add Printer**.

The Add Printer wizard appears.

4. Use the wizard to add a network printer from the Client Network, Client domain. Usually this is a standard printer name, similar to those created by native Remote Desktop Services, such as "HP LaserJet 4 from client name in session 3."

For more information about adding printers, see your Windows operating system documentation.

## Audio

The default audio device is typically the default ALSA device configured for your system. Use the following procedure to specify a different device:

1. Choose and open a configuration file according to which users you want your changes to affect. See [default settings](#) for information about how updates to particular configuration files affect different users.
2. Add the following option, creating the section if necessary:

```
1 [ClientAudio]
2
3 AudioDevice = \<device\>
```

Where device information is located in the ALSA configuration file on your operating system.

### Note:

The location of this information is not standard across all Linux operating systems. Citrix recommends consulting your operating system documentation for more details about locating this information.

## Map client audio

Client audio mapping enables applications executing on the Citrix Virtual Apps server or Citrix Virtual Desktops to play sounds through a sound device installed on the user device. You can set audio quality

on a per-connection basis on the server and users can set it on the user device. If the user device and server audio quality settings are different, the lower setting is used.

Client audio mapping can cause excessive load on servers and the network. The higher the audio quality, the more bandwidth is required to transfer the audio data. Higher quality audio also uses more server CPU to process.

You configure client audio mapping using policies. For more information, see the [Citrix Virtual Apps and Desktops](#) documentation.

**Note:**

Client audio mapping is not supported when connecting to Citrix Virtual Apps for UNIX.

**Enabling UDP audio**

UDP audio can improve the quality of phone calls made over the Internet. It uses User Datagram Protocol (UDP) instead of Transmission Control Protocol (TCP).

**Limitations:**

Following are a few limitations:

- UDP audio is not available in encrypted sessions (that is, those using TLS or ICA Encryption). In such sessions, audio transmission uses TCP.
  - The ICA channel priority can affect UDP audio.
1. Set the following options in the ClientAudio section of module.ini:
    - Set EnableUDPAudio to True. By default, this is set to False, which disables UDP audio.
    - Specify the minimum and maximum port numbers for UDP audio traffic using UDPAudioPortLow and UDPAudioPortHigh respectively. By default, ports 16500 - 16509 are used.
  2. Set client and server audio settings as follows so that the resultant audio is of a medium quality (that is, not high or low).

		Audio quality on client	Audio quality on client	Audio quality on client
		High	Medium	Low
Audio quality on server	High	High	Medium	Low
Audio quality on server	Medium	Medium	Medium	Low
Audio quality on server	Low	Low	Low	Low

## UDP on the client

In \$ICAROOT/config/module.ini file, add the following:

Under the [ClientAudio] section:

```
1 EnableUDPAudio=True
2 UDPAudioPortLow=int
3 UDPAudioPortHigh=int
```

In \$HOME/.ICAClient/wfclient.ini file, add the following:

Under the [WFClient] section:

```
1 AllowAudioInput=True
2 EnableAudioInput=true
3 AudioBandWidthLimit=1
```

### Note:

If the .ICAClient folder is not found (occurs only in case of first time installation and launching) launch the Citrix Workspace app and close. This action creates the .ICAClient folder.

Add the following under wfclient.ini.\* Set policy on DDC:

```
1 Set "Windows Media redirection" to "Prohibited"
2 Set "Audio over UDP" to "Allowed"
3 Set "Audio over UDP real time transport" to "enabled"
4 Set "Audio quality" to "Medium"
```

## Changing how Citrix Workspace app is used

ICA technology is highly optimized and typically does not have high CPU and bandwidth requirements. However, if you are using a very low-bandwidth connection, consider the following to preserve performance:

- **Avoid accessing large files using client drive mapping.** When you access a large file with client drive mapping, the file is transferred over the server connection. On slow connections, this might take a long time.
- **Avoid printing large documents on local printers.** When you print a document on a local printer, the print file is transferred over the server connection. On slow connections, this might take a long time.
- **Avoid playing multimedia content.** Playing multimedia content uses many bandwidth and can cause reduced performance.

## USB

USB support enables users to interact with a wide range of USB devices when connected to a virtual desktop. Users can plug USB devices into their computers and the devices are redirected to their virtual desktop. USB devices available for remoting include flash drives, smartphones, PDAs, printers, scanners, MP3 players, security devices, and tablets.

USB redirection requires either Citrix Virtual Apps 7.6 (or later) or Citrix Virtual Desktops. Citrix Virtual Apps does not support USB redirection of mass storage devices and requires special configuration to support audio devices. See [Citrix Virtual Apps 7.6 documentation](#) for details.

Isochronous features in USB devices such as webcams, microphones, speakers, and headsets are supported in typical low latency/high speed LAN environments. But usually the standard audio or webcam redirection are more suitable.

The following types of device are supported directly in a Citrix Virtual Apps and Desktops session, and so do not use USB support:

- Keyboards
- Mice
- Smart cards
- Headsets
- Webcams

### Note:

Specialist USB devices (for example, Bloomberg keyboards and 3D mice) can be configured to use USB support. For information on configuring policy rules for other specialist USB devices, see [CTX119722](#).

By default, certain types of USB devices are not supported for remoting through Citrix Virtual Apps and Desktops. For example, a user might have a NIC attached to the system board by internal USB. Remoting this would not be appropriate. The following types of USB device are not supported by default for use in a Citrix Virtual Apps and Desktops session:

- Bluetooth dongles
- Integrated NICs
- USB hubs

To update the default list of USB devices available for remoting, edit the `usb.conf` file, located in `$ICA-ROOT/`. For more information, see the [Update the list of USB devices available for remoting](#) section.

To allow the remoting of USB devices to virtual desktops, enable the USB policy rule. For more information, see the [Citrix Virtual Apps and Desktops](#) documentation.

## How USB support works

When a user plugs in a USB device, it is checked against the USB policy, and, if allowed, redirected to the virtual desktop. If the device is denied by the default policy, it is available only to the local desktop.

For desktops accessed through desktop appliance mode, when a user plugs in a USB device, that device is automatically redirected to the virtual desktop. The virtual desktop is responsible for controlling the USB device and displaying it in the user interface.

The session window must have focus when the user plugs in the USB device for redirection to occur, unless desktop appliance mode is in use.

## Mass storage devices

If a user disconnects from a virtual desktop when a USB mass storage device is still plugged in to the local desktop, that device is not redirected to the virtual desktop when the user reconnects. To ensure that the mass storage device is redirected to the virtual desktop, the user must remove and reinsert the device after reconnecting.

### Note:

If you insert a mass storage device into a Linux workstation that has been configured to deny remote support for USB mass storage devices, the device will not be accepted by the Workspace app software. And a separate Linux file browser might open. Therefore, Citrix recommends that you pre-configure user devices with the **Browse removable media when inserted** setting cleared by default. On Debian-based devices, do this using the Debian menu bar by selecting **Desktop > Preferences > Removable Drives and Media**. And on the **Storage** tab, under **Removable Storage**, clear the **Browse removable media when inserted** check box.

For the Client USB device redirection, note the following point.

### Note:

- If the Client USB device redirection server policy is turned on, mass storage devices are always directed as USB devices even if client drive mapping is turned on.
- The app does not support composite device redirection for USB devices.

## USB classes

The following classes of USB device are allowed by the default USB policy rules:

- Audio (Class 01)

Includes microphones, speakers, headsets, and MIDI controllers.



- Physical Interface (Class 05)

These devices are similar to HIDs, but generally provide real-time input or feedback and include force feedback joysticks, motion platforms, and force feedback exoskeletons.

- Still Imaging (Class 06)

Includes digital cameras and scanners. Digital cameras often support the still imaging class which uses the Picture Transfer Protocol (PTP) or Media Transfer Protocol (MTP) to transfer images to a computer or other peripheral. Cameras might also appear as mass storage devices. And it might be possible to configure a camera to use either class, through setup menus provided by the camera itself.

If a camera appears as a mass storage device, client drive mapping is used, and USB support is not required.

- Printers (Class 07)

In general most printers are included in this class, although some use vendor-specific protocols (class ff). Multi-function printers might have an internal hub or be composite devices. In both cases, the printing element generally uses the Printers class and the scanning or fax element uses another class; for example, Still Imaging.

Printers normally work appropriately without USB support.

- Mass Storage (Class 08)

The most common mass storage devices are USB flash drives; others include USB-attached hard drives, CD/DVD drives, and SD/MMC card readers. There is a wide variety of devices having internal storage which also presents a mass storage interface; these include media players, digital cameras, and mobile phones. Known subclasses include:

- 01 Limited flash devices
- 02 Typically CD/DVD devices (ATAPI/MMC-2)
- 03 Typically tape devices (QIC-157)
- 04 Typically floppy disk drives (UFI)
- 05 Typically floppy disk drives (SFF-8070i)
- 06 Most mass storage devices use this variant of SCSI

Mass storage devices can often be accessed through client drive mapping, and so USB support is not required.

Important: Some viruses are known to propagate actively using all types of mass storage. Consider carefully whether or not there is a business need to permit the use of mass storage devices, either through client drive mapping, or USB support. To reduce this risk, the server might be configured to prevent files being executed through client drive mapping.

- Content Security (Class 0d)  
Content security devices enforce content protection, typically for licensing or digital rights management. This class includes dongles.
- Personal Healthcare (Class 0f)  
These devices include personal healthcare devices such as blood pressure sensors, heart rate monitors, pedometers, pill monitors, and spirometers.
- Application and Vendor Specific (Classes fe and ff)  
Many devices use vendor specific protocols or protocols not standardized by the USB consortium, and these usually appear as vendor-specific (class ff).

### USB device classes

The following classes of USB device are denied by the default USB policy rules:

- Communications and CDC Control (Classes 02 and 0a)  
Includes modems, ISDN adapters, network adapters, and some telephones and fax machines.  
The default USB policy does not allow these devices, because one of them might be providing the connection to the virtual desktop itself.
- Human Interface Devices (Class 03)  
Includes a wide variety of both input and output devices. Typical Human Interface Devices (HIDs) are keyboards, mice, pointing devices, graphic tablets, sensors, game controllers, buttons, and control functions.  
Subclass 01 is known as the boot interface class and is used for keyboards and mice.  
The default USB policy does not allow USB keyboards (class 03, subclass 01, protocol 1), or USB mice (class 03, subclass 01, protocol 2). This is because most keyboards and mice are handled appropriately without USB support. And it is normally necessary to use these devices locally as well remotely when connecting to a virtual desktop.
- USB Hubs (Class 09)  
USB Hubs allow extra devices to be connected to the local computer. It is not necessary to access these devices remotely.
- Smart card (Class 0b)  
Smart card readers include contactless and contact smart card readers, and also USB tokens with an embedded smart card equivalent chip.  
Smart card readers are accessed using smart card remoting and do not require USB support.

- Video (Class 0e)

The video class covers devices that are used to manipulate video or video-related material, such as webcams, digital camcorders, analog video converters, some television tuners, and some digital cameras that support video streaming.

By default, optimum webcam performance is provided by HDX RealTime Webcam Video Compression.

- Wireless Controllers (Class e0)

Includes a wide variety of wireless controllers, such as ultra wide band controllers and Bluetooth.

Some of these devices might be providing critical network access, or connecting critical peripherals such as Bluetooth keyboards or mice.

The default USB policy does not allow these devices. However, there might be particular devices it is appropriate to provide access to using USB support.

### List of USB devices

You can update the range of USB devices available for remoting to desktops by editing the list of default rules contained in the `usb.conf` file on the user device in `$(CAROOT)/`.

You update the list by adding new policy rules to allow or deny USB devices not included in the default range. Rules created by an administrator in this way control which devices are offered to the server. The rules on the server control which of these to be accepted.

The default policy configuration for disallowed devices is:

```
DENY: class=09 # Hub devices
```

```
DENY: class=03 subclass=01 # HID Boot device (keyboards and mice)
```

```
DENY: class=0b # Smartcard
```

```
DENY: class=e0 # Wireless Controllers
```

```
DENY: class=02 # Communications and CDC Control
```

```
DENY: class=03 # UVC (webcam)
```

```
DENY: class=0a # CDC Data
```

```
ALLOW: # Ultimate fallback: allow everything else
```

## USB policy rules

Tip: When creating policy rules, see the USB Class Codes, available from the USB web site at <http://www.usb.org/>. Policy rules in `usb.conf` on the user device take the format {ALLOW:|DENY:} followed by a set of expressions based on values for the following tags:

Tag	Description
VID	Vendor ID from the device descriptor
REL	Release ID from the device descriptor
PID	Product ID from the device descriptor
Class	Class from either the device descriptor or an interface descriptor
SubClass	SubClass from either the device descriptor or an interface descriptor
Prot	Protocol from either the device descriptor or an interface descriptor

When creating policy rules, be aware of the following:

- Rules are case-insensitive.
- Rules might have an optional comment at the end, introduced by “#.” A delimiter is not required and the comment is ignored for matching purposes.
- Blank and pure comment lines are ignored.
- Whitespace used as a separator is ignored, but cannot appear in the middle of a number or identifier. For example, `Deny: Class=08 SubClass=05` is a valid rule; `Deny: Class=0 8 Sub Class=05` is not.
- Tags must use the matching operator “=” For example, `VID=1230`.

### Example

The following example shows a section of the `usb.conf` file on the user device. For these rules to be implemented, the same set of rules must exist on the server.

```
ALLOW: VID=1230 PID=0007 # ANOther Industries, ANOther Flash Drive
```

```
DENY: Class=08 SubClass=05 # Mass Storage Devices
```

```
DENY: Class=0D # All Security Devices
```

## Start-up modes

Using desktop appliance mode, you can change how a virtual desktop handles previously attached USB devices. In the WfClient section in the file \$ICAROOT/config/module.ini on each user device, set DesktopApplianceMode = Boolean as follows.

---

TRUE	Any USB devices that are already plugged in start-up provided the device is not disallowed with a Deny rule in the USB policies on either the server (registry entry) or the user device (policy rules configuration file).
FALSE	No USB devices start up.

---

## Webcams

By default, optimum webcam performance is provided by HDX RealTime Webcam Video Compression. In some circumstances, however, you may require users to connect webcams using USB support. To do this, you must disable HDX RealTime Webcam Video Compression. For more information, see [Video Conferencing with HDX RealTime Webcam Video Compression](#).

## Webcam redirection

Following are a few points on webcam redirection:

- Webcam redirection works with and without RTME.
- Webcam redirection works for 32-bit applications. For example, Skype, GoToMeeting. Use a 32-bit browser to verify webcam redirection online. For example, [www.webcamtests.com](http://www.webcamtests.com)
- Webcam usage is exclusive to applications. For example, when Skype is running with a webcam and you launch GoToMeeting, exit Skype to use the webcam with GoToMeeting.

## Xcapture

The Citrix Workspace app package includes a helper application, xcapture, to assist with the exchange of graphical data between the server clipboard and non-ICCCM-compliant X Windows applications on the X desktop. Users can use xcapture to:

- Capture dialog boxes or screen areas and copy them between the user device desktop (including non-ICCCM-compliant applications) and an application running in a connection window
- Copy graphics between a connection window and X graphics manipulation utilities xmag or xv

To start xcapture from the command line:

At the command prompt, type `/opt/Citrix/ICAClient/util/xcapture` and press ENTER (where `/opt/Citrix/ICAClient` is the directory in which you installed Citrix Workspace app).

To copy from the user device desktop:

1. From the xcapture dialog box, click From Screen. The cursor changes to a crosshair.
2. Choose from the following tasks:
  - Select a window. Move the cursor over the window you want to copy and click the middle mouse button.
  - Select a region. Hold down the left mouse button and drag the cursor to select the area you want to copy.
  - Cancel the selection. Click the right mouse button. While dragging, you can cancel the selection by clicking the right button before releasing the middle or left mouse button.
3. From the xcapture dialog box, click To ICA. The xcapture button changes color to show that it is processing the information.
4. When the transfer is complete, use the appropriate paste command in an application launched from the connection window.

To copy from xv to an application in a connection window:

1. From xv, copy the information.
2. From the xcapture dialog box, click From XV and then click To ICA. The xcapture button changes color to show that it is processing the information.
3. When the transfer is complete, use the appropriate paste command in an application launched from the connection window.

To copy from an application in the connection window to xv:

1. From the application in a connection window, copy the information.
2. From the xcapture dialog box, click From ICA and then click To XV. The xcapture button changes color to show that it is processing the information.
3. When the transfer is complete, paste the information into xv.

## Mouse

### Relative Mouse

Relative Mouse support provides an option to interpret the mouse position in a relative rather than absolute manner. This capability is required for applications that demand relative mouse input rather

than absolute.

**Note:**

This feature is available only in sessions running on Citrix Virtual Apps or Citrix Virtual Desktops 7.8 (or later). It is disabled by default.

**To enable the feature:**

In the file `$HOME/.ICAClient/wfclient.ini`, in the section `[WFClient]`, add the entry `RelativeMouse=1`.

This step enables the feature but keeps it inactive until you activate it.

**Tip:**

Refer to the section `Alternative Relative Mouse values` for additional information about enabling relative mouse features.

**To activate the feature:**

Type `Ctrl/F12`.

After the feature is enabled, type `Ctrl/F12` again to synchronize the server pointer position with the client. The server and client pointer positions are not synchronized when using Relative Mouse.

**To deactivate the feature:**

Type `Ctrl-Shift/F12`.

The feature is also switched off when a session window loses focus.

### Alternative Relative Mouse values

Alternatively, consider using the following values for `RelativeMouse`:

- `RelativeMouse=2` Enables the feature and activates it whenever a session window gains focus.
- `RelativeMouse=3` Enables, activates, and keeps the feature activated always.
- `RelativeMouse=4` Enables or disables the feature when the client-side mouse pointer is hidden or shown. This mode is suitable for automatically enabling or disabling relative mouse for first-person gaming-style application interfaces.

To change the keyboard commands, add settings like:

- `RelativemouseOnChar=F11`
- `RelativeMouseOnShift=Shift`
- `RelativemouseOffChar=F11`
- `RelativeMouseOffShift=Shift`

The supported values for **RelativemouseOnChar** and **RelativemouseOffChar** are listed under `[Hotkey Keys]` in the `config/module.ini` file in the Citrix Workspace app installation tree. The values

for **RelativeMouseOnShift** and **RelativeMouseOffShift** set the modifier keys to be used and are listed under the [Hotkey Shift States] heading.

## Keyboard

### Keyboard behavior

To generate a remote Ctrl+Alt+Delete key combination:

1. Decide which key combination creates the Ctrl+Alt+Delete combination on the remote virtual desktop.
2. In the WFClient section of the appropriate configuration file, configure UseCtrlAltEnd accordingly:
  - True means that Ctrl+Alt+End passes the Ctrl+Alt+Delete combination to the remote desktop.
  - False (default) means that Ctrl+Alt+Enter passes the Ctrl+Alt+Delete combination to the remote desktop.

### Bloomberg keyboard redirection

**Note:**

Bloomberg audio redirection follows similar configuration steps.

You can achieve Bloomberg keyboard redirection as follows:

- through generic USB redirection
- through generic USB redirection and with selective redirection support

### Generic redirection

Configuring the Bloomberg v4 keyboard through Generic USB Redirection on the client side:

As a prerequisite, the policy should be enabled in Domain Delivery Controller (DDC).

1. Find the vid and pid of the Bloomberg keyboard. For example, in Debian and Ubuntu run the following command:

```
lsusb
```

2. Go to \$ICAROOT and edit the usb.conf file.
3. Add the following entry in the usb.conf file to allow the Bloomberg keyboard for USB redirection, and then save the file.

```
ALLOW: vid=1188 pid=9545
```



4. Restart the `ctxusb` daemon on the client. For example, in Debian and Ubuntu run the following command:

```
systemctl restart ctxusb
```

5. Launch a client session. Make sure the session has focus while plugging in the Bloomberg v4 keyboard for redirection.

### Selective redirection

This feature allows the use of the Bloomberg v4 keyboard interface across multiple sessions. This functionality provides flexibility to use the keyboard in all remote sessions except the fingerprint and audio interfaces. The fingerprint and audio interfaces are redirected to single sessions as before.

**Note:**

By default, this feature is enabled for x86 and x64 platforms and is disabled for ARMHF platforms.

To enable the feature:

1. Edit the `BloombergRedirection` section as follows in the `config/All_Regions.ini` file.

```
BloombergRedirection=true
```

2. Perform all the steps mentioned in Generic redirection.

To disable the feature:

1. Edit the `BloombergRedirection` section in the `config/All_Regions.ini` file.

2. Set the `BloombergRedirection` value to false.

```
BloombergRedirection=false
```

3. Perform all the steps mentioned in Generic redirection.

**Note:**

Setting the value to false reverts the functionality to the behavior present in earlier versions of the client, where all the interfaces are redirected to a single session.

### Automatic reconnection

This topic describes the HDX Broadcast auto-client reconnection feature. Citrix recommends that you use this feature with the HDX Broadcast session reliability feature.

Users can be disconnected from their sessions because of unreliable networks, highly variable network latency, or range limitations of wireless devices. With the HDX Broadcast auto-client reconnection feature, Citrix Workspace app for Linux can detect unintended disconnections of sessions and reconnect users to the affected sessions automatically.

When this feature is enabled on the server, users do not have to reconnect manually to continue working. Citrix Workspace attempts to reconnect to the session a set number of times until there is a successful reconnection or the user cancels the reconnection attempts. If user authentication is required, a dialog box requesting credentials appears to a user during automatic reconnection. Automatic reconnection does not occur if users exit applications without logging off. Users can reconnect only to disconnected sessions.

By default, Citrix Workspace App for Linux waits 30 seconds before attempting to reconnect to a disconnected session and attempts to reconnect to that session three times.

When connecting through an AccessGateway, ACR is not available. To protect against network dropouts, ensure that Session Reliability is enabled both on the Server and Client, as well as configured on the AccessGateway.

For instructions on configuring HDX Broadcast auto-client reconnection, see your Citrix Virtual Apps and Desktops documentation.

### **Session reliability**

This topic describes the HDX Broadcast session reliability feature, which is enabled by default.

With HDX Broadcast session reliability, users continue to see a published application's window if the connection to the application experiences an interruption. For example, wireless users entering a tunnel may lose their connection when they enter the tunnel and regain it when they emerge on the other side. During the downtime, all of the user's data, key presses, and other interactions are stored, and the application appears frozen. When the connection is re-established, these interactions are replayed into the application.

When auto-client reconnection and session reliability are configured, session reliability takes precedence if there is a connection problem. Session reliability attempts to re-establish a connection to the existing session. It might take up to 25 seconds to detect a connection problem. And then takes a configurable period (the default is 180 seconds) to attempt the reconnection. If session reliability fails to reconnect, then auto-client reconnect attempts to reconnect.

If HDX Broadcast session reliability is enabled, the default port used for session communication switches from 1494 to 2598.

Citrix Workspace users cannot override the server settings. For more information, see the [Citrix Virtual Apps and Desktops](#) documentation.

#### **Important:**

HDX Broadcast session reliability requires that another feature, Common Gateway Protocol, is

enabled (using policy settings) on the server. Disabling Common Gateway Protocol also disables HDX Broadcast session reliability.

### **Multimedia performance**

The Citrix Workspace app includes a broad set of technologies that provide a high-definition user experience for today's media-rich user environments. These improve the user experience when connecting to hosted applications and desktops, as follows:

- HDX MediaStream Windows Media Redirection
- HDX MediaStream Flash Redirection
- HDX RealTime Webcam Video Compression
- H.264 support

#### **Note:**

Citrix supports RTOP coexistence with Citrix Workspace app for Linux Version 1901 and later with GStreamer 0.1.

### **HDX Mediastream Windows Media Redirection**

HDX Mediastream Windows Media Redirection overcomes the need for the high bandwidths required to provide multimedia capture and playback on virtual Windows desktops accessed from Linux user devices. Windows Media Redirection provides a mechanism for playing the media run-time files on the user device rather than on the server, thereby reducing the bandwidth requirements for playing multimedia files.

Windows Media Redirection improves the performance of Windows Media player and compatible players running on virtual Windows desktops. A wide range of file formats are supported, including:

- Advanced Systems Format (ASF)
- Motion Picture Experts Group (MPEG)
- Audio-Video Interleaved (AVI)
- MPEG Audio Layer-3 (MP3)
- WAV sound files

Citrix Workspace app includes a text-based translation table, `MediaStreamingConfig.tbl`, for translating Windows-specific media format GUIDs into MIME types GStreamer can use. You can update the translation table to do the following:

- Add previously unknown or unsupported media filters/file formats to the translation table
- Block problematic GUIDs to force fall-back to server-side rendering.
- Add more parameters to existing MIME strings to allow for troubleshooting of problematic formats by changing a stream's GStreamer parameters

- Manage and deploy custom configurations depending on the media file types supported by GStreamer on a user device.

With client-side fetching, you can also allow the user device to stream media directly from URLs of the form <http://>, [<mms://>](mms://), or [<rtsp://>](rtsp://) rather than streaming the media through a Citrix server. The server is responsible for directing the user device to the media, and for sending control commands (including Play, Pause, Stop, Volume, Seek). But the server does not handle any media data. This feature requires advanced multimedia GStreamer libraries on the device.

To implement HDX MediaStream Windows Media Redirection:

1. Install GStreamer 0.10, an open-source multimedia framework, on each user device that requires it. Typically, you install GStreamer before you install Citrix Workspace app to allow the installation process to configure Citrix Workspace app to use it.

Most Linux distributions include GStreamer. Alternatively, you can download GStreamer from <http://gstreamer.freedesktop.org>.

2. To enable client-side fetching, install the required GStreamer protocol source *plugins* for the file types that users play on the device. You can verify that a plug-in is installed and operational using the `gst-launch` utility. If `gst-launch` can play the URL, the required plug-in is operational. For example, run `gst-launch-0.10 playbin2 uri=<http://example-source/file.wmv>` and check that the video plays correctly.
3. When installing Citrix Workspace app on the device, select the GStreamer option if you are using the tarball script (this is done automatically for the .deb and .rpm packages).

Note about the client-side fetching feature:

- By default, this feature is enabled. You can disable it using the `SpeedScreenMMACSFEnabled` option in the Multimedia section of `All-Regions.ini`. With this option set to `False`, Windows Media Redirection is used for media processing.
- By default, all MediaStream features use the GStreamer `playbin2` protocol. You can revert to the earlier `playbin` protocol for all MediaStream features except Client-Side Fetching, which continues to use `playbin2`, using the `SpeedScreenMMAEnablePlaybin2` option in the Multimedia section of `All-Regions.ini`.
- Citrix Workspace app does not recognize playlist files or stream configuration information files such as `.asx` or `.nsc` files. If possible, users must specify a standard URL that does not reference these file types. Use `gst-launch` to verify that a given URL is valid.

Note about GStreamer 1.0:

- By default, GStreamer 0.10 is used for HDX MediaStream Windows media redirection. GStreamer 1.0 is used only when GStreamer 0.10 is not available.
- If you want to use GStreamer 1.0, follow the instructions below:

1. Find the install directory of the GStreamer plug-ins. Depending on your distribution, the OS architecture, and the way you install GStreamer, the installation location of the plug-ins varies. The typical installation path is `/usr/lib/x86_64-linux-gnu/gstreamer-1.0` or `$HOME/.local/share/gstreamer-1.0`.
2. Find the install directory of Citrix Workspace app for Linux. The default directory for privileged (root) user installations is `/opt/Citrix/ICAClient`. The default directory for non-privileged user installations is `$HOME/ICAClient/platform` (where platform can be `linuxx64`, for example). For more information, see [Install and set up](#).
3. Install `libgstflatstm1.0.so` by making a symbolic link in the GStreamer plug-ins directory: `ln -sf $ICACLIENT_DIR/util/libgstflatstm1.0.so $GST_PLUGINS_PATH/libgstflatstm1.0.so`. This step might require elevated permissions, with `sudo`, for example.
4. Use `gst_play1.0` as the player: `ln -sf $ICACLIENT_DIR/util/gst_play1.0 $ICACLIENT_DIR/util/gst_play`. This step might require elevated permissions, with `sudo`, for example.
  - If you want to use GStreamer 1.0 in HDX RealTime Webcam Video Compression, use `gst_read1.0` as the reader: `ln -sf $ICACLIENT_DIR/util/gst_read1.0 $ICACLIENT_DIR/util/gst_read`.

## HDX MediaStream Flash Redirection

HDX MediaStream Flash Redirection enables Adobe Flash content to play locally on user devices, providing users with high definition audio and video playback, without increasing bandwidth requirements.

1. Ensure that your user device meets the feature requirements. For more information, see [System requirements](#).
2. Add the following parameters to the `[WFClient]` section of `wfclient.ini` (for all connections made by a specific user) or the `[Client Engine\Application Launching]` section of `All_Regions.ini` (for all users of your environment):
  - **HDXFlashUseFlashRemoting=Ask: Never; Always**

Enables HDX Mediastream for Flash on the user device. By default, this is set to **Never** and users are presented with a dialog box asking them if they want to optimize Flash content when connecting to webpages containing that content.
  - **HDXFlashEnableServerSideContentFetching=Disabled; Enabled**

Enables or disables server-side content fetching for Citrix Workspace app. By default this is set to **Disabled**.
  - **HDXFlashUseServerHttpCookie=Disabled; Enabled**

Enables or disables HTTP cookie redirection. By default, this is set to **Disabled**.

- **HDXFlashEnableClientSideCaching=Disabled; Enabled**

Enables or disables client-side caching for web content fetched by Citrix Workspace app. By default, this is set to **Enabled**.

- **HDXFlashClientCacheSize= [25-250]**

Defines the size of the client-side cache, in MB. This can be any size between 25 MB and 250 MB. When the size limit is reached, existing content in the cache is deleted to allow storage of new content. By default, this is set to **100**.

- **HDXFlashServerSideContentCacheType=Persistent: Temporary; NoCaching**

Defines the type of caching used by Citrix Workspace app for content fetched using server-side content fetching. By default, this is set to **Persistent**.

**Note:** This parameter is required only if **HDXFlashEnableServerSideContentFetching** is set to **Enabled**.

3. Flash redirection is disabled by default. In `/config/module.ini` change `FlashV2=Off` to `FlashV2=On` to enable the feature.

## **HDX RealTime webcam video compression**

HDX RealTime provides a webcam video compression option to improve bandwidth efficiency during video conferencing, ensuring users experience optimal performance when using applications such as GoToMeeting with HD Faces, Skype for Business.

1. Ensure that your user device meets the feature requirements.
2. Ensure that the Multimedia virtual channel is enabled. To do this, open the `module.ini` configuration file, located in the `$ICAROOT/config` directory, and check that `MultiMedia` in the `[ICA3.0]` section is set to "On."
3. Enable audio input by clicking Use my microphone and webcam on the Mic & Webcam page of the Preferences dialog.

## **Disable HDX RealTime webcam video compression**

By default, optimum webcam performance is provided by HDX RealTime Webcam Video Compression. In some circumstances, however, you might require users to connect webcams using USB support. To do this, you must do the following:

- Disable HDX RealTime Webcam Video Compression
- Enable USB support for webcams

1. Add the following parameter to the [WFClient] section of the appropriate .ini file:

HDXWebCamEnabled=Off

For more information, see [default settings](#).

2. Open the usb.conf file, typically located at \$ICAROOT/usb.conf.

3. Remove or comment out the following line:

```
DENY: class=0e # UVC (default via HDX RealTime Webcam Video Compression)
```

4. Save and close the file.

## H.264

Citrix Workspace app supports the display of H.264 graphics, including HDX 3D Pro graphics, that are served by Citrix Virtual Apps and Desktops 7. This support uses the deep compression codec feature, which is enabled by default. The feature provides better performance of rich and professional graphics applications on WAN networks compared with the existing JPEG codec.

Follow the instructions in this topic to disable the feature (and process graphics using the JPEG codec instead). You can also disable text tracking while still enabling deep compression codec support. This helps to reduce CPU costs while processing graphics that include complex images but relatively small amounts of text or non-critical text.

### Important:

To configure this feature, do not use any lossless setting in the Citrix Virtual Apps and Desktops Visual quality policy. If you do, H.264 encoding is disabled on the server and does not work in Citrix Workspace app.

To disable deep compression codec support:

In wfclient.ini, set **H264Enabled** to False. This also disables text tracking.

To disable text tracking only

With deep compression codec support enabled, in wfclient.ini set **TextTrackingEnabled** to False.

## Screen tiles

You can improve the way that JPEG-encoded screen tiles are processed using the direct-to-screen bitmap decoding, batch tile decoding, and deferred XSync features.

1. Ensure that your JPEG library supports these features.
2. In the Thinwire3.0 section of wfclient.ini, set DirectDecode and BatchDecode to True.

Note: Enabling batch tile decoding also enables deferred XSync.

## Enabling logging

To enable logging for Citrix Workspace app for Linux:

1. Download the Citrix Workspace app for Linux and install it on your Linux machine, setting the ICAROOT environment variable to the installation location. For example, /opt/Citrix/ICAClient.  
By default, the TC\_ALL trace class is enabled to provide all the traces.
2. To collect logs for a particular module, open the debug.ini file at \$ICAROOT and add the required trace parameters to the [wfica] section.

Add the trace classes with a “+” symbol. For example, +TC\_LIB. You can add multiple classes separated by the pipe symbol.

For example, +TC\_LIB|+TC\_MMVD.

The following table lists various modules and their corresponding trace class values:

Section	Modules	TraceClasses value
wfica	Graphics	TC_TW
	EUEM	TC_EUEM
	WFICA (Session Launch)	TC_NCS
	Printing	TC_CPM
	Connection Sequence - WD	TC_WD
	Connection Sequence - PD	TC_PD
	Connection Sequence - TD	TC_TD
	Proxy related files	TC_PROXY
	MultiMedia Virtual Driver / Webcam	TC_MMVD
	Virtual Drivers	TC_VD
	Client Drive Mapping	TC_CDM
	Audio	TC_CAM
	COM (Communication Port)	TC_CCM
	Seamless	TC_TWI
Smart Card	TC_SCARDVD	
Connection center	Connection center	TC_CSM
WebHelper	Set logSwitch to 1 (to enable) or 0 (to disable) Example: logSwitch = 1	



3. Open the `$ICAROOT/config/module.ini` file. In the `[WFClient]` section, change **SyslogThreshold=0** to **SyslogThreshold=7**. This modification generates logs for all levels. To log only errors, set **SyslogThreshold=3**.
4. Launch the Citrix Workspace app process (`./selfservice` at `$ICAROOT`). After the session ends, you can find the log file at `/var/log/syslog`. The logs are appended to the log file on subsequent launches

For information about getting new and refreshed logs in subsequent launches, see [Additional information on syslog configuration](#).

### Syslog configuration

By default, all syslog logs are saved at `/var/log/syslog`. You can configure the path and the name of the log file by editing the following line under the `[RULES]` section in the `/etc/rsyslog.conf` file. For example,

```
user.* -/var/log/logfile_name.log
```

Save your changes and then restart the syslog service using the command:

```
sudo service rsyslog restart
```

### Points to remember:

Following are a few points to remember:

- To ensure that the syslog generated is always new, delete syslog and run the command `sudo service rsyslog restart`.
- To avoid duplicate messages, add **\$RepeatedMsgReduction on** at the beginning of `rsyslog.conf` file.
- To receive logs, ensure that the **\$ModLoad imuxsock.so** line is uncommented at the beginning of the `rsyslog.conf` file.

### Remote logging

To enable remote logging on:

- **Server-side configuration:** uncomment the following lines in the `rsyslog.conf` file of the syslog server:

```
$ModLoad imtcp
```

```
$InputTCPServerRun 10514
```

- **Client-side configuration:** add the following line in rsyslog.conf file by replacing localhost with the IP address of the remote server:

```
*.* @localhost:10514
```

## Multi-monitor layout persistence

This feature retains the session monitor layout information across endpoints. The session appears at the same monitor(s) as configured.

### Prerequisite:

This feature requires the following:

- StoreFront v3.15 or later.
- If .ICAClient is already present in the home folder of the current user:

Delete All\_Regions.ini file

or

To retain AllRegions.ini file, add the following lines at the end of the [Client Engine\Application Launching] section:

SubscriptionUrl=

PreferredWindowsBounds=

PreferredMonitors=

PreferredWindowState=

SaveMultiMonitorPref=

If the .ICAClient folder is not present, it indicates a fresh install of the Citrix Workspace app. In that case the default setting for the feature is retained.

### Use cases

- Launch a session on any monitor in windowed mode and save the setting.  
When you relaunch the session, it appears in the same mode, on the same monitor, and in the same position.
- Launch a session on any monitor in full-screen mode and save the setting.  
When you relaunch the session, it appears in full-screen mode on the same monitor.
- Stretch and span a session in windowed mode across multiple monitors and then switch to full-screen mode. The session continues in full-screen across all monitors. When you relaunch the session, it appears in full-screen mode, spanning across all monitors.

**Note:**

The layout is overwritten with every save, and the layout is saved only on the active StoreFront.

If you launch multiple desktop sessions from the same StoreFront on different monitors, saving the layout in one session saves the layout information of all the sessions.

## Save layout

To enable the save layout feature:

1. Install the StoreFront 3.15 or later version (equal or greater than v3.15.0.12) on a compatible Delivery Controller (DDC).
2. Download the build of Citrix Workspace app 1808 or later for Linux from the [Downloads](#) page and then install it on your Linux machine.
3. Set the ICAROOT environment variable to the install location.
4. Check whether the **All\_Regions.ini** file is present in the **.ICAClient** folder. If so, delete it.
5. In the **\$ICAROOT/config/All\_Regions.ini** file, look for the field – **SaveMultiMonitorPref**. By default, the value of this field is “true” (meaning this feature is turned on). To toggle off this feature, set this field to false.

If you make any changes to the value of **SaveMultiMonitorPref**, you must delete the **All\_Regions.ini** file present in the **.ICAClient** folder to prevent value mismatches and a possible profile lockdown. Set or unset the **SaveMultiMonitorPref** flag before launching sessions.

6. Launch a new desktop session.
7. Click **Save Layout** on the desktop viewer toolbar to save the current session layout. A notification appears at the bottom right of the screen, indicating success.

When you click Save layout, the icon greys out. This indicates that saving is in progress. When the layout is saved the icon appears normal.

However, if the icon is grayed out for a long time, see Knowledge Center article [CTX235895](#) for troubleshooting information.

8. Disconnect or log off the session.  
Relaunch the session. The session appears in the same mode, on the same monitor, and in the same position.

## Limitations and unsupported scenarios:

- Saving a layout for windowed mode session spanning across multiple monitors is not supported due to limitations with the Linux Display manager.
- Saving session information across monitors with varied resolution is not supported in this release and might result in unpredictable behavior.
- Customers deployments with multiple storefront

### Using Citrix Virtual desktops on dual monitor

1. Select the desktop viewer and click the down arrow.
2. Select **Window**.
3. Drag the Citrix Virtual Desktops screen between the two monitors. Ensure that about half the screen is present in each monitor.
4. From the Citrix Virtual Desktop toolbar, select **Full-screen**.

The screen extends to both the monitors.

### Workspace launcher

Citrix introduces Workspace launcher (WebHelper) to launch published desktops and applications. Mozilla Corporation has announced that Netscape Plugin Application Programming Interface (NPAPI) support is deprecated as of version 52 of the Firefox browser. Other browsers, too, have deprecated support for NPAPI.

Previously, the browser plug-in provided along with Citrix Workspace app for Linux enabled users to launch published desktops and applications was based on the NPAPI.

Citrix Workspace launcher currently works not only with direct connections to StoreFront, but also through Citrix Gateway.

### Keyboard layout synchronization

Keyboard layout synchronization between client and VDA enables you to switch among preferred keyboard layouts on the client device when using a Windows or a Linux VDA. This feature is disabled by default.

#### Prerequisite:

- Enable the Unicode Keyboard Layout Mapping feature on the Windows VDA. For more information, see Knowledge Center article [CTX226335](#).
- Enable the Dynamic Keyboard layout sync feature on the Linux VDA. For more information, see [Dynamic keyboard layout synchronization](#)

To enable this feature, add the following lines to the module.ini file:

```
[ICA 3.0]
KeyboardSync=On
[KeyboardSync]
```

```
DriverName = VDIME.DLL
```

When you set **KeyboardSync=On** in the module.ini file and set **KeyboardLayout=(User Profile)** in the **wfclient.ini** file, the vdime virtual driver detects the active keyboard layout on the client and sends the information to VDA. When the keyboard layout changes in a client session, the vdime is aware and sends the new layout to VDA immediately.

To disable this feature, set **KeyboardSync=Off** in the module.ini file to revert to the earlier behavior. In the earlier behavior, the keyboard layout is read from the **\$HOME/.ICAClient/wfclient.ini** file and sent to the VDA along with other client information when the session starts.

## Usage

With this feature enabled, when the keyboard layout changes on the client device during a session, the keyboard layout of the session changes accordingly.

### Limitations:

Keyboard layout synchronization is dependent on XKB lib, which allows automatic keyboard layout synchronization between the VDA and the client device.

## Keyboard layout support for Linux VDA

**Note:** The Linux keyboard locale for all the references in the following table is a hyphen.

Linux Keyboard Layout	Linux Keyboard / Linux VDA layout	Windows Locale	Windows Keyboard ID	Linux VDA Layout
ara	-	ar-SA	00000401	ara
ara	azerty	ar-DZ	00020401	ara
at	-	de-AT	00000407	at
be	iso-alternate	fr-BE	0000080c	be
be	-	nl-BE	00000813	be
bg	-	bg-BG	00030402	bg
bg	phonetic	bg-BG	00040402	bg
bg	bas_phonetic	bg-BG	00020402	bg
br	-	pt-BR	00000416	br
by	-	be-BY	00000423	by
ca	eng	en-CA	00000409	ca

<b>Linux Keyboard Layout</b>	<b>Linux Keyboard / Linux VDA layout</b>	<b>Windows Locale</b>	<b>Windows Keyboard ID</b>	<b>Linux VDA Layout</b>
ca	multix	fr-CA	00011009	ca
ca	fr-legacy	fr-CA	00000c0c	ca
ca	-	fr-CA	00001009	ca
ch	fr	fr-CH	0000100c	ch
ch	-	de-CH	00000807	ch
cn	-	en-US	00000409	us
cz	-	cs-CZ	00000405	cz
cz	qwerty	cs-CZ	00010405	cz
de	-	de-DE	00000407	de
de	mac	de-DE	00000407	de
dk	-	da-DK	00000406	dk
ee	-	et-EE	00000425	ee
es	-	es-ES	0000040a	es
es	mac	es-ES	0000040a	es
fi	-	fi-FI	0000040b	fi
fr	-	fr-FR	0000040c	fr
fr	mac	fr-FR	0000040c	fr
gb	-	en-GB	00000809	gb
gb	mac	en-GB	00000809	gb
gb	extd	en-GB	00000452	gb
gr	-	el-GR	00000408	gr
hr	-	hr-HR	0000041a	hr
hu	-	hu-HU	0000040e	hu
ie	-	en-IE	00001809	ie
il	-	he-IL	0002040d	il
in	eng	en-IN	00004009	in
iq	-	ar-IQ	00000401	iq
is	-	is-IS	0000040f	is

<b>Linux Keyboard Layout</b>	<b>Linux Keyboard / Linux VDA layout</b>	<b>Windows Locale</b>	<b>Windows Keyboard ID</b>	<b>Linux VDA Layout</b>
it	-	it-IT	00000410	it
jp	-	en-US	00000409	us
jp	mac	en-US	00000409	us
kr	-	en-US	00000409	us
latam	-	es-MX	0000080a	latam
lt	-	lt-LT	00010427	lt
lt	ibm	lt-LT	00000427	lt
lt	std	lt-LT	00020427	lt
lv	-	lv-LV	00020426	lv
no	-	nb-NO	00000414	no
pl	-	pl-PL	00000415	pl
pl	qwertz	pl-PL	00010415	pl
pt	-	pt-PT	00000816	pt
pt	mac	pt-PT	00000816	pt
ro	std	ro-RO	00010418	ro
rs	-	sr-Cyrl-RS	00000c1a	rs
rs	latin	sr-Latn-RS	0000081a	rs
ru	-	ru-RU	00000419	ru
ru	typewriter	ru-RU	00010419	ru
ru	mac	ru-RU	00000419	ru
se	-	sv-SE	0000041d	se
se	mac	sv-SE	0000041d	se
si	-	sl-SI	00000424	si
sk	-	sk-SK	0000041b	sk
sk	qwerty	sk-SK	0001041b	sk
th	-	th-TH	0000041e	th
th	pat	th-TH	0001041e	th
tj	-	tg-Cyrl-TJ	00000428	tj

<b>Linux Keyboard Layout</b>	<b>Linux Keyboard / Linux VDA layout</b>	<b>Windows Locale</b>	<b>Windows Keyboard ID</b>	<b>Linux VDA Layout</b>
tr	-	tr-TR	0000041f	tr
tr	f	tr-TR	0001041f	tr
tw	-	en-US	00000409	us
ua	-	uk-UA	00000422	ua
us	-	en-US	00000409	us
us	mac	en-US	00000409	us
us	dvorak	en-US	00010409	us
us	dvorak-l	en-US	00030409	us
us	dvorak-r	en-US	00040409	us
us	intl	nl-NL	00020409	us
vn	-	vi-VN	0000042a	vn

### VDA keyboard layout

The VDA keyboard layout feature helps you use the VDA keyboard layout regardless of the client's keyboard layout settings. It supports the following types of keyboard: PC/XT 101, 102, 104, 105, 106.

To use the server side keyboard layout:

1. Launch the wfclient.ini file.
2. Change the value of the KeyboardLayout attribute as below:

```
KeyboardLayout=(Server Default)
```

The default value for KeyboardLayout attribute is (User Profile).

3. Relaunch the session for the changes to take effect.

### File type association

A Citrix Virtual Apps Services may also publish a file, rather than an application or desktop. This process is referred to as publishing content, and allows pnbrowse to open the published file.

There is a limitation to the type of files that are recognized by Citrix Workspace App for Linux. For the system to recognize the file type of the published content and for users to view it through Citrix



Workspace app, a published application must be associated with the file type of the published file. For example, to view a published Adobe PDF file using Citrix Workspace app, an application such as Adobe PDF Viewer must be published. Unless a suitable application is published, users cannot view the published content.

To enable FTA on the client-side:

1. Ensure that the app that you want to associate is a favorite or a subscribed application.
2. To get the list of published applications and the server URL, run the commands:

```
1 ./util/storebrowse -l
2
3 ./util/storebrowse -S <StoreFront URL>
```

3. Run the `./util/ctx_app_bind` command with the following syntax:

```
./util/ctx_app_bind [-p] example_file|MIME-type published-application [
server|server-URI]
```

for example,

```
./util/ctx_app_bind a.txt BVT_DB.Notepad_AWTSVDA-0001 https://awddc1.
bvt.local/citrix/store/discovery
```

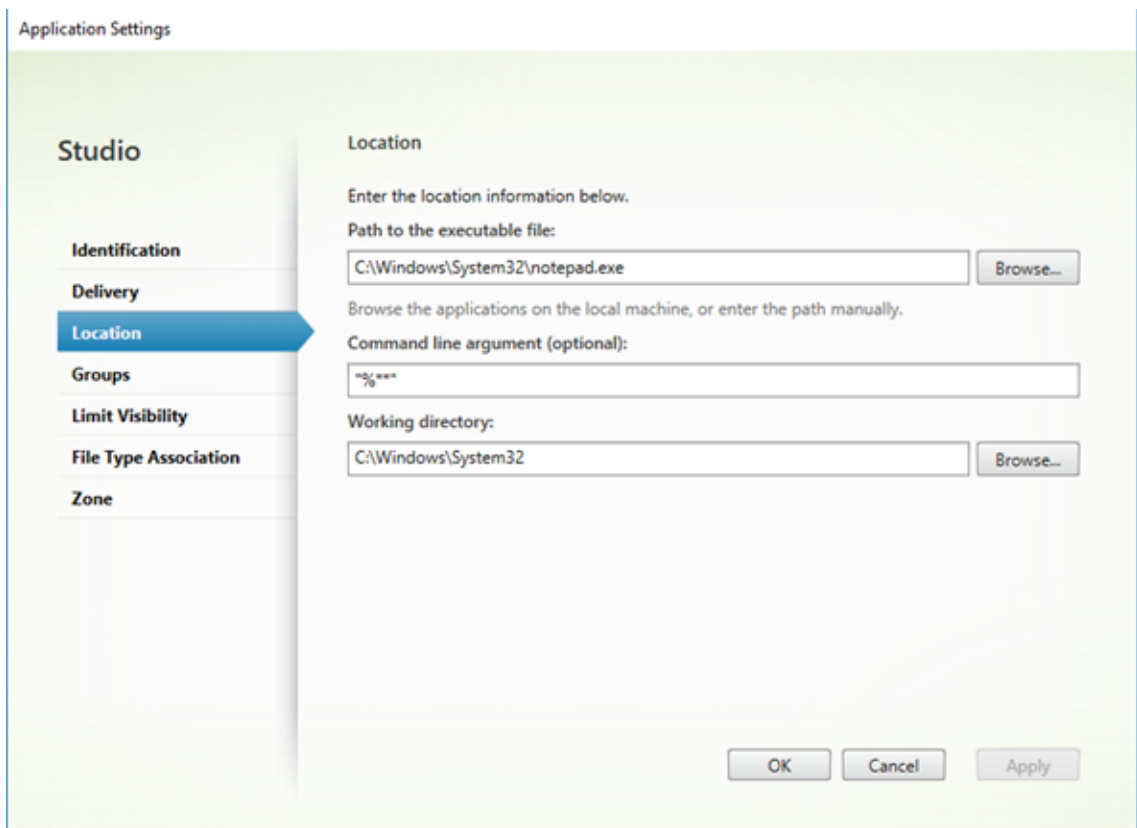
4. Ensure that the file you are attempting to open is client drive mapping (CDM) enabled.
5. Double-click the file to open it using the associated application.

### Associating a published application with file types

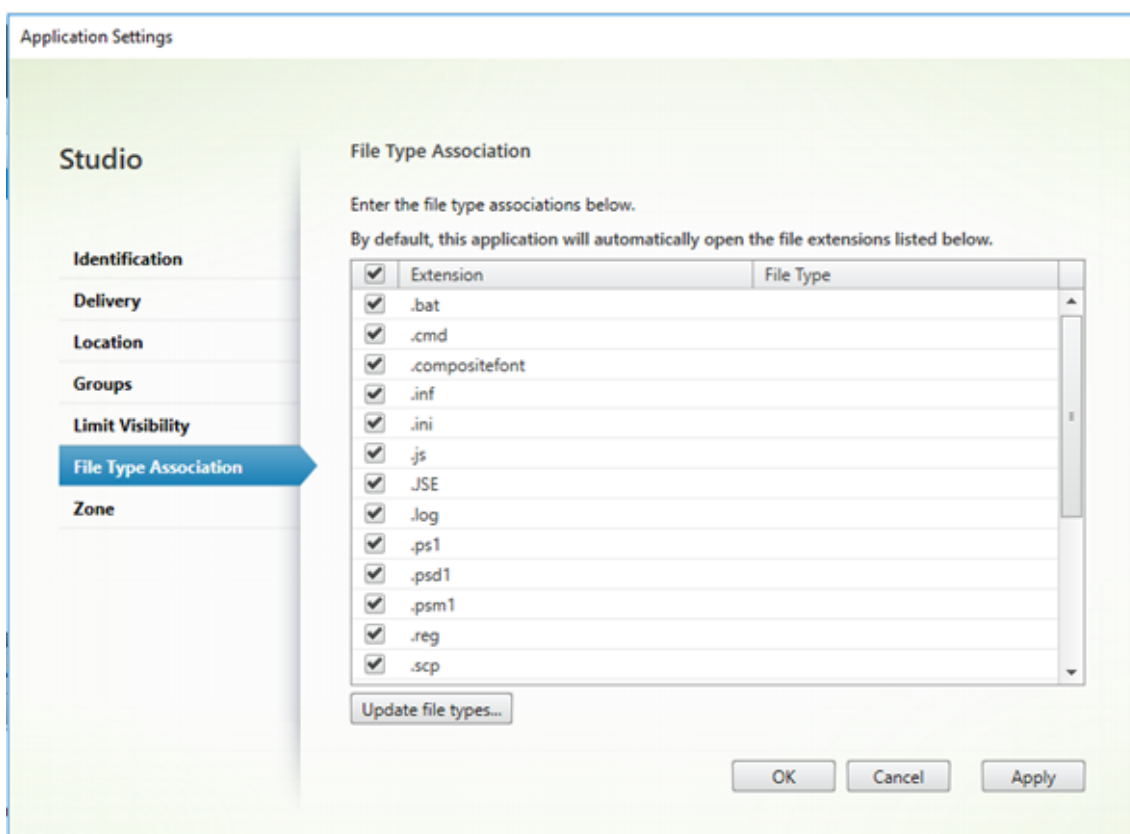
Citrix Workspace app reads and applies the settings configured by administrators in Citrix Studio. To apply file type association (FTA) in a session, ensure that you connect to the Store server where the FTA is configured.

To link a file extension with a Citrix Workspace app for Linux application:

1. Publish the application.
2. Log on to Citrix Studio.
3. Right-click the application and select **Properties**.
4. Select **Location**.
5. Add “%\*” in the Command line argument (optional) field to bypass the command-line validation and then click OK.



6. Right-click the application and select **Properties**.
7. Select **File Type Association**.
8. Select the extensions that you want Citrix Workspace app to associate with the application (select all that apply).



9. Click **Apply** and **Update file types**.

10. Follow the steps mentioned in [File type association](#) to enable FTA on the client-side.

**Note:**

Ensure StoreFront file type association is ON. By default, file type association is enabled in stores so that content is seamlessly redirected to users' subscribed applications when they open local files of the associated types.

## Authenticate

October 7, 2019

### Smart card

To configure smart card support in Citrix Workspace app for Linux, you must configure StoreFront server through the StoreFront console to allow smart card authentication. Enable the required protocol from the StoreFront console.

**Note:**

Smart cards are not supported with the Citrix Virtual Apps Services site for Web Interface configurations (formerly known as Program Neighborhood Agent), or with the “legacy PNAgent” site that can be provided by a StoreFront server.

Citrix Workspace app for Linux supports smart card readers that are compatible with PCSC-Lite and smart cards with PKCS#11 drivers for the appropriate Linux platform. By default, Citrix Workspace app for Linux now locates `opensc-pkcs11.so` in one of the standard locations. To ensure that Citrix Workspace app for Linux finds either `opensc-pkcs11.so` in a non-standard location or another PKCS#11 driver, store the location in a configuration file using the following steps:

1. Locate the configuration file: `$ICAROOT/config/AuthManConfig.xml`
2. Locate the line `<key>PKCS11module</key>` and add the driver location to the `<value>` element immediately following the line.

**Note:**

If you enter a file name for the driver location, Citrix Workspace app navigates to that file in the `$ICAROOT/PKCS#11` directory. Alternatively, you can use an absolute path beginning with “/.”

To configure the behavior of Citrix Workspace app for Linux when a smart card is removed, update `SmartCardRemovalAction` in the configuration file using the following steps:

1. Locate the configuration file: `$ICAROOT/config/AuthManConfig.xml`
2. Locate the line `<key>SmartCardRemovalAction</key>` and add ‘noaction’ or ‘forcelogoff’ to the `<value>` element immediately following the line.

The default behavior is ‘noaction’. No action is taken to clear credentials stored and tokens generated with regards to the smart card on the removal on the smart card. The ‘forcelogoff’ action clears all credentials and tokens within StoreFront on the removal of the smart card.

### Enabling smart card support

Citrix Workspace app for Linux supports various smart card readers. If smart card support is enabled for both the server and Citrix Workspace app, you can use smart cards for the following purposes:

- Smart card logon authentication. Use smart cards to authenticate users to Citrix Virtual Apps servers.
- Smart card application support. Enable smart card-aware published applications to access local smart card devices.

Smart card data is security sensitive and should be transmitted over a secure authenticated channel, such as TLS.

Smart card support has the following prerequisites:

- Your smart card readers and published applications must be PC/SC industry standard compliant.
- Install the appropriate driver for your smart card.
- Install the PC/SC Lite package.
- Install and run the pcsd Daemon, which provides middleware to access the smart card using PC/SC.
- On a 64-bit system, both 64-bit and 32-bit versions of the “libpcsclite1” package must be present.

**Important:**

If you are using the SunRay terminal with SunRay server software Version 2.0 or later, install the PC/SC SRCOM bypass package, available for download from

<http://www.sun.com/>.

For more information about configuring smart card support on your servers, see the [Citrix Virtual Apps and Desktops](#) documentation.

### **V3 authentication protocol**

“V3” authentication indicates the third major definition of a logon protocol to Citrix Gateway that is supported by Citrix Workspace App for Linux.

V3 is the standard logon protocol for Citrix Gateway in combination with the “N-Factor” authentication policy framework that makes authentication steps and the associated credential collection forms completely configurable. Native Citrix Workspace App can support this protocol by building on the Forms logon support already implemented for StoreFront. The web logon page for Citrix Gateway and Traffic Manager virtual servers also consume this protocol using code shared with Citrix Workspace App for Linux.

For more information, see [SAML Authentication](#) and Knowledge Center article [NetScaler Authentication](#).

### **Secure**

October 7, 2019

To secure the communication between your Site and Citrix Workspace app, you can integrate your Citrix Workspace app connections using secure technologies such as the following:

- Citrix Gateway: For information, see the topics in this section and the Citrix Gateway, and StoreFront documentation.

### Note:

Citrix recommends using Citrix Gateway between StoreFront servers and user devices.

- A firewall: Network firewalls can allow or block packets based on the destination address and port. If you are using Citrix Workspace app through a network firewall that maps the server's internal network IP address to an external Internet address (that is, network address translation, or NAT), configure the external address.
- Trusted server.
- For Citrix Virtual Apps or Web Interface deployments only (not applicable to XenDesktop 7): A SOCKS proxy server or secure proxy server (also known as security proxy server, HTTPS proxy server, or TLS tunneling proxy server). You can use proxy servers to limit access to and from your network and to handle connections between Citrix Workspace app and servers. Citrix Workspace app supports SOCKS and secure proxy protocols.
- For Citrix Virtual Apps or Web Interface deployments only: Citrix Secure Web Gateway or SSL Relay solutions with Transport Layer Security (TLS) protocols. TLS versions 1.0 through 1.2 are supported.

## Citrix Gateway

Citrix Gateway (formerly Access Gateway) secures connections to StoreFront stores, and lets administrators control, in a detailed way, user access to desktops and applications.

To connect to desktops and applications through Citrix Gateway:

1. Specify the Citrix Gateway URL that your administrator provides. You can do this in one of these ways:
  - The first time you use the self-service user interface, you are prompted to enter the URL in the Add Account dialog box
  - When you later use the self-service user interface, enter the URL by clicking Preferences > Accounts > Add
  - If you are establishing a connection with the storebrowse command, enter the URL at the command line

The URL specifies the gateway and, optionally, a specific store:

- To connect to the first store that Citrix Workspace app finds, use a URL of the form, for example: <https://gateway.company.com>.

- To connect to a specific store, use a URL of the form, for example: <https://gateway.company.com?<storename>>. This dynamic URL is in a non-standard form; do not include = (the equals sign character) in the URL. If you are establishing a connection to a specific store with storebrowse, you might need quotation marks around the URL in the storebrowse command.
2. When prompted, connect to the store (through the gateway) using your user name, password, and security token. For more information on this step, see the Citrix Gateway documentation.
- When authentication is complete, your desktops and applications are displayed.

### Proxy server

Proxy servers are used to limit access to and from your network, and to handle connections between Citrix Workspace app and your Citrix Virtual Apps or Citrix Virtual Desktops deployment. Citrix Workspace app supports the SOCKS protocol, along with the Citrix Secure Web Gateway and Citrix SSL Relay, the secure proxy protocol, and Windows NT Challenge/Response (NTLM) authentication.

The list of supported proxy types is restricted by the contents of Trusted\_Regions.ini and Untrusted\_Regions.ini to the Auto, None, and Wpad types. If you use the SOCKS, Secure or Script types, edit those files to add the additional types to the permitted list.

#### Note:

To ensure a secure connection, enable TLS.

### Secure proxy server

Configuring connections to use the secure proxy protocol also enables support for Windows NT Challenge/Response (NTLM) authentication. If this protocol is available, it is detected and used at run time without any additional configuration.

#### Important:

NTLM support requires that the OpenSSL library, libcrypto.so, is installed on the user device. This library is often included in Linux distributions, but can be downloaded from <http://www.openssl.org/> if necessary in new window.

### Secure Web Gateway and SSL

You can integrate Citrix Workspace app with the Citrix Secure Web Gateway or Secure Sockets Layer (SSL) Relay service. Citrix Workspace app supports the TLS protocol. TLS (Transport Layer Security)

is the latest, standardized version of the SSL protocol. The Internet Engineering Taskforce (IETF) re-named it TLS when it took over responsibility for the development of SSL as an open standard. TLS secures data communications by providing server authentication, encryption of the data stream, and message integrity checks. Some organizations, including U.S. government organizations, require the use of TLS to secure data communications. These organizations may also require the use of validated cryptography, such as FIPS 140 (Federal Information Processing Standard). FIPS 140 is a standard for cryptography.

## Secure Web Gateway

You can use the Citrix Secure Web Gateway in either Normal mode or Relay mode to provide a secure channel for communication between Citrix Workspace app and the server. No configuration of Citrix Workspace app is required if you are using the Citrix Secure Web Gateway in Normal mode and users are connecting through the Web Interface.

Citrix Workspace app uses settings that are configured remotely on the server running the Web Interface to connect to servers running the Citrix Secure Web Gateway. For information about configuring proxy server settings for Citrix Workspace app, see the [Web Interface](#) documentation.

If the Citrix Secure Web Gateway Proxy is installed on a server in the secure network, you can use the Citrix Secure Web Gateway Proxy in Relay mode. For more information, see the [Citrix Virtual Apps \(Citrix Secure Web Gateway\)](#) documentation.

If you are using Relay mode, the Citrix Secure Web Gateway server functions as a proxy and you must configure Citrix Workspace app to use:

- The fully qualified domain name (FQDN) of the Citrix Secure Web Gateway server.
- The port number of the Citrix Secure Web Gateway server. Relay mode is not supported by Citrix Secure Web Gateway Version 2.0.

The FQDN must list, in sequence, the following three components:

- Host name
- Intermediate domain
- Top-level domain

For example: my\_computer.my\_company.com is an FQDN, because it lists, in sequence, a host name (my\_computer), an intermediate domain (my\_company), and a top-level domain (com). The combination of intermediate and top-level domain (my\_company.com) is referred to as the domain name.

## SSL Relay

By default, Citrix SSL Relay uses TCP port 443 on the Citrix Virtual Apps server for TLS-secured communication. When the SSL Relay receives a TLS connection, it decrypts the data before redirecting it



to the server.

If you configure SSL Relay to listen on a port other than 443, you must specify the non-standard listening port number to Citrix Workspace app.

You can use Citrix SSL Relay to secure communications:

- Between a TLS-enabled user device and a server
- With Web Interface, between the Citrix Virtual Apps server and the web server

For information about configuring and using SSL Relay to secure your installation, see the Citrix Virtual Apps documentation. For information about configuring the Web Interface to use TLS encryption, see the [Web Interface](#) documentation.

## TLS

You can control the versions of the TLS protocol that can be negotiated by adding the following configuration options in the [WFClient] section:

- MinimumTLS=1.0
- MaximumTLS=1.2

These values are the default values, which are implemented in code. Adjust them as you require.

### Note:

- These values are read whenever programs start. If you change them after starting self-service or storebrowse, type: **killall AuthManagerDaemon ServiceRecord selfservice storebrowse**.
- Citrix Workspace app for Linux does not allow the use of the SSLv3 protocol.

Citrix Workspace app for Linux supports DTLS 1.0 and TLS 1.0, 1.1 and 1.2, with the following cipher suites:

- RSA+AES256-SHA (RSA for key exchange, AES 256 for encryption, SHA-1 for digest)
- RSA+AES256-SHA256 (RSA for key exchange, AES 256 for encryption, SHA-256 for digest)
- RSA+AES128-SHA (RSA for key exchange, AES 128 for encryption, SHA-1 for digest)
- RSA+DES-CBC3-SHA (RSA for key exchange, Triple-DES for encryption, SHA-1 for digest)
- RSA+RC4128-MD5 (RSA for key exchange, RC4 128 for encryption, MD5 for digest)
- RSA+RC4128-SHA (RSA for key exchange, RC4 128 for encryption, SHA-1 for digest)
- RSA+AES128\_GCM+SHA256 (RSA for key exchange, AES 128 for encryption, SHA-256 for digest)
- RSA+AES256\_GCM+SHA384 (RSA for key exchange, AES 256 for encryption, SHA-384 for digest)
- TLS\_ECDHE\_RSA\_WITH\_AES\_256\_GCM\_SHA384 (Elliptic curve Diffie-Hellman for key exchange, RSA for authentication, AES 256, and GCM SHA 384 for digest)
- TLS\_ECDHE\_RSA\_WITH\_AES\_256\_CBC\_SHA384 (Elliptic curve Diffie-Hellman for key exchange, RSA for authentication, AES 256, and CBC SHA 384 for digest)

- TLS\_RSA\_AES256\_CBC\_SHA256 (RSA for authentication, AES 256, and CBC SHA 256 for digest)

The effective encryption key size is as defined for that standard SSL/TLS cipher suite as named above:

- RC4 algorithm: 128 bits (stream cipher)
- Triple DES algorithm: 3x64 bits (effective size 3x56=168 bits) (block size 64 bits)
- AES algorithm: 128 bits or 256 bits (block size 128)
- For RSA key exchange and authentication the supported key lengths (modulus) range from 1,024 bits to 4,096 bits.
- For ECDH key exchange, the supported elliptic curves are NIST P-256 and NIST P-384 (256 bit and 384 bit key lengths).

To select the cipher suite set, add the following configuration option in the [WFClient] section:

- SSLCiphers=GOV

This value is the default value. Other recognized values are COM and ALL.

**Note:**

As with the TLS version configuration, if you change this after starting self-service or storebrowse you must type:

```
killall AuthManagerDaemon ServiceRecord selfservice storebrowse
```

## Cryptographic update

This feature is an important change to the secure communication protocol. Cipher suites with the prefix TLS\_RSA\_ do not offer forward secrecy and are considered weak. These cipher suites were deprecated in Citrix Receiver version 13.10 with an option for backward compatibility.

The TLS\_RSA\_ cipher suites have been removed entirely. Instead, it supports the advanced TLS\_ECDHE\_RSA\_ cipher suites. If your environment is not configured with the TLS\_ECDHE\_RSA\_ cipher suites, client launches are not supported due to weak ciphers. For client authentication, 1536-bit RSA keys are supported.

The following advanced cipher suites are supported:

- TLS\_ECDHE\_RSA\_WITH\_AES\_256\_GCM\_SHA384 (0xc030)
- TLS\_ECDHE\_RSA\_WITH\_AES\_256\_CBC\_SHA384 (0xc028)
- TLS\_ECDHE\_RSA\_WITH\_AES\_128\_CBC\_SHA (0xc013)

## Cipher suites

To enable different cipher suites, change the parameter SSLCiphers value to ALL, COM or GOV. By default, the option is set to ALL in the All\_Regions.ini file in the \$ICAROOT/config directory.

The following sets of cipher suites are provided by ALL, GOV, and COM, respectively:

- ALL
  - all 3 Ciphers are supported.
- GOV
  - TLS\_ECDHE\_RSA\_WITH\_AES\_256\_GCM\_SHA384 (0xc030)
  - TLS\_ECDHE\_RSA\_WITH\_AES\_256\_CBC\_SHA384 (0xc028)
- COM
  - TLS\_ECDHE\_RSA\_WITH\_AES\_128\_CBC\_SHA (0xc013)

For troubleshooting information, see [Cipher suites](#).

### Deprecated cipher suites

#### Important:

Starting with Version 1903, Citrix will be supporting only the following three cipher suites:

- TLS\_ECDHE\_RSA\_WITH\_AES\_256\_GCM\_SHA384 – GOV/ALL
- TLS\_ECDHE\_RSA\_WITH\_AES\_256\_CBC\_SHA384 – GOV/ALL
- TLS\_ECDHE\_RSA\_WITH\_AES\_128\_CBC\_SHA – COM/ALL

This topic, **Deprecated cipher suites** applies only to Version 1901 and earlier. Starting with Version 1903, only the advanced TLS\_ECDHE\_RSA\_ cipher suites are supported. For more information see, [Cryptographic update](#). This section is included only for reference and only for customers using versions 1901 and earlier of the client. The cipher suites mentioned below are deprecated without backward compatibility.

Cipher suites with the prefix TLS\_RSA\_ do not offer forward secrecy. These cipher suites are now generally deprecated by the industry. However, to support backward compatibility with older versions of Citrix Virtual Apps and Desktops, Citrix Workspace app for Linux has an option to enable these cipher suites.

Flags have been created to allow the usage of deprecated cipher suites. In Citrix Workspace app 1808 for Linux version, these flags are enabled by default, but they do not enforce deprecation for the cipher suites using the AES or 3DES algorithms by default. However, you can modify and use these flags to enforce the deprecation more strictly.

For better security, set the flag Enable\_TLS\_RSA\_ to False.

Following is the list of deprecated cipher suites:

- TLS\_RSA\_AES256\_GCM\_SHA384
- TLS\_RSA\_AES128\_GCM\_SHA256
- TLS\_RSA\_AES256\_CBC\_SHA256
- TLS\_RSA\_AES256\_CBC\_SHA
- TLS\_RSA\_AES128\_CBC\_SHA

- TLS\_RSA\_3DES\_CBC\_EDE\_SHA
- TLS\_RSA\_WITH\_RC4\_128\_MD5
- TLS\_RSA\_WITH\_RC4\_128\_SHA

**Note:**

The last two cipher suites use the RC4 algorithm and are deprecated because they are insecure. You might also consider the TLS\_RSA\_3DES\_CBC\_EDE\_SHA cipher suite to be deprecated. You can use flags to enforce all these deprecations.

For information on configuring DTLS v1.2, see [Adaptive transport](#).

**Prerequisite:**

If you are using version 1901 and earlier, to configure this feature on client, perform the following step:

If .ICAClient is already present in the home directory of the current user:

- Delete All\_Regions.ini file

Or

- To retain AllRegions.ini file, add the following lines at the end of the [Network\SSL] section:
  - Enable\_RC4-MD5=
  - Enable\_RC4\_128\_SHA=
  - Enable\_TLS\_RSA\_=

If the .ICAClient folder is not present in the home folder of the current user, then it indicates a fresh install of the Citrix Workspace app. In that case, the default setting for the features is retained.

**Configure deprecated cipher suites**

To configure deprecated cipher suites:

1. Open the **\$ICAROOT/config/All\_Regions.ini** file.
2. Under the **Network\SSL** section, use the following three flags to enable or disable the deprecated cipher suites:
  - **Enable\_TLS\_RSA\_:** By default, the flag Enable\_TLS\_RSA\_ is set to True. Set the flag Enable\_TLS\_RSA\_ to true to view the following cipher suites:
    - TLS\_RSA\_AES256\_GCM\_SHA384
    - TLS\_RSA\_AES128\_GCM\_SHA256
    - TLS\_RSA\_AES256\_CBC\_SHA256
    - TLS\_RSA\_AES256\_CBC\_SHA
    - TLS\_RSA\_AES128\_CBC\_SHA
    - TLS\_RSA\_3DES\_CBC\_EDE\_SHA

**Important:**

Set the flag `Enable_TLS_RSA_` to true to use the other two cipher suites `Enable_RC4-MD5` and `Enable_RC4_128_SHA`.

- **Enable\_RC4-MD5:** By default, the flag `Enable_RC4-MD5` is set to **False**. Set this flag to true to enable the RC4-MD5 cipher suite.
- **Enable\_RC4\_128\_SHA:** By default, the flag `Enable_RC4_128_SHA` is set to **False**. Set this flag to true to enable the RC4\_128\_SHA cipher suite.

3. Save the file.

The following table lists the cipher suites in each set:

Table 1 – Cipher suite support matrix

Ciphersuite	Native Crypto Kit mode and cipher set								
	Open			FIPS			SP800-52		
	OPEN ALL	OPEN COM	OPEN GOV	FIPS ALL	FIPS COM	FIPS GOV	SP800-52 ALL	SP800-52 COM	SP800-52 GOV
TLS_ECDHE_RSA_WITH_AES_256_GCM_SHA384 (1)	Y		Y	Y		Y	Y		Y
TLS_ECDHE_RSA_WITH_AES_256_CBC_SHA384(1)	Y		Y	Y		Y	Y		Y
TLS_ECDHE_RSA_WITH_AES_128_CBC_SHA	Y	Y		Y	Y		Y	Y	
TLS_RSA_WITH_AES_256_GCM_SHA384 (1) (2)	X								
TLS_RSA_WITH_AES_128_GCM_SHA256 (1) (2)	X	X							
TLS_RSA_WITH_AES_256_CBC_SHA256 (1) (2)	X								
TLS_RSA_WITH_AES_256_CBC_SHA (2)	X								
TLS_RSA_WITH_AES_128_CBC_SHA (2)	X	X							
TLS_RSA_WITH_RC4_128_SHA (2) (3)	X	X							
TLS_RSA_WITH_RC4_128_MD5 (2) (3)	X	X							
TLS_RSA_WITH_3DES_EDE_CBC_SHA (2)	X								
TLS_EMPTY_RENEGOTIATION_INFO_SCSV	Y	Y	Y	Y	Y	Y	Y	Y	Y
<b>Notes</b>									
(1) Ciphersuites that require TLS1.2/DTLS 1.2									
(2) Ciphersuites disabled by default									
(3) Ciphersuites not available for DTLS protocol									
Y - Supported ciphersuites									
X-Deprecated ciphersuites									

**Note:**

All cipher suites above are FIPS- and SP800-52- compliant. The first two are allowed only for (D)TLS1.2 connections. See **Table 1 – Cipher suite support matrix** for a comprehensive representation of cipher suite supportability.

## Troubleshoot

October 7, 2019

This article contains information to help administrators troubleshoot issues with Citrix Workspace app for Linux.

## Connection

You might encounter the following connection issues.

### Published resource or desktop session

If, when establishing a connection to a Windows server, a dialog box appears with the message “Connecting to server..” but no subsequent connection window appears, you might need to configure the server with a Client Access License (CAL). For more information about licensing, see [Licensing](#).

### Session reconnection

Sometimes reconnecting to a session with a higher color depth than that requested by Citrix Workspace app causes the connection to fail. This is due to a lack of available memory on the server. If the reconnection fails, Citrix Workspace app tries to use the original color depth. Otherwise, the server tries to start a new session with the requested color depth, leaving the original session in a disconnected state. However, the second connection might also fail if there is still a lack of available memory on the server.

### Full Internet name

Citrix recommends that you configure DNS (Domain Name Server) on your network to enable you to resolve the names of servers to which you want to connect. If you do not have DNS configured, it may not be possible to resolve the server name to an IP address. Alternatively, you can specify the server by its IP address, rather than by its name. TLS connections require a fully qualified domain name, not an IP address.

### Proxy detection failure

If your connection is configured to use automatic proxy detection and you see a “Proxy detection failure: Javascript error” error message when trying to connect, copy the wpad.dat file into \$ICAROOT/util. Run the following command, where hostname is the hostname of the server to which you are trying to connect:

```
cat wpad.dat | ./pacexec pac.js | grep "undeclared variable"  
FindProxyForURL  
http://hostname hostname  
2>&1
```

If you get no output, there is a serious issue with the wpad.dat file on the server that you need to investigate. However, if you see output such as “assignment to undeclared variable ...” you can fix the problem. Open pac.js and for each variable listed in the output, add a line at the top of the file in the following format, where “...” is the variable name.

```
var ...;
```

### **Slow sessions**

If a session does not start until you move the mouse, there might be a problem with random number generation in the Linux kernel. As a workaround, run an entropy-generating daemon such as rngd (which is hardware-based) or haveged (from Magic Software).

### **Cipher suites**

If your connection fails with the new cryptographic support:

1. You can use various tools to check what cipher suites your server supports, including:
  - Sslslab.com (requires the server to have Internet access)
  - sslyze (<https://github.com/nabla-c0d3/sslyze>)
2. In Linux Client WireShark find packet (Client Hello, Server Hello) with filter (ip.addr == VDAIPAddress) to find the SSL section. The result has the cipher suites sent by the client and accepted by the server.

### **Weak cipher-suites for SSL connections**

When making a TLS connection, the Citrix Workspace app for Linux offers a more modern and restricted set of cipher suites by default. If you are connecting to a server that requires an older cipher suite, set the configuration option SSLCiphers=ALL in the [WFClient] section of a configuration file.

The following advanced cipher suites are supported:

- TLS\_ECDHE\_RSA\_WITH\_AES\_256\_GCM\_SHA384 (0xc030), ALL, GOV
- TLS\_ECDHE\_RSA\_WITH\_AES\_256\_CBC\_SHA384 (0xc028), ALL, GOV
- TLS\_ECDHE\_RSA\_WITH\_AES\_128\_CBC\_SHA (0xc013), ALL, COM

### **Loss of connection**

When using the UDT protocol, you might see the error message: Connection to “...” has been lost. This issue can occur when the connection goes through a router with a Maximum Transmission Unit for UDT that is smaller than the default of 1,500 bytes. Try both:

- Uncomment the udtMSS entry in \$ICAROOT/config/All\_Regions.ini and in \$HOME/.ICAclient/All\_Regions.ini
- Set udtMSS=1000 in a configuration file

### Connection errors

Connection errors might produce various different error dialogs. Examples are:

- Error in connection: A protocol error occurred while communicating with the Authentication Service
- The Authentication Service could not be contacted
- Your account cannot be added using this server address

Some problems might cause such errors, including:

- When the local computer and the remote computer cannot negotiate a common TLS protocol. For more information, see [Configure and enable TLS](#).
- When the remote computer requires an older cipher suite for a TLS connection. In this case, you can set the configuration option SSLCiphers=ALL in the [WFClient] section of a configuration file and run **killall AuthManagerDaemon ServiceRecord selfservice storebrowse** before restarting the connection.
- When the remote computer requests a client certificate inappropriately. IIS should only “accept” or “require” certificates for “Citrix/Authentication/Certificate.”
- Other problems.

### Low-bandwidth connections

Citrix recommends that you use the latest version of Citrix Virtual Apps or Citrix Virtual Desktops on the server and Citrix Workspace app on the user device.

If you are using a low-bandwidth connection, you can change your Citrix Workspace app configuration and the way you use Citrix Workspace app to improve performance.

- **Configure your Citrix Workspace app connection** - Configuring your Citrix Workspace app connections can reduce the bandwidth that ICA requires and improve performance
- **Change how Citrix Workspace app is used** - Changing the way Citrix Workspace app is used can also reduce the bandwidth required for a high-performance connection
- **Enable UDP audio** - This feature can maintain consistent latency on congested networks in Voice-over-IP (VoIP) connections
- **Use the latest versions of Citrix Virtual Apps and Citrix Workspace app for Linux** - Citrix continually enhances and improves performance with each release, and many performance features require the latest Citrix Workspace app and server software.



## Display

### Screen Tearing

Screen tearing occurs when parts of two (or more) different frames appear on the screen at the same time, in horizontal blocks. This is most visible with large areas of fast changing content on screen. Although the data is captured at the VDA in a way that avoids tearing, and the data is passed to the client in a way that doesn't introduce tearing, X11 (the Linux/Unix graphics subsystem) does not provide a consistent way to draw to the screen in a way that prevents tearing.

To prevent screen tearing, Citrix recommends the standard approach which synchronizes application drawing with the drawing of the screen. That is, wait for `vsvnc`, to initiate the drawing of the next frame. There are some options when using Linux, depending on the graphics hardware you have on the client and what window manager you are using. These options are divided into two groups of solutions:

- X11 GPU settings
- Use a Composition Manager

### X11 GPU Configuration

For Intel HD graphics, create a file in the `xorg.conf.d` called **20-intel.conf** with the following contents:

Section "Device"

```
1 Identifier      "Intel Graphics"
2 Driver          "intel"
3 Option          "AccelMethod" "sna"
4 Option          "TearFree" "true"
```

EndSection

For Nvidia graphics, locate the file in the `xorg.conf.d` folder that contains the "MetaModes" Option for your configuration. For each comma separated MetaMode used add the following:

```
{ForceFullCompositionPipeline = On}
```

For example:

```
Option "MetaModes" "DFP-0: 1920x1200 +0+0 {ForceFullCompositionPipeline = On}"
```

**Note:**

Different Linux distributions use different paths to `xorg.conf.d`, for example, `/etc/X11/xorg.conf.d`, or, `/user/share/X11/xorg.conf.d`.

### Composition Managers

Use the following:

- Compiz (built into Ubuntu Unity). Install the “CompizConfig Settings Manager.”

Run “CompizConfig Settings Manager”.

Under “General > Composition” uncheck “Undirect Fullscreen Windows”.

#### Note:

Use “CompizConfig Settings Manager” with caution because incorrectly changing values can prevent the system from launching.

- Compton (an add-on utility). Refer to the man page/documentation for Compton for full details. For example, run the following command:

```
compton --vsync opengl --vsync -aggressive
```

### Incorrect keystrokes

If you are using a non-English language keyboard, the screen display may not match the keyboard input. In this case, you should specify the keyboard type and layout that you are using. For more information about specifying keyboards, see [Control keyboard behavior](#).

### Excessive redrawing

Some window managers continuously report the new window position when moving seamless windows, which can result in excessive redrawing. To fix this problem, switch the window manager to a mode that draws only window outlines when moving a window.

### Icon compatibility

The Citrix Workspace app for linux creates window icons that work with most window managers, but are not fully compatible with the X Inter-Client Communication Convention.

### **Full icon compatibility**

To provide full icon compatibility:

1. Open the wfclient.ini configuration file.
2. Edit the following line in the [WFClient] section: UseIconWindow=True
3. Save and close the file.

### **Cursor color**

The cursor can be difficult to see if it is the same or similar in color to the background. You can fix this issue by forcing areas of the cursor to be black or white.

To change the color of the cursor

1. Open the wfclient.ini configuration file.
2. Add one of the following lines to the [WFClient] section:  
CursorStipple=ffff,ffff (to make the cursor black)  
CursorStipple=0,0 (to make the cursor white)
3. Save and close the file.

### **Color flash**

When you move the mouse into or out of a connection window, the colors in the non-focused window may start to flash. This issue is a known limitation when using the X Windows System with Pseudo-Color displays. If possible, use a higher color depth for the affected connection.

### **Color changes with TrueColor display**

Users have the option of using 256 colors when connecting to a server. This option assumes that the video hardware has palette support to enable applications to change the palette colors to produce animated displays.

TrueColor displays have no facility to emulate the ability to produce animations by rapidly changing the palette. Software emulation of this facility is expensive both in terms of time and network traffic. To reduce this cost, Citrix Workspace app buffers rapid palette changes, and updates the real palette only every few seconds.

## Incorrect display

Citrix Workspace app uses EUC-JP or UTF-8 character encoding for Japanese characters, while the server uses SJIS character encoding. Citrix Workspace app does not translate between these character sets. This can cause problems displaying files that are saved on the server and viewed locally, or saved locally and viewed on the server. This issue also affects Japanese characters in parameters used in extended parameter passing.

## Session span

Full-screen sessions span all monitors by default, but a command-line multi-monitor display control option, `-span`, is also available. It allows full-screen sessions to span multiple monitors.

Desktop viewer toolbar functionality allows you to switch a session between windowed and full screen session window, including multi-monitor support for the intersected monitors.

### Important:

Span has no effect on Seamless or normal windowed sessions (including those in maximized windows).

The `-span` option has the following format:

```
-span [h][o][a|mon1[,mon2[,mon3,mon4]]]
```

If `h` is specified, a list of monitors is printed on stdout. And if that is the whole option value, `wfica` then exits.

If `o` is specified, the session window has the `override-redirect` attribute.

### Caution:

The use of this option value is not recommended. It is intended as a last resort, for use with uncooperative window managers. The session window is not visible to the window manager, does not have an icon, and cannot be restacked. It can be removed only by ending the session.

If `a` is specified, Citrix Workspace app tries to create a session that covers all monitors.

Citrix Workspace app assumes that the rest of the `-span` option value is a list of monitor numbers. A single value selects a specific monitor, two values select monitors at the top-left and bottom-right corners of the required area, four specify monitors at the top, bottom, left, and right edges of the area.

Assuming `o` was not specified, `wfica` uses the `_NET_WM_FULLSCREEN_MONITORS` message to request an appropriate window layout from the window manager, if it is supported. Otherwise, it uses size and position hints to request the desired layout.

The following command can be used to test for window manager support:

```
xprop -root | grep \\_NET\\_WM\\_FULLSCREEN\\_MONITORS
```

If there is no output, there is no support. If there is no support, you may need an override-redirect window. You can set up an override-redirect window using `-span o`.

To make a session that spans multiple monitors from the command line:

1. At a command prompt, type:

```
/opt/Citrix/ICAClient/wfica -span h
```

A list of the numbers of the monitors currently connected to the user device is printed to stdout and `wfica` exits.

2. Make a note of these monitor numbers.

3. At a command prompt, type:

```
/opt/Citrix/ICAClient/wfica -span \[w\[,x\[,y,z\]\]\]
```

where `w`, `x`, `y`, and `z` are monitor numbers obtained in step 1 above and the single value `w`, specifies a specific monitor, two values `w` and `x` specify monitors at the top-left and bottom-right corners of the required area, and four values `w`, `x`, `y` and `z` specify monitors at the top, bottom, left, and right edges of the area.

**Important:**

Define the `WFICA_OPTS` variable before starting self-service or connecting to the Web interface through a browser. To do this, edit your profile file, normally found at `$HOME/.bash_profile` or `$HOME/.profile`, adding a line to define the `WFICA_OPTS` variable.

For example:

```
export WFICA_OPTS="-span a"
```

This change affects both Citrix Virtual Apps and Desktops sessions.

If you have started self-service or storebrowse, remove processes they started in order for the new environment variable to take effect. Remove them with:

```
killall AuthManagerDaemon ServiceRecord storebrowse
```

## Local applications

You might not escape from a full-screen session to use local applications or another session, because the client-side system UI is hidden and the Keyboard Transparency feature disables the usual keyboard command. For example, `Alt+Tab`, sending the command to the server instead.

As a workaround, use `CTRL+F2` to turn off the Keyboard Transparency feature temporarily until the focus next returns to the session window. An alternative workaround is to set `TransparentKeyPassthrough` to `No` in `$ICAROOT/config/module.ini`. This disables the Keyboard Transparency feature. However you might have to override the ICA file by adding this setting in the `All_regions.ini` file.

## **Browser**

### **Local browser**

When you click on a link in a Windows session, the content appears in a local browser. Server-client content redirection is enabled in wfclient.ini. This causes a local application to run. To disable server-client content redirection, see [server-client content redirection](#).

### **Access published resources**

When you access published resources, your browser prompts to save a file. Browsers other than Firefox and Chrome may require configuration before you can connect to a published resource. If you are connecting through the Web Interface, you may be able to access the Web Interface home page with the list of resources. However, when trying to access a resource by clicking an icon on the page, your browser prompts you to save the ICA file.

### **Configure a different browser**

To configure a different browser for use with Web Interface: details vary among browsers, but you can set up the MIME data types in the browser so that the \$ICAROOT/wfica is executed as a helper application when the browser encounters data with the application/x-ica MIME type or an .ica file.

### **Specific browser**

If you have problems using a specific web browser, set the environment variable BROWSER to specify the local path and name of the required browser before running setupwfc.

### **Firefox browser**

When you launch desktops or applications in Firefox, if page is unresponsive, try enabling the ICA plug-in.

### **ICA plug-in in Firefox**

When the ICA plug-in is enabled in Firefox, desktop and application sessions might not start. In this case, try disabling the ICA plug-in.

## Configuration errors

These errors might occur if you configured a connection entry incorrectly.

**E\_MISSING\_INI\_SECTION - Verify the configuration file: “..”. The section “..” is missing in the configuration file.**

The configuration file was incorrectly edited or is corrupt.

**E\_MISSING\_INI\_ENTRY - Verify the configuration file: “..”. The section “..” must contain an entry “..”.**

The configuration file was incorrectly edited or is corrupt.

**E\_INI\_VENDOR\_RANGE - Verify the configuration file: “..”. The X server vendor range “..” in the configuration file is invalid.**

The X Server vendor information in the configuration file is corrupt. Contact Citrix.

## wfclient.ini configuration errors

These errors might occur if you edited wfclient.ini incorrectly.

**E\_CANNOT\_WRITE\_FILE - Cannot write file: “..”**

There was a problem saving the connection database; for example, no disk space.

**E\_CANNOT\_CREATE\_FILE - Cannot create file: “..”**

There was a problem creating a connection database.

**E\_PNAGENT\_FILE\_UNREADABLE - Cannot read Citrix Virtual Apps file “..”: No such file or directory.**

— Or —

**Cannot read Citrix Virtual Apps file “..”: Permission denied.**

You are trying to access a resource through a desktop item or menu, but the Citrix Virtual Apps file for the resource is not available. Refresh the list of published resources by selecting Application Refresh on the View menu, and try to access the resource again. If the error persists, check the properties of the desktop icon or menu item, and the Citrix Virtual Apps file to which the icon or item refers.

## PAC file errors

These errors might occur if your deployment uses proxy auto-configuration (PAC) files to specify proxy configurations.

**Proxy detection failure: Improper auto-configuration URL.**

An address in the browser was specified with an invalid URL type. Valid types are [http://](#) and [https://](#), and other types are not supported. Change the address to a valid URL type and try again.

**Proxy detection failure: .PAC script HTTP download failed: Connect failed.**

Check if an incorrect name or address was entered. If so, fix the address and retry. If not, the server could be down. Retry later.

**Proxy detection failure: .PAC script HTTP download failed: Path not found.**

The requested PAC file is not on the server. Either change this on the server, or reconfigure the browser.

**Proxy detection failure: .PAC script HTTP download failed.**

The connection failed while downloading the PAC file. Reconnect and try again.

**Proxy detection failure: Empty auto-configuration script.**

The PAC file is empty. Either change this on the server, or reconfigure the browser.

**Proxy detection failure: No JavaScript support.**

The PAC executable or the pac.js text file is missing. Reinstall Citrix Workspace app.

**Proxy detection failure: JavaScript error.**

The PAC file contains invalid JavaScript. Fix the PAC file on the server. Also see [Connection](#).

**Proxy detection failure: Improper result from proxy auto-configuration script.**

A badly formed response was received from the server. Either fix this on the server, or reconfigure the browser.

## Certificates

When you use a store with SAML authentication (using AUTHv3 protocol), the following error message appears: “Unacceptable TLS Certificate.”

The issue occurs when you use Citrix Workspace app for Linux 1906 and later. For troubleshooting instructions, see Knowledge Center article [CTX260336](#).

## Others

### Connection issues

You might also encounter the following issues.



## Close a session

If you want to know whether the server has instructed Citrix Workspace app to close a session, you can use the *wfica* program to log when it has received a command to terminate the session from the server.

To record this information through the syslog system, add *SyslogThreshold* with the value 6 to the [WFClient] section of the configuration file. This enables the logging of messages that have a priority of LOG\_INFO or higher. The default value for *SyslogThreshold* is 4 (=LOG\_WARNING).

Similarly, to have *wfica*, send the information to standard error, and add *PrintLogThreshold* with the value 6 to the [WFClient] section. The default value for *PrintLogThreshold* is 0 (=LOG\_EMERG).

For more information on logging, see [Enabling logging](#) and for more information on syslog configuration, see [syslog configuration](#).

## Configuration file settings

For each entry in *wfclient.ini*, there must be a corresponding entry in *All\_Regions.ini* for the setting to take effect. In addition, for each entry in the [Thinwire3.0], [ClientDrive], and [TCP/IP] sections of *wfclient.ini*, there must be a corresponding entry in *canonicalization.ini* for the setting to take effect. See the *All\_Regions.ini* and *canonicalization.ini* files in the *\$ICAROOT/config* directory for more information.

## Published applications

If you have issues running published applications that access a serial port, the application might fail (with or without an error message, depending on the application itself) if the port has been locked by another application. Under such circumstances, check that there are no applications that have either temporarily locked the serial port or have locked the serial port and exited without releasing it.

To overcome this problem, stop the application that is blocking the serial port. Regarding UUCP-style locks, there might be a lock file left behind after the application exits. The location of these lock files depends on the operating system used.

## Starting Citrix Workspace app

If Citrix Workspace app does not start, the error message “Application default file could not be found or is out of date” appears. The reason might be that the environment variable *ICAROOT* is not defined correctly. This is a requirement if you installed Citrix Workspace app to a non-default location. To overcome this problem, Citrix recommends that you do one of the following:

- Define ICAROOT as the installation directory.

To check that the ICAROOT environment variable is defined correctly, try starting Citrix Workspace app from a terminal session. If the error message still appears, it is likely that the ICAROOT environment variable is not correctly defined.

- Reinstall Citrix Workspace app to the default location. For more information about installing Citrix Workspace app, see [Install and set up](#).

If Citrix Workspace app was previously installed in the default location, remove the `/opt/Citrix/ICAClient` or `$HOME/ICAClient/platform` directory before reinstalling.

### **Citrix CryptoKit (formerly SSLSDK)**

To find the Citrix CryptoKit (formerly SSLSDK) or OpenSSL version number that you are running, you can use the following command:

```
strings libctxssl.so | grep "Citrix SSLSDK"
```

You can also run this command on AuthManagerDaemon or PrimaryAuthManager

### **Keyboard shortcuts**

If your window manager uses the same key combinations to provide native functionality, your key combinations might not function correctly. For example, the KDE window manager uses the combinations from CTRL+SHIFT+F1 to CTRL+SHIFT+F4 to switch between desktops 13 to 16. If you experience this problem, try the following solutions:

- Translated mode on the keyboard maps a set of local key combinations to server-side key combinations. For example, by default in Translated mode, CTRL+SHIFT+F1 maps to the server-side key combination ALT+F1. To reconfigure this mapping to an alternative local key combination, update the following entry in the [WFClient] section of `$HOME/.ICAClient/wfclient.ini`. This maps the local key combination Alt+Ctrl+F1 to Alt+F1:
  - Change `Hotkey1Shift=Ctrl+Shift` to `Hotkey1Shift=Alt+Ctrl`.
- Direct mode on the keyboard sends all key combinations directly to the server. They are not processed locally. To configure Direct mode, in the [WFClient] section of `$HOME/.ICAClient/wfclient.ini`, set `TransparentKeyPassthrough` to Remote.
- Reconfigure the window manager so that it suppresses default keyboard combinations.

### **Remote Croatian keyboard**

This procedure ensures that ASCII characters are correctly sent to remote virtual desktops with Croatian keyboard layouts.

1. In the WFClient section of the appropriate configuration file, set UseEUKSforASCII to True.
2. Set UseEUKS to 2.

### **Japanese keyboard**

To configure use of a Japanese keyboard, update the following entry in the wfclient.ini configuration file:

```
KeyboardLayout=Japanese (JIS)
```

### **ABNT2 keyboard**

To configure use of an ABNT2 keyboard, update the following entry in the wfclient.ini configuration file:

```
KeyboardLayout=Brazilian (ABNT2)
```

### **Local keyboard**

If some keys on the local keyboard do not behave as expected, choose the best-matching server layout from the list in \$ICAROOT/config/module.ini.

### **Windows Media Player**

Citrix Workspace app might not have GStreamer plugins to handle a requested format. This normally causes the server to request a different format. Sometimes the initial check for a suitable plugin incorrectly indicates that one is present. This is normally detected and causes an error dialog to appear on the server indicating that Windows Media Player encountered a problem while playing the file. Retrying the file within the session typically works because the format is rejected by Citrix Workspace app. And as a result, the server either requests another format or renders the media itself.

In a few situations, the fact that there is no suitable plugin is not detected and the file is not played correctly, despite the progress indicator moving as expected in Windows Media Player.

To avoid this error dialog or failure to play in future sessions:

1. Temporarily add the configuration option “SpeedScreenMMAVerbose=On” to the [WFClient] section of \$Home/.ICAClient/wfclient.ini, for example.
2. Restart wfica from a self-service that has been started from a terminal.
3. Play a video that generates this error.

4. Note (in the tracing output) the mime-type associated with the missing plugin trace, or the mime-type that should be supported but does not play (for example, “video/x-h264..”).
5. Edit \$ICAROOT/config/MediaStreamingConfig.tbl. On the line with the noted mime-type, insert a ‘?’ between the ‘:’ and the mime type. This disables the format.
6. Repeat steps 2 - 5 (above) for other media formats that produce this error condition.
7. Distribute this modified MediaStreamingConfig.tbl to other machines with the same set of GStreamer plugins.

**Note:**

Alternately, after identifying the mime-type it may be possible to install a GStreamer plugin to decode it.

### Serial port setting

To configure a single serial port, add the following entries in the \$ICAROOT/config/module.ini configuration file:

```
LastComPortNum=1
```

```
ComPort1=device
```

To configure two or more serial ports, add the following entries in the \$ICAROOT/config/module.ini configuration file:

```
LastComPortNum=2
```

```
ComPort1=device1
```

```
ComPort2=device2
```

### Errors

This topic contains a list of other common error messages you may see when using Citrix Workspace app.

**An error occurred. The error code is 11 (E\_MISSING\_INI\_SECTION). Please refer to the documentation. Exiting.**

When running Citrix Workspace app from the command line, this usually means the description given on the command line was not found in the appsrv.ini file.

**E\_BAD\_OPTION - The option “...” is invalid.**

Missing argument for option “...”.

**E\_BAD\_ARG - The option “..” has an invalid argument: “..”.**

Invalid argument specified for option “..”.

**E\_INI\_KEY\_SYNTAX - The key “..” in the configuration file “..” is invalid.**

The X Server vendor information in the configuration file is corrupt. Create a configuration file.

**E\_INI\_VALUE\_SYNTAX - The value “..” in the configuration file “..” is invalid.**

The X Server vendor information in the configuration file is corrupt. Create a configuration file.

**E\_SERVER\_NAMELOOKUP\_FAILURE - Cannot connect to server “..”.**

The server name cannot be resolved.

**Cannot write to one or more files: “..”. Correct any disk full issues or permissions problems and try again.**

Check for disk full issues, or permissions problems. If a problem is found and corrected, retry the operation that prompted the error message.

**Server connection lost. Reconnect and try again. These files might be missing data: “..”.**

Reconnect and retry the operation that prompted the error.

## Diagnostic information

If you are experiencing problems using Citrix Workspace app, you may be asked to provide Technical Support with diagnostic information. This information assists this team in trying to diagnose the problem and offer assistance to rectify it.

To obtain diagnostic information about Citrix Workspace app

1. In the installation directory, type `util/lurdump`. It is recommended that you do this while a session is open and, if possible, while the issue is occurring.

A file is generated that contains detailed diagnostic information, including version details, the contents of Citrix Workspace app’s configuration files, and the values of various system variables.

2. Check the file for confidential information before sending it to Technical Support.

## Troubleshoot connections to resources

Users can manage their active connections using the Connection Center. This feature is a useful productivity tool that enables users and administrators to troubleshoot slow or problematic connections. With Connection Center, users can manage connections by:

- Closing an application.
- Logging off a session. This step ends the session and closes any open applications.
- Disconnecting from a session. This step cuts the selected connection to the server without closing any open applications (unless the server is configured to close applications on disconnection).
- Viewing connection transport statistics.

## SDK and API

October 7, 2019

### Citrix Virtual Channel SDK

The Citrix Virtual Channel Software Development Kit (SDK) provides support for writing server-side applications and client-side drivers for additional virtual channels using the ICA protocol. The server-side virtual channel applications are on Citrix Virtual Apps and Desktops servers. If you want to write virtual drivers for other client platforms, contact Citrix Technical support.

The Virtual Channel SDK provides:

- The Citrix Virtual Driver Application Programming Interface (VD-API) used with the virtual channel functions in the Citrix Server API SDK (WF-API SDK) to create new virtual channels. The virtual channel support provided by VD-API makes it easy to write your own virtual channels.
- Working source code for several virtual channel sample programs that demonstrate programming techniques.
- The Virtual Channel SDK requires the WF-API SDK to write the server side of the virtual channel.

For more information, see [Citrix Virtual Channel SDK for Citrix Workspace app for Linux](#).

### Command-line Reference

For information on command-line reference and parameters, see [Citrix Workspace app for Linux Command Reference](#).

### Platform Optimization SDK

As part of the HDX SoC initiative for Citrix Workspace app for Linux, we have come up with the 'Platform optimization SDK' for enabling an ecosystem of low cost, low power, high performance devices with innovative form factors.

The Platform Optimization SDK can be used by developers looking to improve the performance of Linux-based devices by allowing them to create plug-in extensions for the ICA engine component (wfica) of Citrix Workspace app for Linux. Plugins are built as shareable libraries that are dynamically loaded by wfica. These plugins can help you optimize the performance of your Linux devices, enabling the following functions:

- Provide accelerated decoding of JPEG and H.264 data used to draw the session image
- Control the allocation of memory used to draw the session image
- Improve performance by taking control of the low-level drawing of the session image
- Provide graphics output and user input services for OS environments that do not support X11

For information, see [Citrix Workspace app for Linux - Platform Optimization SDK](#).



### **Locations**

Corporate Headquarters | 851 Cypress Creek Road Fort Lauderdale, FL 33309, United States

Silicon Valley | 4988 Great America Parkway Santa Clara, CA 95054, United States

© 2019 Citrix Systems, Inc. All rights reserved. Citrix, the Citrix logo, and other marks appearing herein are property of Citrix Systems, Inc. and/or one or more of its subsidiaries, and may be registered with the U.S. Patent and Trademark Office and in other countries. All other marks are the property of their respective owner(s).