



User Guide

NICE DCV



NICE DCV: User Guide

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Table of Contents

Getting Started	1
Step 1: Get the Session Information	1
Step 2: Choose a Client	2
NICE DCV clients	3
Requirements	3
Supported features	5
Windows client	7
Installable Windows client	7
Portable Windows client	9
Web browser client	9
Linux client	10
macOS client	12
Using NICE DCV	13
Connecting to a session	13
Connecting using the Windows client	14
Connecting using the web browser client	16
Connecting using the Linux client	17
Connecting using the macOS client	18
Connecting using URI	20
Changing display resolution	20
Setting the time zone	23
Managing streaming modes	27
Streaming modes on Windows, Linux, and macOS clients	27
Streaming modes on Web browser client	31
Transferring files	33
Transferring files using Windows, Linux and macOS clients	34
Transferring files using web browser	36
Printing	37
Copying and pasting	39
Windows, Linux, and macOS clients	39
Web browser client	39
Using a smart card	40
Connecting a smart card	40
Using a smart card on Linux servers	43

Releasing a smart card	44
Smart card data caching (optional)	44
Saving a screenshot	45
Collaborating sessions	46
Using multiple monitors	50
Extending full-screen across all monitors	51
Extending full-screen across selected monitors	52
Exiting full screen on multiple monitors	59
Using USB remotization	60
Using a USB device on a NICE DCV server	60
Using a webcam	62
Using a webcam on Windows, Linux and macOS clients	62
Using a webcam on the web browser client	66
Using accurate audio/video synchronization	69
Using high color accuracy	72
High color accuracy on native clients	73
High color accuracy on Web browser client	75
Using a connection file	76
Creating the connection file	76
Supported parameters	78
Running the connection file	85
Setting certificate validation	85
Using WebAuthn redirection	86
Webauthn Redirection user interface	86
Troubleshooting	89
Using the Log Files	89
Release notes and document history	91
Release Notes	91
NICE DCV 2023.1-16388	93
NICE DCV 2023.1-16388	94
NICE DCV 2023.1-16220	95
NICE DCV 2023.0-15487	97
NICE DCV 2023.0-15065	98
NICE DCV 2023.0-15022	100
NICE DCV 2023.0-14852	101
NICE DCV 2022.2-14521	102

NICE DCV 2022.2-14357	103
NICE DCV 2022.2-14175	103
NICE DCV 2022.2-14126	104
NICE DCV 2022.2-13907	105
NICE DCV 2022.1-13300	106
NICE DCV 2022.1-13216	107
NICE DCV 2022.1-13067	107
NICE DCV 2022.0-12760	108
NICE DCV 2022.0-12627	109
NICE DCV 2022.0-12123	109
NICE DCV 2022.0-11954	110
NICE DCV 2021.3-11591	111
NICE DCV 2021.2-11445	112
NICE DCV 2021.2-11190	113
NICE DCV 2021.2-11135	113
NICE DCV 2021.2-11048	114
DCV 2021.1-10851	116
DCV 2021.1-10598	117
DCV 2021.1-10557	117
DCV 2021.0-10242	118
DCV 2020.2-9662	119
DCV 2020.2-9508	119
DCV 2020.1-9012	121
DCV 2020.1-9012	121
DCV 2020.1-8942	121
DCV 2020.0-8428	123
DCV 2019.1-7644	124
DCV 2019.1-7423	124
DCV 2019.0-7318	125
DCV 2017.4-6898	126
DCV 2017.3-6698	128
DCV 2017.2-6182	130
DCV 2017.1-5870	132
DCV 2017.1-5777	132
DCV 2017.0-5600	133
DCV 2017.0-5121	133

DCV 2017.0-4334	134
DCV 2017.0-4100	134
Document history	135

Getting Started with NICE DCV

NICE DCV is a high-performance remote display protocol. It lets you securely deliver remote desktops and application streaming from any cloud or data center to any device, over varying network conditions. By using NICE DCV with Amazon EC2, you can run graphics-intensive applications remotely on Amazon EC2 instances. You can then stream the results to more modest client machines, which eliminates the need for expensive dedicated workstations.

To use NICE DCV, install the NICE DCV server software on a server. The NICE DCV server software is used to create a secure [session](#). You install and run your applications on the server. The server uses its hardware to perform the high-performance processing that the installed applications require. Your users access the application by remotely connecting to the session using a NICE DCV client application. When the connection is established, the NICE DCV server software compresses the visual output of the application and streams it back to the client application in an encrypted pixel stream. The client application receives the compressed pixel stream, decrypts it, and then outputs it to the local display.

Contents

- [Step 1: Get the NICE DCV Session Information](#)
- [Step 2: Choose a NICE DCV Client](#)

Step 1: Get the NICE DCV Session Information

After the NICE DCV session is running on the NICE DCV server, you must have specific information to connect to it. Contact your NICE DCV administrator if you don't have the following information:

- The IP address or host name of the NICE DCV server
- The port that the NICE DCV server is configured to communicate over. By default, port 8443 is used by the NICE DCV server.
- The session ID
- Sign-in credentials to connect to the NICE DCV host server

Step 2: Choose a NICE DCV Client

Next, choose the NICE DCV client that best meets your needs. NICE DCV offers the following clients:

- A Windows client
- A web browser client
- A Linux client
- A macOS client

For more information about the available clients, see [NICE DCV clients](#).

After you choose a NICE DCV client, you can use it to connect to, and interact with the NICE DCV session. For more information about using the NICE DCV clients to interact with sessions, see [Using NICE DCV](#).

NICE DCV clients

NICE DCV offers a Windows client, Linux client, web browser client, and macOS client. The clients offer similar feature sets, but there are some differences. Choose the NICE DCV client that meets your specific requirements.

Topics

- [Requirements](#)
- [Supported features](#)
- [Windows client](#)
- [Web browser client](#)
- [Linux client](#)
- [macOS client](#)

Requirements

To use NICE DCV, ensure that the client computers meet the following minimum requirements. Bear in mind that your experience is dependent on the number of pixels that are streamed from the NICE DCV server to the NICE DCV client.

	Windows client	Web browser client	Linux client	macOS client
Softw	<p>The Windows client is supported on 32-bit and 64-bit versions of the following operating systems:</p> <ul style="list-style-type: none"> • Windows 10 • Windows 11 	<p>The web browser client is supported on the latest three major versions of the following browsers, across all major desktop operating systems (Windows, macOS, and Linux):</p> <ul style="list-style-type: none"> • Mozilla Firefox 	<p>The Linux client is supported on the following modern Linux operating systems:</p> <ul style="list-style-type: none"> • RHEL 7.x and CentOS 7.x • RHEL 8.x, CentOS 8, and Rocky Linux 8.5 or later (x86_64) 	<p>macOS clients with Intel processors require macOS Monterey (12) or later.</p> <p>macOS clients with Apple M1 processors require macOS Monterey (12).</p>

	Windows client	Web browser client	Linux client	macOS client
	<p>The client requires the following additional software:</p> <ul style="list-style-type: none"> .NET Framework 4.6.2 Microsoft Visual C++ Redistributable for Visual Studio. For more information and download instructions, see the Microsoft Support website. 	<ul style="list-style-type: none"> Google Chrome Microsoft Edge Apple Safari <p>The web browser client also requires WebGL and asm.js.</p> <div data-bbox="553 611 846 1209" style="border: 1px solid #add8e6; border-radius: 10px; padding: 10px; margin-top: 10px;"> <p>Note</p> <p>The web browser client isn't supported on mobile operating systems, such as Android and iOS.</p> </div>	<ul style="list-style-type: none"> RHEL 9, CentOS 9, and Rocky Linux 9 (x86_64) SUSE Linux Enterprise 15.x Ubuntu 20.04, and 22.04 	
Network	The client must connect to the NICE DCV server, and it must communicate over the required port. By default, this is port 8443.			

Note

NICE DCV does not support operating systems that have reached end of life. Contact your vendor regarding your operating system.

For more information about the NICE DCV server requirements, see [NICE DCV server requirements](#) in the *NICE DCV Administrator Guide*.

Supported features

The following table compares the features that are supported by the NICE DCV clients.

Feature	<u>Windows client</u>	<u>Web browser client</u>	<u>Linux client</u>	<u>macOS client</u>
Connect to Windows NICE DCV servers	✓	✓	✓	✓
Connect to Linux NICE DCV servers	✓	✓	✓	✓
QUIC UDP transport protocol	✓	✗	✓	✓
Manage streaming modes	✓	✓	✓	✓
Transfer files	✓	✓	✓	✓
Print from sessions	✓	✓ ¹	✓	✓
Copy and paste	✓	✓	✓	✓
Smart card support	✓	✗	✓	✓
USB remotization support	✓ (installable client)	✗	✗	✗
Connection file support	✓	✗	✓	✓
Stereo 2.0 audio playback	✓	✓	✓	✓
Surround sound audio playback	✓ (up to 7.1)	✗	✓ (up to 5.1)	✗
Stereo 2.0 audio recording	✓	✓	✓	✓
Touchscreen support	✓ (Windows 10 and later)	✓ ²	✓	✗

Feature	<u>Windows client</u>	<u>Web browser client</u>	<u>Linux client</u>	<u>macOS client</u>
Stylus support	✓ (Windows 10 and later)	✓ ³	✓	✓
Gamepad support	✓ (Windows 10 and later)	✗	✗	✗
<u>Multiple monitor support</u>	✓	✓ ⁴	✓	✓
<u>Extending full screen across selected monitors</u>	✓	✓	✓	✓
<u>Webcam support</u>	✓	✓ ⁵	✓	✓
<u>Setting time zone</u>	✓	✓	✓	✓
<u>Using accurate audio/video synchronization</u>	✓	✗	✓	✓
<u>NICE DCV Extensions</u>	✓	✗	✓	✓
<u>WebAuthN</u>	✓	✗	✓	✓

¹These clients support printing to a file only. They don't support printing to a local printer.

²Supported by Firefox, Edge, and Google Chrome.

³Supported in Chromium-based browsers only. This includes Google Chrome and Microsoft Edge version 79 and later. Tilt and pressure events aren't supported in other browsers.

⁴Support for up to two monitors.

⁵Supported in Chromium-based browsers only. This includes Google Chrome and Microsoft Edge version 79 and later. This doesn't include Firefox and Safari.

For more information about the NICE DCV server features, see [NICE DCV server features](#) in the *NICE DCV Administrator Guide*.

Windows client

The NICE DCV Windows client is supported on Windows computers only. The Windows client is a standalone application that runs on the Windows operating system.

For instructions on how to connect to a NICE DCV session using the Windows client, see [Connecting to a NICE DCV session using the Windows client](#).

The Windows client is available in two versions: an installable version and a portable version. Both versions have the same minimum system requirements and have the same features.

Contents

- [Installable Windows client](#)
- [Portable Windows client](#)

Installable Windows client

You can use an installation wizard to install the client. The wizard takes you through a series of steps where you can customize your client installation. Or, you can use the command line to perform an unattended installation. This second method uses default settings to automate the installation procedure.

Before using the wizard or the command line to install the client, make sure that your computer has the required software. For a complete list of required software, see [Requirements](#).

To install the Windows client using the installation wizard

1. Download the [Windows client installer](#).

Tip

The [latest packages](#) page of the download website contains links that always point to the newest available version. You can use these links to automatically retrieve the newest NICE DCV packages.

2. Run the installer.
3. On the **Welcome** screen, choose **Next**.
4. On the **End-User License Agreement** screen, read the license agreement. If you accept the terms, select the **I accept the terms in the License Agreement** check box. Choose **Next**.
5. On the **Destination Folder** screen, choose **Next** to keep the default installation folder. To install the client in a different folder, change the destination path, and then choose **Next**.
6. (Optional) On the **Drivers Selection** screen, select **USB device remotization**. Then, choose **Will be installed on local hard drive, Next**. This installs the drivers required to support some specialized USB devices. These devices include 3D pointing devices and graphic tablets.

Note

Using specialized USB devices requires additional client and server configuration. For instructions, see [Using USB remotization](#).

7. On the **Ready to install** screen, choose **Install**.

To install the Windows client using an unattended installation

1. Download the [Windows client installer](#).
2. Open a command prompt window and navigate to the folder where you downloaded the installer.
3. Run the unattended installer.

```
C:\> msixec.exe /i nice-dcv-client-Release-2023.1-8993.msi /quiet /norestart /l*v  
dcv_client_install_msi.log
```

To install all of the optional components, including the USB driver, include the `ADDLOCAL=ALL` option in the command.

```
C:\> msixexec.exe /i nice-dcv-client-Release-2023.1-8993.msi ADDLOCAL=ALL /quiet /
norestart /l*v dcv_client_install_msi.log
```

Portable Windows client

The Windows client is also available in a portable version. You don't need to install the portable version on your computer. You can copy it to a USB drive and run it directly from the USB drive on any Windows computer that meets the minimum requirements.

To use the portable Windows client

1. Download the portable [Windows client zip file](#).

Tip

The [latest packages](#) page of the download website contains links that always point to the newest available version. You can use these links to automatically retrieve the newest NICE DCV packages.

2. Extract the contents of the zip file.
3. To launch the client, open the extracted folder, navigate to `/bin/`, and double-click `dcvviewer.exe`.

Web browser client

The NICE DCV web browser client runs inside a web browser. You don't need to install the web client. The web browser client is supported on the following browsers across all major desktop operating systems (including Windows, macOS, and Linux):

Browser	Version
Google Chrome	Latest three major versions
Mozilla Firefox	Latest three major versions
Microsoft Edge	Latest three major versions

Browser	Version
Apple Safari	Latest three major versions

For instructions on how to connect to a NICE DCV session using the web browser client, see [Connecting to a NICE DCV session using the web browser client](#).

WebCodecs

The web browser client can use WebCodecs to use video decoders that are already present in the browser. This can improve frame rate, because packets can be decoded by components of the browser. The NICE DCV web browser client will automatically use it if supported by the browser.

The use of WebCodecs is available on the following browsers:

- Google Chrome version 94 and later
- Microsoft Edge version 94 and later

All major operating systems are supported. This includes Windows, macOS, and Linux.

Limitations

The web browser client has the following limitations:

- It supports up to two screens with a maximum resolution of 1920x1080. The maximum resolution can be overridden on the server side. For more information, see [Managing the NICE DCV Session Display Layout](#) in the *NICE DCV Administrator Guide*.
- It uses the web browser's proxy configuration.

Linux client

The Linux client runs natively on the operating system. You can use it to connect to NICE DCV sessions that are hosted on Windows and Linux NICE DCV servers.

You install the Linux client on a Linux client computer using a software package. The software package installs all required packages and their dependencies, and performs the required client configuration.

For instructions on how to connect to a NICE DCV session using the Linux client, see [Connecting to a NICE DCV session using the Linux client](#).

To install the Linux client

1. The software packages are digitally signed with a secure GPG signature. To allow the package manager to verify the package signature, import the NICE GPG key. To do this, open a terminal window and import the NICE GPG key.

- RHEL, CentOS, Rocky Linux, and SUSE Linux Enterprise 15

```
$ sudo rpm --import https://d1uj6qtbmh3dt5.cloudfront.net/NICE-GPG-KEY
```

- Ubuntu

Download the GPG key.

```
$ wget https://d1uj6qtbmh3dt5.cloudfront.net/NICE-GPG-KEY
```

Install the GPG key.

```
$ sudo apt-key add NICE-GPG-KEY
```

2. Download the appropriate client software package for your target operating system from the [NICE DCV](#) website.

Tip

The [latest packages](#) page of the download website contains links that always point to the newest available version. You can use these links to automatically retrieve the newest NICE DCV packages.

3. Install the Linux client. Enter the filename of the downloaded file to complete the following command.

- RHEL, CentOS, and Rocky Linux

```
$ sudo yum install the downloaded .rpm file
```

- Ubuntu

```
$ sudo dpkg --install the downloaded .deb file
```

- SUSE Linux Enterprise

```
$ sudo zypper install the downloaded .rpm file
```

macOS client

The NICE DCV macOS client is supported on Apple Mac computers only. The macOS client is a standalone application that runs on the macOS operating system.

The macOS client is installed using a .dmg software package.

For instructions on how to connect to a NICE DCV session using the macOS client, see [Connecting to a NICE DCV session using the macOS client](#).

To install the macOS client

1. Download the correct macOS client installer depending on your client computer.
 - [macOS client for Intel processors](#)
 - [macOS clients for Apple M1 processors](#)

Tip

The [latest packages](#) page of the download website contains links that always point to the newest available version. You can use these links to automatically retrieve the newest NICE DCV packages.

2. Run the downloaded .dmg file.

If you get an error stating that the application can't be installed because it's from an unidentified developer, see the [Safely open apps on your Mac](#) webpage.

3. Click and drag the DCV .app file to the **Applications** folder.
4. (Optional) For easy access, create a desktop shortcut or add the application to the dock.

Using NICE DCV

After you choose a NICE DCV client, you can use it to connect to and interact with a NICE DCV session.

Topics

- [Connecting to a NICE DCV session](#)
- [Changing display resolution](#)
- [Setting the time zone](#)
- [Managing streaming modes](#)
- [Transferring files](#)
- [Printing](#)
- [Copying and pasting](#)
- [Using a smart card](#)
- [Saving a screenshot](#)
- [Collaborating on a NICE DCV session](#)
- [Using multiple monitors](#)
- [Using USB remotization](#)
- [Using a webcam](#)
- [Using accurate audio/video synchronization](#)
- [Using high color accuracy](#)
- [Using a connection file](#)
- [Set certificate validation policy](#)
- [Using WebAuthn redirection](#)

Connecting to a NICE DCV session

After the NICE DCV session starts running on the NICE DCV server, you can connect to it using your preferred client. Ensure that you have the required information when connecting to your NICE DCV session. For more information, see [Step 1: Get the NICE DCV Session Information](#).

If you're connecting to a console session, contact your NICE DCV server administrator. With them, ensure that the session is started and confirm the server and session details. If you're connecting

to a virtual session on a Linux NICE DCV server, you might need to start your own session. For more information, see [Starting NICE DCV Sessions](#) in the *NICE DCV Administrator Guide*.

Topics

- [Connecting to a NICE DCV session using the Windows client](#)
- [Connecting to a NICE DCV session using the web browser client](#)
- [Connecting to a NICE DCV session using the Linux client](#)
- [Connecting to a NICE DCV session using the macOS client](#)
- [Connecting to a NICE DCV session using URI](#)

Connecting to a NICE DCV session using the Windows client

The steps for connecting to a NICE DCV session are the same for both the installable and portable versions of the Windows client.

To connect to a session using the Windows client

1. Launch the Windows client.
2. Choose **Connections Settings**, configure your proxy settings as follows, and then choose **OK**.
 - To avoid connecting through a proxy, choose **Connect Directly**.
 - To connect to the NICE DCV server using your preconfigured operating system proxy settings, choose **Use system proxy**.
 - To connect to the NICE DCV server through a specific HTTP proxy server, choose **Get through web proxy**. Specify the IP address and communication port or the hostname of the proxy server. If the HTTP proxy server requires authentication, select the **Proxy server requiring password** check box and enter your sign-in credentials.
 - To connect to the NICE DCV server through a specific SOCKS5 proxy server, choose **Get through SOCKSv5 proxy**. Specify the IP address and communication port or the hostname of the proxy server. If the SOCKSv5 proxy server requires authentication, select the **Proxy server requiring password** check box and enter your sign-in credentials.
 - To select the transport protocol to use for data transport, choose the **Protocol** tab. By default, the client uses the QUIC protocol (based on UDP) for data transport if it's available. If it isn't available, the client uses the WebSocket protocol (based on TCP). This option is always available.

QUIC is available only if the two following conditions are met. First, the NICE DCV server is configured to support it. Second, your network configuration supports UDP communication between the NICE DCV client and the NICE DCV server. Additionally, it's only supported for direct client-server communication where there are no intermediate proxies, gateways, or load balancers.

You can force the client to use a data transport protocol by explicitly selecting it. To verify which protocol is in use, check the Streaming Modes dialog. Additionally, if the QUIC protocol is in use, "QUIC" appears in the titlebar.

For more information and instructions, see [Enable the QUIC UDP transport protocol](#) in the *NICE DCV Administrator Guide*.


3. Specify the session details in the following format:

```
server_hostname_or_IP:port#session_id
```

In the following example, the command connects to a session that's named `my-session`. This session is hosted on a NICE DCV server with the hostname `my-dcv-server.com`. It's connected over port `8443`.

```
my-dcv-server.com:8443#my-session
```

4. Choose **Connect**.
5. Enter sign-in credentials and choose **Login**.

 **Note**

By default, the connection is terminated after three unsuccessful login attempts. To try again, restart the connection.

6. If you're prompted to verify the server's certificate, confirm the certificate's fingerprint with your NICE DCV administrator. If the fingerprint is valid, choose **Trust & Connect**.

Connecting to a NICE DCV session using the web browser client

The steps for connecting to a NICE DCV session are the same across all supported web browsers. The client connects to the NICE DCV server using your web browser's proxy settings. To connect using different proxy settings, see the documentation for your specific web browser.

Note

The web browser client doesn't support the QUIC (UDP) transport protocol.

To connect to your NICE DCV session using the web browser client

1. Open a web browser and enter the NICE DCV server URL in the following format:

```
https://server_hostname_or_IP:port/#session_id
```

In the following example, the URL connects to a session that's named `my-session`. This session is hosted on a NICE DCV server with the hostname `my-dcv-server.com`. It's connected over port `8443`.

```
https://my-dcv-server.com:8443/#my-session
```

2. Enter your sign-in credentials and choose **Login**.

Note

By default, the connection is terminated after three unsuccessful login attempts. To try again, restart the connection.

3. Your web browser might warn you that the server's certificate isn't trusted. If you're unsure about the authenticity of the certificate, confirm it with your NICE DCV administrator. Proceed if it's safe to do so.

Note

This step varies depending on the web browser that you're using.

Connecting to a NICE DCV session using the Linux client

The steps for connecting to a NICE DCV session are the same across all Linux clients.

To connect to a session using the Linux client

1. Launch the Linux client.
2. Choose **Connections Settings**, configure your proxy settings as follows, and then choose **Apply**.
 - To avoid connecting through a proxy, choose **Connect directly**.
 - To connect to the NICE DCV server using your preconfigured operating system proxy settings, choose **Use system proxy**.
 - To connect to the NICE DCV server through a specific HTTP proxy server, choose **Get through web proxy (HTTP)**. Specify the IP address or the hostname of the proxy server, as well as the communication port. If the HTTP proxy server requires authentication, select the check box of the **Proxy server requiring password** and enter your sign-in credentials.
 - To connect to the NICE DCV server through a specific HTTPS proxy server, choose **Get through web proxy (HTTPS)**. Specify the IP address or the hostname of the proxy server, as well as the communication port. If the web proxy server requires authentication, select the **Proxy server requiring password** check box and enter your sign-in credentials.
 - To select the transport protocol to use for data transport, choose the **Protocol** tab. By default, the client uses the QUIC protocol (based on UDP) for data transport if it's available. If it isn't available, the client uses the WebSocket protocol (based on TCP). This option is always available.

QUIC is available only if the following two conditions are met. First, the NICE DCV server is configured to support it. Second, your network configuration supports UDP communication between the NICE DCV client and the NICE DCV server. Additionally, it's only supported for direct client-server communication where there are no intermediate proxies, gateways, or load balancers.

You can force the client to use a data transport protocol by explicitly selecting it. To verify which protocol is in use, check the Streaming Modes dialog. Additionally, if the QUIC protocol is in use, "QUIC" appears in the titlebar.

For more information and instructions, see [Enable the QUIC UDP transport protocol](#) in the *NICE DCV Administrator Guide*.

3. Specify the session details in the following format:

```
server_hostname_or_IP:port#session_id
```

In the following example, the command connects to a session that's named `my-session`. This session is hosted on a NICE DCV server with the hostname `my-dcv-server.com`. It's connected over port `8443`.

```
my-dcv-server.com:8443#my-session
```

4. Choose **Connect**.
5. Enter your sign-in credentials and choose **Login**.

Note

By default, the connection is terminated after three unsuccessful login attempts. To try again, restart the connection.

6. If you're prompted to verify the certificate on the server, confirm the fingerprint of the certificate with your NICE DCV administrator. If the fingerprint is valid, choose **Trust & Connect**.

Connecting to a NICE DCV session using the macOS client

To connect to a session using the macOS client

1. Launch the macOS client.

If you get an error stating that the application can't be opened because it's from an unidentified developer, see the [Safely open apps on your Mac](#) webpage.

2. Choose **Connections Settings**, configure your proxy settings as follows, and then choose **Apply**.
 - To avoid connecting through a proxy, choose **Connect directly**.
 - To connect to the NICE DCV server using your preconfigured operating system proxy settings, choose **Use system proxy**.

- To connect to the NICE DCV server through a specific HTTP proxy server, choose **Get through web proxy (HTTP)**. Specify the IP address or hostname of the proxy server as well as the communication port. If the HTTP proxy server requires authentication, select the **Proxy server requiring password** check box and enter your sign-in credentials.
- To connect to the NICE DCV server through a specific HTTPS proxy server, choose **Get through web proxy (HTTPS)**. Specify the IP address or hostname of the proxy server as well as the communication port. If the web proxy server requires authentication, select the **Proxy server requiring password** check box and enter your sign-in credentials.
- To select the transport protocol to use for data transport, choose the **Protocol** tab. By default, the client uses the QUIC protocol (based on UDP) for data transport if it's available. If it isn't available, the client uses the WebSocket protocol (based on TCP). This option is always available.

QUIC is available only if the following conditions are met. First, the NICE DCV server is configured to support it. Second, your network configuration supports UDP communication between the NICE DCV client and the NICE DCV server. Additionally, it's only supported for direct client-server communication where there are no intermediate proxies, gateways, or load balancers.

You can force the client to use a data transport protocol by explicitly selecting it. To verify which protocol is in use, check the Streaming Modes dialog. Additionally, if the QUIC protocol is in use, "QUIC" appears in the titlebar.

For more information, see [Enable the QUIC UDP transport protocol](#) in the *NICE DCV Administrator Guide*.

3. Specify the session details in the following format:

```
server_hostname_or_IP:port#session_id
```

In the following example, the command connects to a session that's named `my-session`. This session is hosted on a NICE DCV server with the host name `my-dcv-server.com`. It's connected over port 8443.

```
my-dcv-server.com:8443#my-session
```

4. Choose **Connect**.
5. Enter your sign-in credentials and choose **Login**.

Note

By default, the connection is terminated after three unsuccessful login attempts. To try again, restart the connection.

6. If you're prompted to verify the server's certificate, confirm the certificate's fingerprint with your NICE DCV administrator. If the fingerprint is valid, choose **Trust & Connect**.

Connecting to a NICE DCV session using URI

Using a URI automatically opens a locally installed NICE DCV client with information passed into from the URI.

Within the URL field of your internet browser, enter the URI in this format: `dcv://hostname[:port]/[?authToken][#sessionId]`

Example

For example, `dcv://203.0.113.1:8443/?`

`authToken=e3b0c44298fc1c149afb4c8996fb92427ae41e4649b934ca495991b7852b855#12345`

Your locally installed client will open with the information prepopulated.

For more information, see [GetSessionConnectionData](#) in the [NICE DCV Session Manager Developer Guide](#)


Changing display resolution

By default, NICE DCV automatically adapts the display resolution of the remote machine to match the current size of the client. When the client window is resized, DCV requests the server to change its display resolution to a size that fits within the client window.

NICE DCV can configure a resolution according to the settings and the server system configuration.

- Web client resolution is limited by default to 1920x1080 (from `web-client-max-head-resolution` server setting).
- Native clients are limited by default to 4096x2160 (from `max-head-resolution`).

Note that the available resolutions and number of monitors depend on the configuration of the server, make sure to follow the [prerequisites guide](#) to properly setup the system environment and drivers for best performance.

 **Note**

Maximum supported per-monitor resolution is 4096x4096 for up to 4 monitors. Higher resolutions or more than 4 monitors are not supported in any configuration.

If you prefer a fixed resolution on the server, which does not change even when the client window is resized, select the **Display Resolution** menu and specify the desired resolution. If you decide to re-enable automatic resize, you can select **Adapt automatically**.

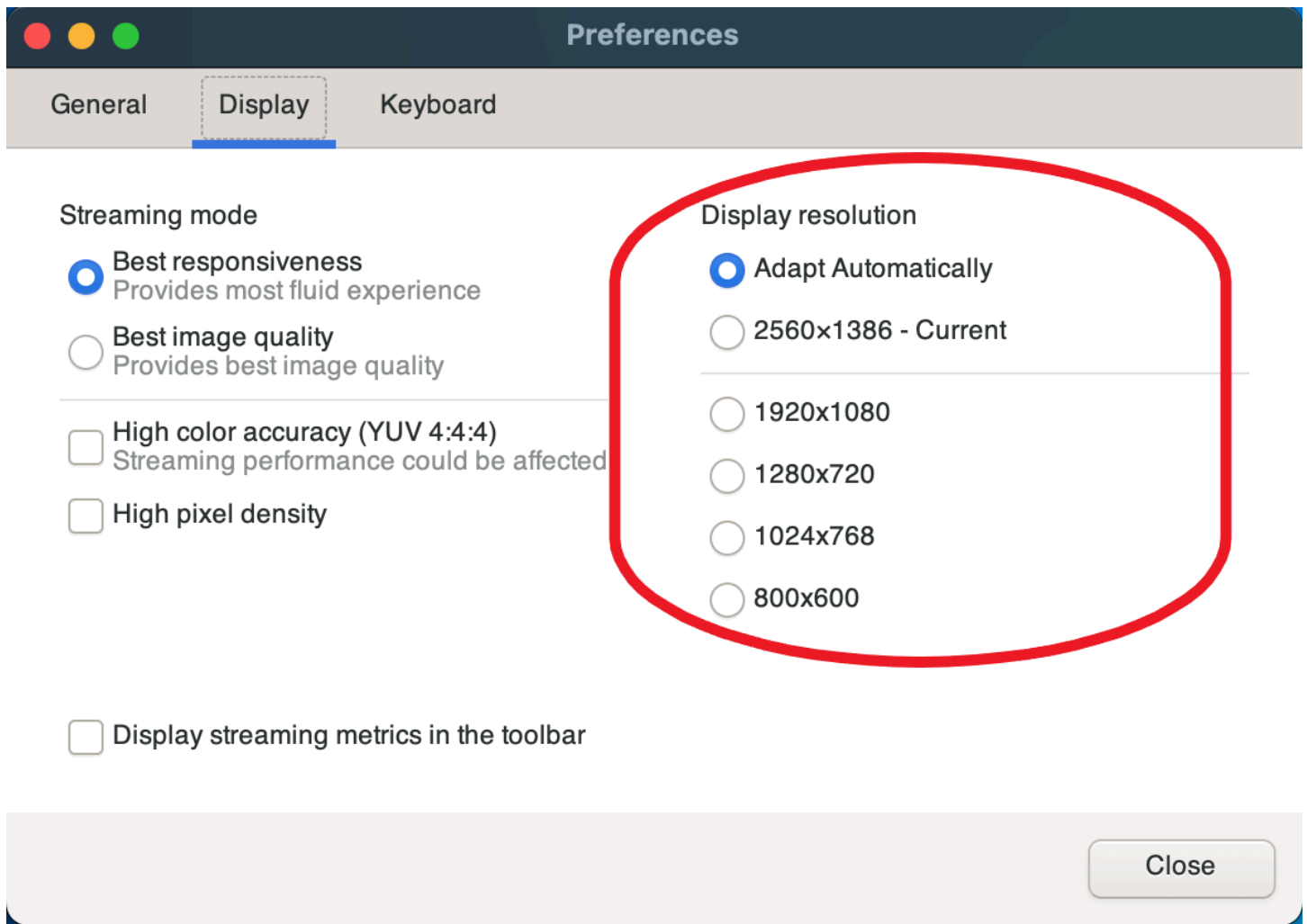
This functionality is available on the Windows client, web browser client, Linux client, and macOS client.

Changing display resolution on Windows clients

1. Click on the **Settings** icon from the menu at the top.
2. Select **Display Resolution** from the menu.
3. Select your preferred resolution from the drop-down menu.

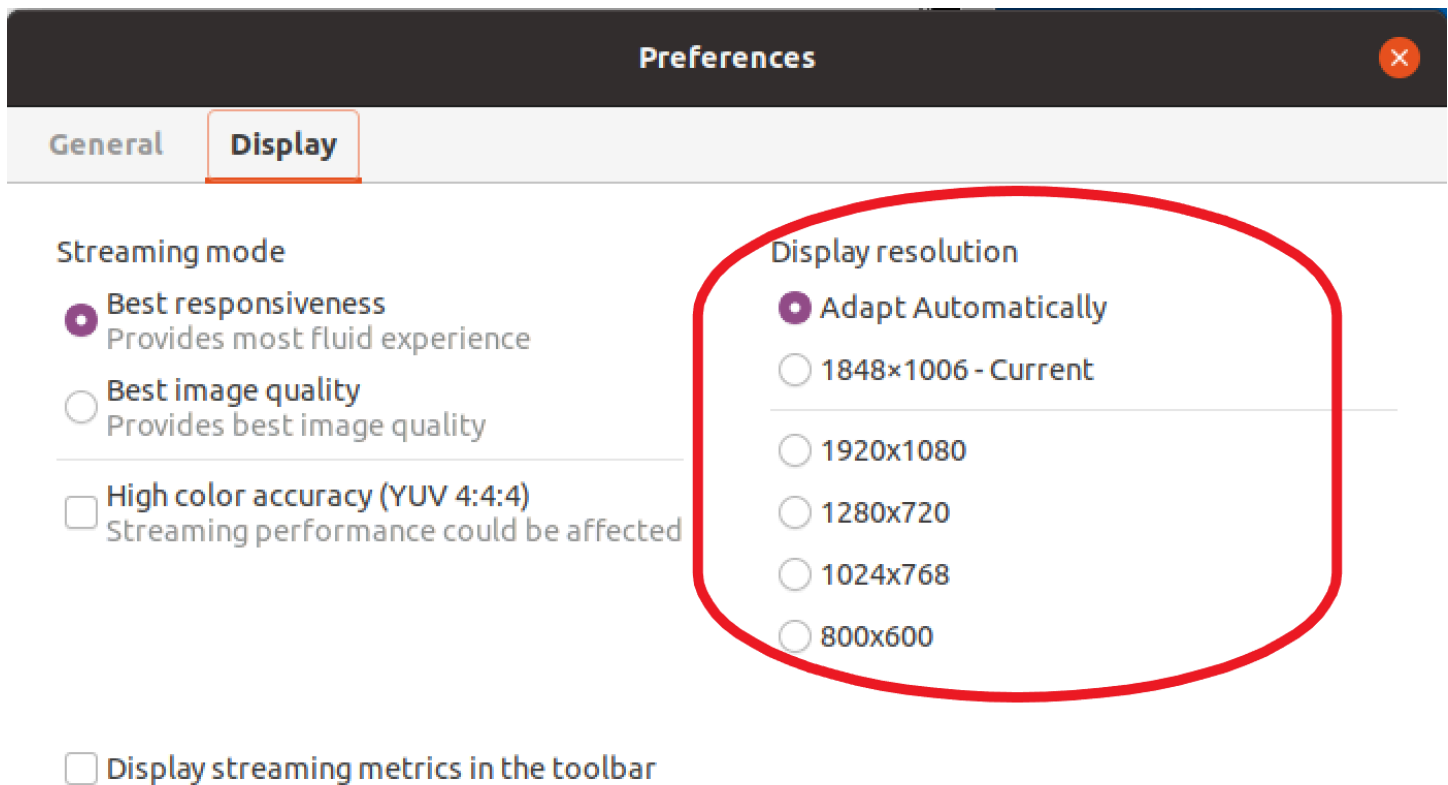
Changing display resolution on macOS clients

1. Click on the **DCV Viewer** icon from the menu at the top.
2. Select **Preferences** from the drop-down menu.
3. Go to the **Display** tab.
4. Select your preferred resolution from the **Display Resolution** menu.



Changing display resolution on Linux clients

1. Click on the **Settings** icon from the menu at the top.
2. Select **Preferences** from the menu.
3. Go to the **Display** tab.
4. Select your preferred resolution from the **Display Resolution** menu.



Setting the time zone

DCV allows you to set the time zone for your session to display either the time zone you are currently or the time zone of where the remote desktop you are using is located.

This is referred to as time zone redirection.

Once this feature is either enabled or disabled the DCV client will save this setting for each time the user signs on to the client.

When collaborating sessions, the first client to connect to the session, known as the primary connection, will set the time zone for the session even if the primary connection leaves the session. For more information, see [Collaborating on a NICE DCV session](#).

To use this feature, your administrator will have to enable it. If you do not have the option to change your displayed time zone and would like to do so, contact your administrator. For more information, see [Modifying Configuration Parameters](#) in the *NICE DCV Administrator Guide*.

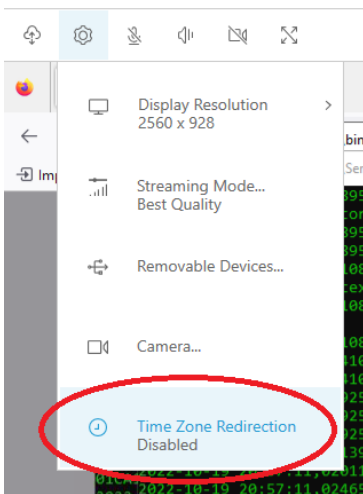
To set your time zone, do one of the following depending on your client:

- **For Windows**

1. Go to the **Settings** icon.
2. Select **Time Zone Redirection** from the drop down menu.

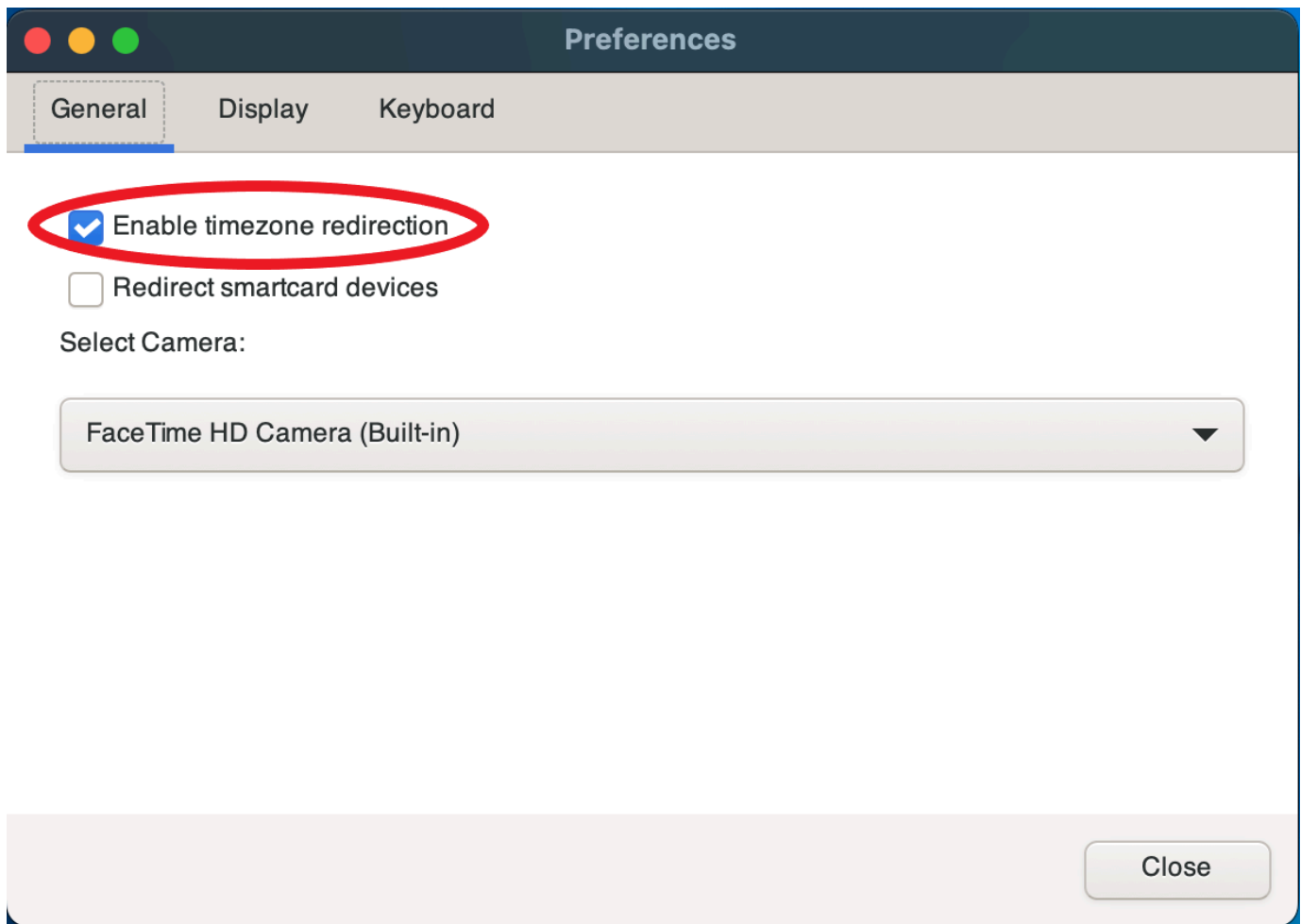
Note

It will indicate if the feature is **Enabled** or **Disabled** under the menu item.



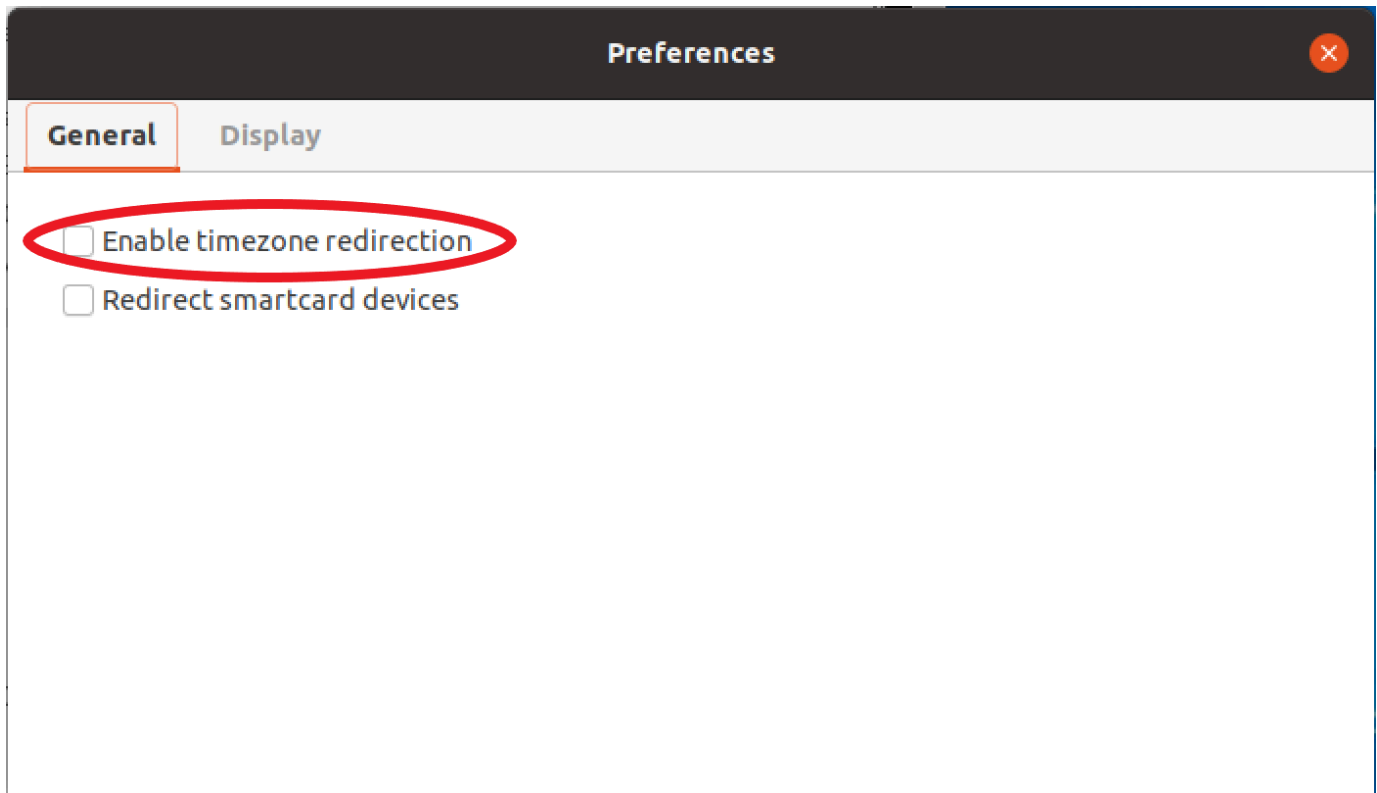
- **For macOS**

1. Go to the **DCV Viewer** icon from the toolbar at the top.
2. Select **Preferences** from the drop-down menu.
3. Select the **General** tab.
4. Check the box for **Enable timezone redirection**.



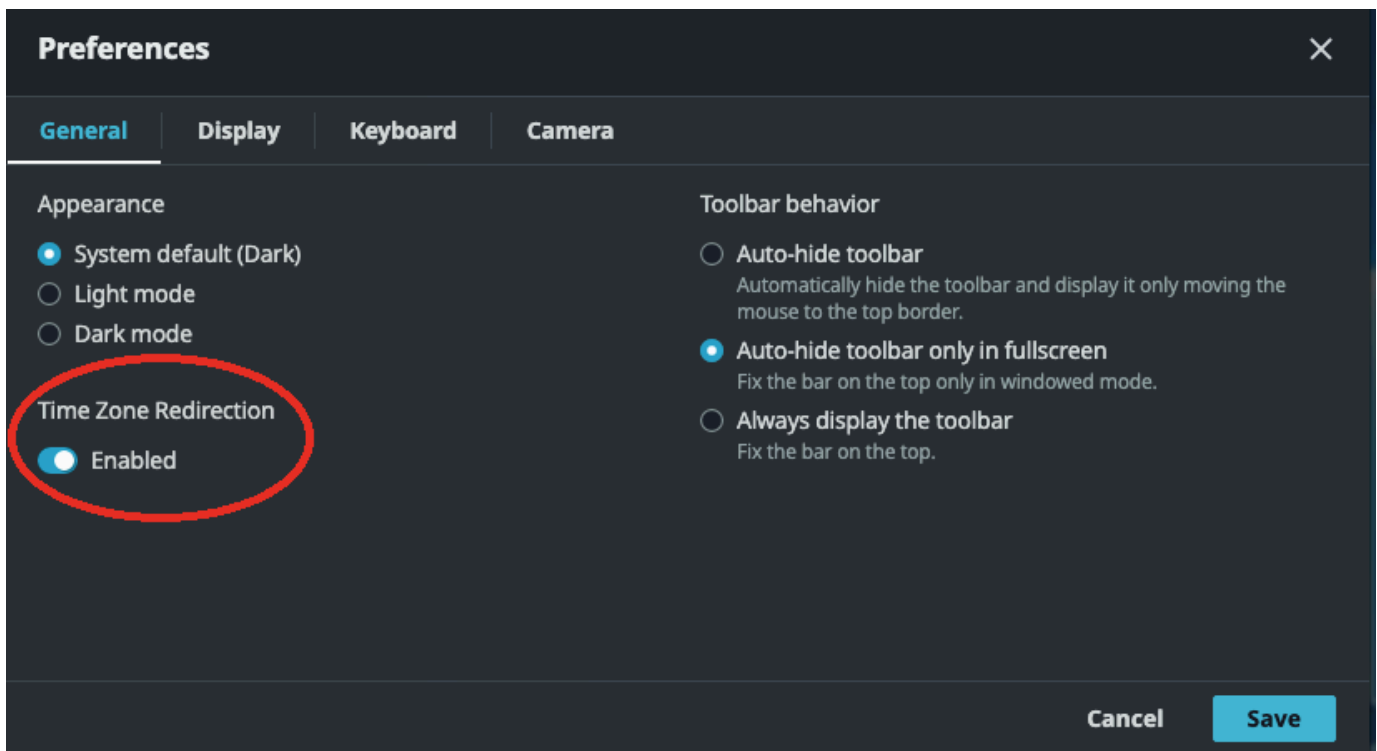
- **For Linux**

1. Go to the **Settings** icon.
2. Select **Preferences** from the drop-down menu.
3. Select the **General** tab in the **Preferences** windows.
4. Check the box for **Timezone Redirection**.



- **For web based clients**

1. Go to **Preferences**.
2. Click on the switch for **Time Zone Redirection**.



Managing streaming modes

NICE DCV uses an adaptive protocol that automatically optimizes the streaming mode depending on the network capabilities. However, you can specify whether you prefer to prioritize responsiveness or image quality.

- Prioritizing responsiveness (**Best responsiveness**) reduces the image quality to improve the frame rate. This option prioritizes faster response times though it might result in lower image quality.
- Prioritizing image quality (**Best quality**) reduces the responsiveness to provide better image quality. This option prioritizes higher image quality. It might result in longer response times.

This functionality is available on the Windows client, web browser client, Linux client, and macOS client. The steps for setting the streaming mode depend on the client used.

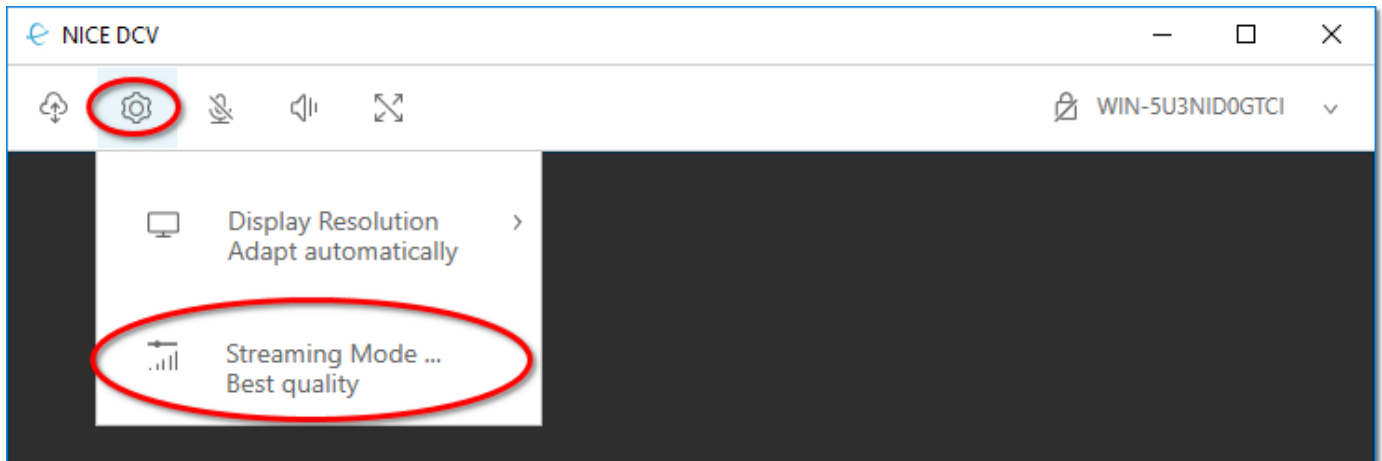
Topics

- [Streaming modes on Windows, Linux, and macOS clients](#)
- [Streaming modes on Web browser client](#)

Streaming modes on Windows, Linux, and macOS clients

Streaming modes on Windows clients

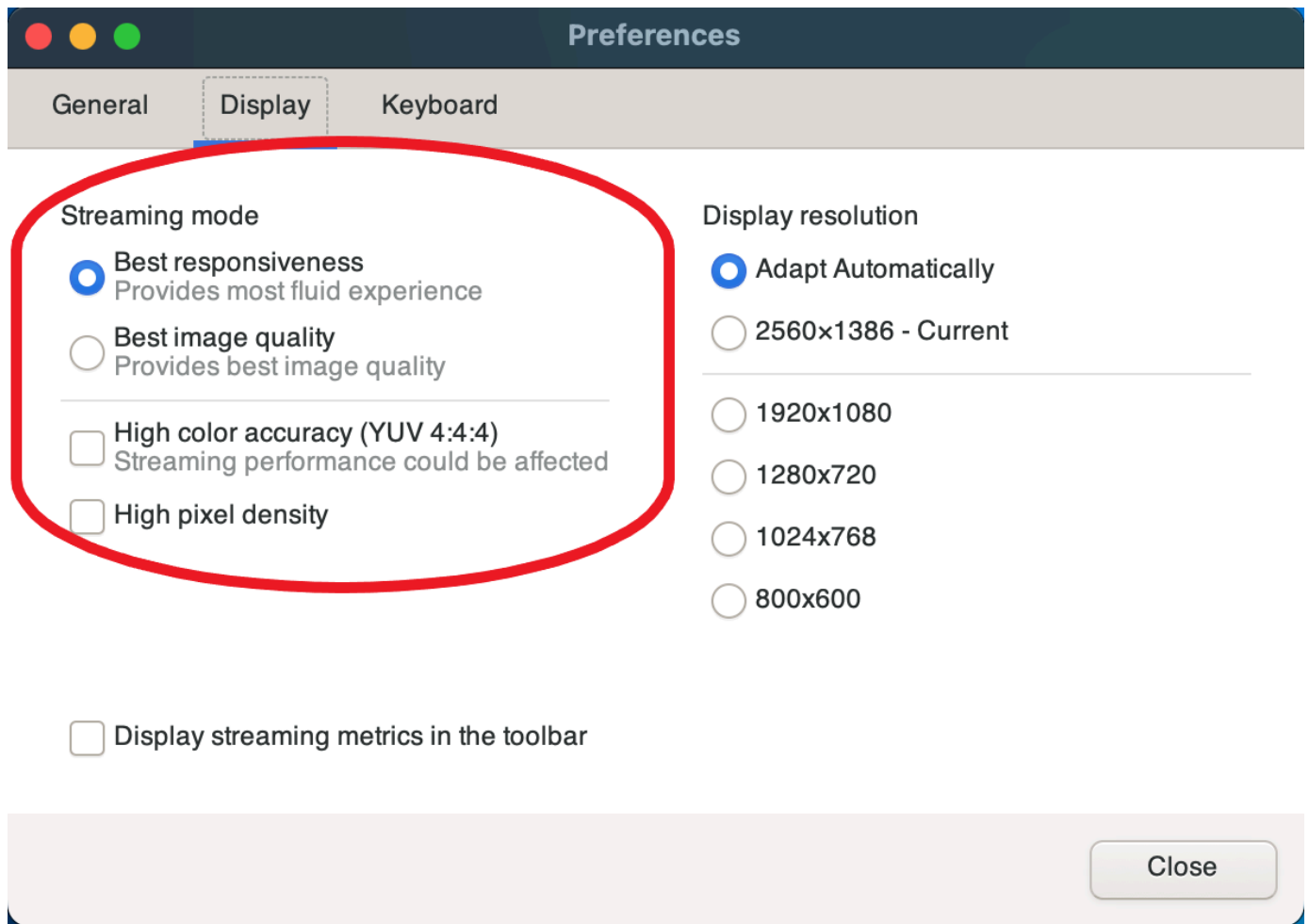
1. Choose the **Settings** icon.
2. Select **Streaming Mode** from the drop-down list.
3. In the Streaming Mode window, choose one of the following options:
 - **Best responsiveness**
 - **Best quality**
4. (Optional) For information about network performance, choose **Display Streaming Metrics**. For more information, see [Streaming metrics](#).



5. Close the **Streaming Mode** window.

Streaming modes on macOS clients

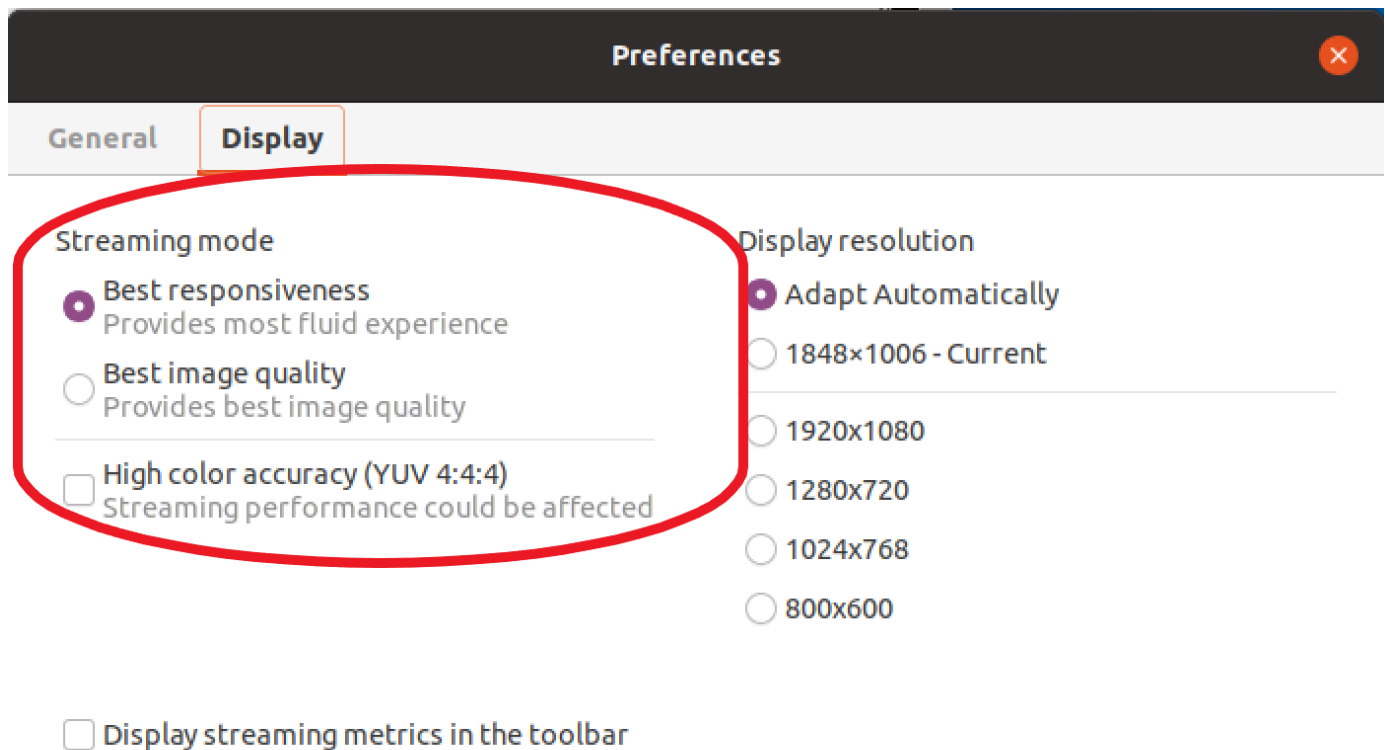
1. Choose the **DCV Viewer** icon at the top of the window.
2. Select **Preferences** from the drop-down menu.
3. Select the **Display** tab in the **Preferences** window.
4. Choose one of the following options:
 - **Best responsiveness**
 - **Best image quality**
5. (Optional) For information about network performance, choose **Display Streaming Metrics**. For more information, see [Streaming metrics](#).



6. Close the **Preferences** window.

Streaming modes on Linux clients

1. Choose the **Settings** icon at the top of the window. **Streaming Mode.**
2. Select the **Display** tab in the **Preferences** window.
3. Choose one of the following options:
 - **Best responsiveness**
 - **Best image quality**
4. (Optional) For information about network performance, choose **Display Streaming Metrics**. For more information, see [Streaming metrics](#).



5. Close the **Preferences** window.

Streaming metrics

The streaming metrics can be used to evaluate your network performance and determine which streaming mode is suitable for your network conditions. To view the streaming metrics, choose **Settings, Streaming Mode, Display Streaming Metrics**.

The streaming metrics provide the following real-time information:

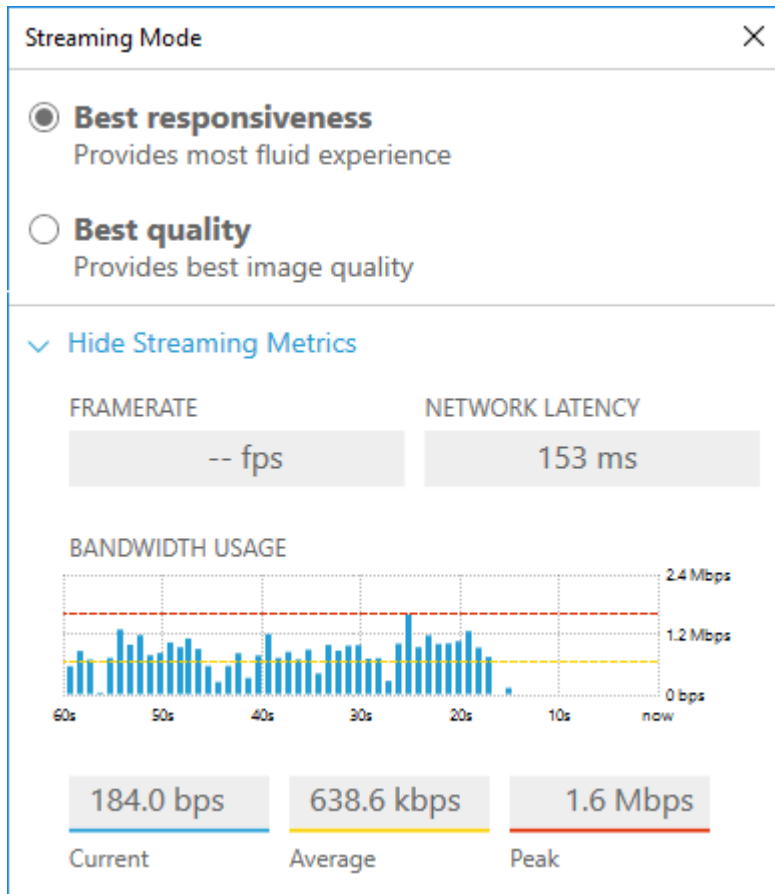
Note

Metrics are displayed for the current NICE DCV session connection.

- **Framerate**—Indicates the number of frames received from the NICE DCV server every second.
- **Network latency**—Indicates the amount of time (in milliseconds) it takes for a packet of data to be sent to the NICE DCV server and back to the client.

- **Bandwidth usage**—Indicates the amount of data being sent and received over the network connection. The red line shows the peak network throughput. The yellow line shows the average throughput. The blue line shows the current (real-time) throughput.

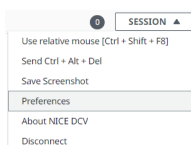
The following image shows example streaming metric data.



Streaming modes on Web browser client

The steps for managing the streaming modes are the same across all supported web browsers.

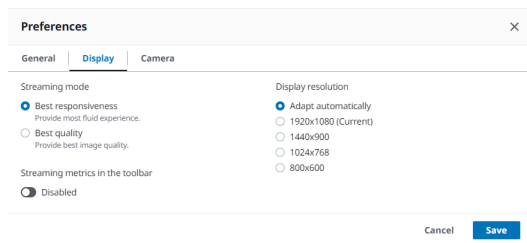
1. In the client, choose **Session, Preferences**.



2. Under the **Display** tab, choose one of the following options from the **Streaming options** section:

- **Best responsiveness**

- **Best quality**



3. (Optional) For information about network performance, choose **Display Streaming Metrics**. For more information, see [Streaming metrics](#).
4. Save and close the **Preferences** modal.

Streaming metrics

The streaming metrics can be used to evaluate your network performance and determine which streaming mode is suitable for your network conditions.

The streaming metrics provide the following real-time information:

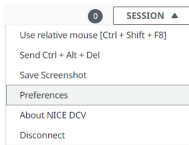
Note

Metrics are displayed for the current NICE DCV session connection.

- **Framerate**—Indicates the number of frames received from the NICE DCV server every second.
- **Network latency**—Indicates the amount of time (in milliseconds) it takes for a packet of data to be sent to the NICE DCV server and back to the client.
- **Bandwidth usage**—Indicates the amount of data being sent and received over the network connection. The red line shows the peak network throughput. The yellow line shows the average throughput. The blue line shows the current (real-time) throughput.

To view the streaming metrics:

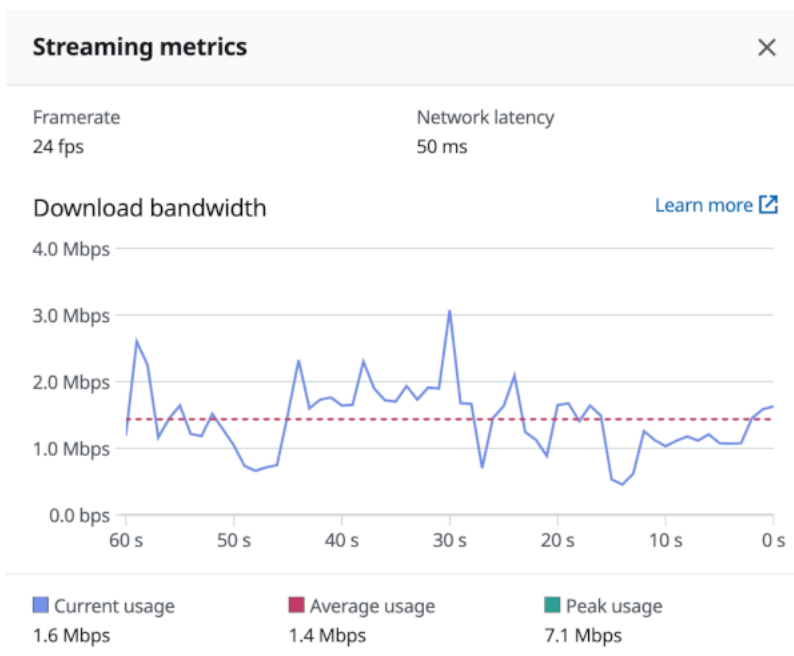
1. In the client, choose **Session, Preferences**.



2. Under the **Display** tab, enable the toggle to show **Streaming metrics in the toolbar**.
3. Close the **Preferences** modal.
4. The streaming metrics are then displayed in the center of the client toolbar.

28 fps 48 ms

5. Click on the streaming metrics to see more detailed streaming data like in the following example.



6. (Optional) Close the **Metrics** modal.

Transferring files

You can use NICE DCV to upload files to and download files from NICE DCV session storage. For instructions on how to enable and configure session storage, see [Enabling Session Storage](#) in the *NICE DCV Administrator Guide*.

You must be authorized to use this feature. If you are not authorized, the functionality is not available in the client. For more information, see [Configuring NICE DCV Authorization](#) in the *NICE DCV Administrator Guide*.

This functionality is available on the Windows, web browser, Linux, and macOS clients.

Topics

- [Transferring files using Windows, Linux and macOS clients](#)
- [Transferring files using web browser](#)

Transferring files using Windows, Linux and macOS clients

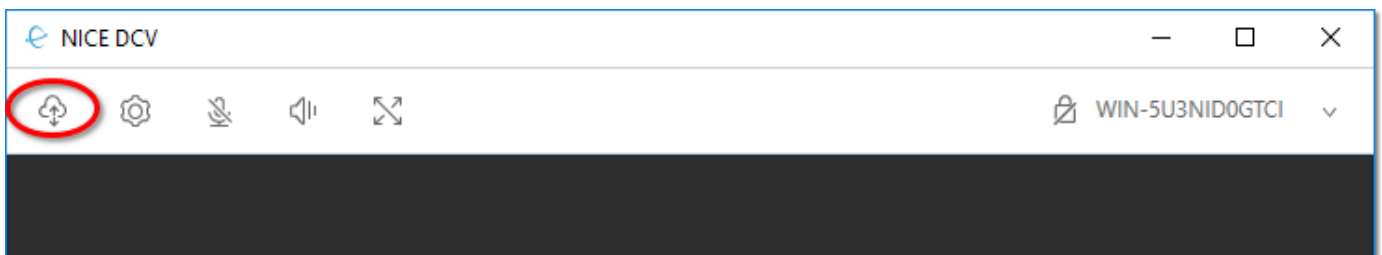
The steps for uploading, downloading, and renaming files are similar across Windows, Linux and macOS clients.

Downloading a file

If you're using the Windows client, the file is downloaded to your desktop. If you're using the Linux, or macOS client, the file is downloaded to your default Downloads folder.

To download a file from the session storage to your computer

1. In the client, choose **Storage**.



2. In the **File Storage** window, either select the file to download, or choose the down arrow next to the file and then choose **Download**.

Uploading a file

Files that you upload to a session are saved to a path that's specified by the NICE DCV server administrator.

To upload a file from your computer to the NICE DCV session storage

1. Choose **Storage** in the client.
2. Do one of the following:
 - To upload the file to an existing folder:
Navigate to the folder within the **File Storage** window.
 - To upload the file to a new folder
 1. Choose **Create Folder**.
 2. Enter folder name.
 3. Open the new folder.
3. Choose **Upload File** in the **File Storage** window.
4. Select the file to upload.
5. Choose **Open**.

To drag and drop a file from your computer to the NICE DCV session storage

1. Navigate to **File Storage**, the folder, or the subfolder you would like to upload the file and open it.
2. On your local computer, select one or more files or folders you would like to upload.
3. Drag the selected file(s) or folder(s) onto the NICE DCV session window.

Note

If the **File Storage** window is closed, it will automatically open.

4. Drop your files within the drop area of your desired location in **File Storage**, selected folder, or selected subfolder window.

Renaming a file

You can change the name of the file in session storage.

To change the name of a file in session storage

1. In the client, choose **Storage**.

2. Choose the down arrow that's next to the file to rename, and choose **Rename**.
3. Enter the new file name and press **Enter**.

Transferring files using web browser

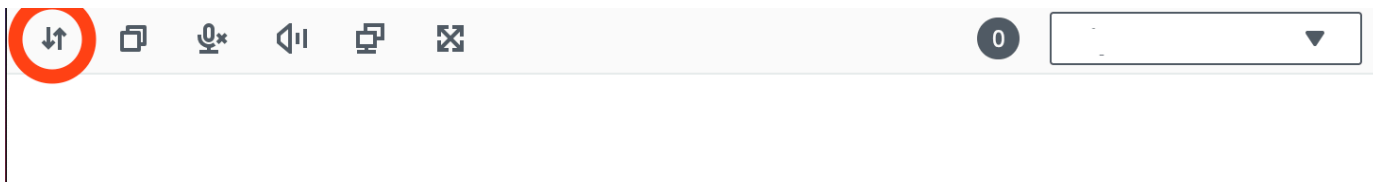
The steps for uploading, downloading, and renaming files are the same across all supported web browsers.

Downloading a file

In the web browser client the file is downloaded to your default Downloads folder.

To download a file from the session storage to your computer

1. In the client, choose **Storage**.



2. In the **File Storage** window, either select the file to download, or select a table row corresponding to the file to download and click on the **Actions** button and the **Download** option from there. You can also just click on the name of the file to download it.

Uploading a file

Files that you upload to a session are saved to a path that's specified by the NICE DCV server administrator.

To upload a file from your computer to the DCV session

1. Choose **Storage** in the client.
2. Do one of the following:
 - Upload the file to an existing folder:

Navigate to the folder within the **File Storage** window.

- Upload the file to a new folder
 1. Choose **Create Folder**.

2. Enter folder name.
3. Open the new folder.
3. Choose **Upload File** in the **File Storage** window.
4. Select the file to upload.
5. Choose **Open**.

To drag and drop a file from your computer to the NICE DCV session storage

1. Navigate to **File Storage**, the folder, or the subfolder you would like to upload the file and open it.
2. On your local computer, select one or more files or folders you would like to upload.
3. Drag the selected file(s) or folder(s) onto the NICE DCV session window.

Note

If the **File Storage** window is closed, it will automatically open.

4. Drop your files within the drop area of your desired location in **File Storage**, selected folder, or selected subfolder window.

Renaming a file

You can change the name of the file in session storage.

To change the name of a file in session storage

1. In the client, choose **Storage**.
2. Select a table row corresponding to the item to rename and click on the **Actions** button and the **Rename** option from there.
3. Enter the new file name and press **Enter**.

Printing

You can use NICE DCV to print content from a NICE DCV session. The available printing devices depend on the client that you're using.

- **Windows client, Linux client, and macOS client** — You can print to the physical printer that's connected to your client computer. Or, you can print to a PDF document that uses the NICE DCV virtual printer.
- **Web browser client** — You can print to a .PDF document using the NICE DCV virtual printer.

When you print to the NICE DCV virtual printer, the content is exported to a printable file. You can download it to your local computer using the client and then print it using your local printer.

You must be authorized to use this feature. If you are not authorized, the functionality is not available in the client. For more information, see [Configuring NICE DCV Authorization](#) in the *NICE DCV Administrator Guide*.

To print content from the session

1. In the client, open the Print window.
2. In the Print window, choose one of the following printing devices and then choose **Print**.
 - (All clients connected to all Windows and Linux server) **DCV Printer** — Prints to the NICE DCV virtual printer
 - (Windows client connected to Windows and Linux server) **<local-printer-name>-Redirected** — Prints to the local printer
3. If you print to the NICE DCV virtual printer, a notification appears when the file is ready for download. In the top-right corner, choose **Notifications**, locate the Print notification in the list, and then choose **Download**.
 - If you're using the web browser client, after the download has completed, choose **Show in folder**.
 - If you're using the Windows client, the printer dialog is automatically opened when the file is downloaded.
 - If you're using the Linux or macOS clients, the downloaded file is automatically opened with the default associated application.

Note

The file is deleted from the NICE DCV server after you have downloaded it, and it's no longer available for download.

Copying and pasting

You can use NICE DCV to copy and paste text between your local computer and the NICE DCV session. You must be authorized to use this feature. If you are not authorized, the functionality is not available in the client. For more information, see [Configuring NICE DCV Authorization](#) in the *NICE DCV Administrator Guide*.

The type of content that can be copied and pasted, and the methods for copying and pasting differ between the Windows client, web browser client, Linux client, and macOS client.

Topics

- [Windows, Linux, and macOS clients](#)
- [Web browser client](#)

Windows, Linux, and macOS clients

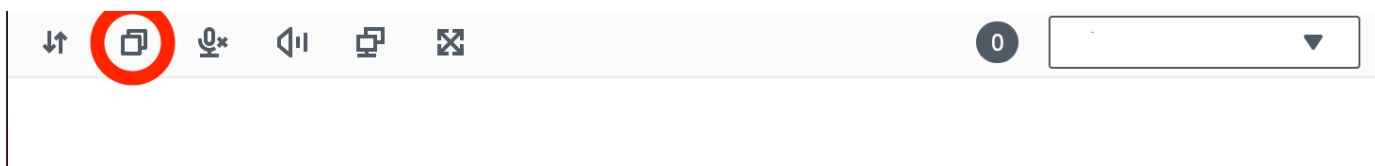
You can use the Windows, Linux, and macOS clients to copy and paste text and images between your local computer and the NICE DCV session. You can do this using the keyboard shortcuts and context (right-click) menu shortcuts. If you can't copy and paste, contact your NICE DCV server administrator to ensure that the permissions are properly configured.

Web browser client

You can use the web browser client to copy and paste text and images between your local computer and the NICE DCV session. Use keyboard shortcuts and context (right-click) menu to copy and paste text and images on Google Chrome and Microsoft Edge. Mozilla Firefox and Apple Safari do not support copying and pasting images, and require a different procedure to copy and paste text.

To copy text from the session in Mozilla Firefox or Apple Safari and paste on your local computer

1. In the web browser client, highlight the text to copy and choose **Clipboard, Copy to Local Device**.



The text is now placed in your computer's clipboard.

2. Paste the text using the paste keyboard shortcut or context menu shortcut.

To copy text from your local computer and paste in the session in Mozilla Firefox or Apple Safari

1. On your local computer, copy the text using the copy keyboard shortcut or context menu.
2. In the web browser client, choose **Clipboard, Paste to Remote Session**.
3. Paste the text using the host operating system's paste shortcuts.

Using a smart card

You can use NICE DCV to use one or more smart cards that's connected to your client computer. You can do this using the standard Personal Computer/Smart Card (PC/SC) interface, in a NICE DCV session. For each session, only one connected client can connect a smart card at a time. This is especially important in environments where multiple clients connect to the same session.

Smart card access is supported only with the Windows, Linux, and macOS clients. It's not supported with the web browser client.

Only one client can connect a smart card at a time. While your smart card is connected, no other clients who are connected to the session can connect a smart card.

After you're done using the smart card in the NICE DCV session, release it. After it's released, other clients who are connected to the session can connect a smart card. The smart card is automatically released when you disconnect from the session.

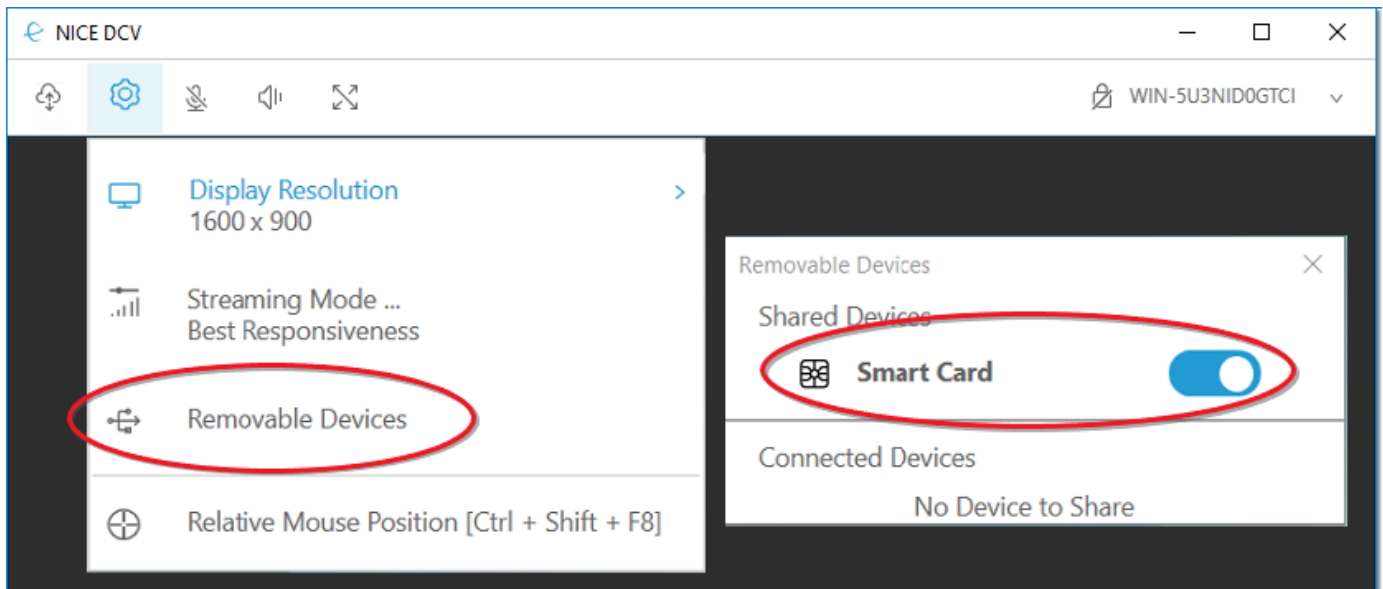
You must be authorized to use this feature. If you are not authorized, the functionality is not available in the client. For more information, see [Configuring NICE DCV Authorization](#) in the *NICE DCV Administrator Guide*.

Connecting a smart card

Connecting to a Windows client

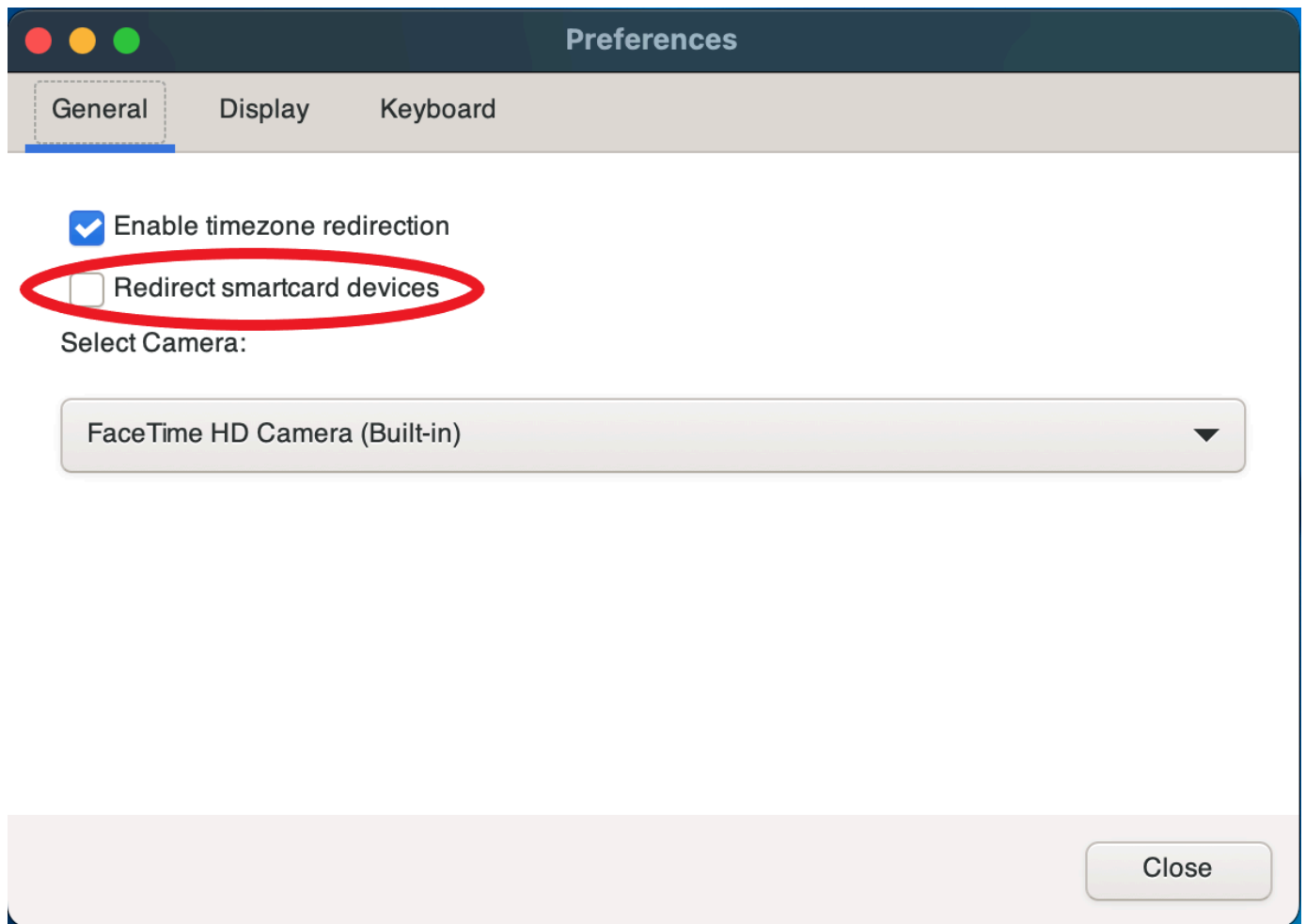
1. Launch the client and connect to the NICE DCV session.

2. Choose the **Settings** icon.
3. Select **Removable Devices** from the drop-down list.
4. Enable the **Smart Card** toggle.



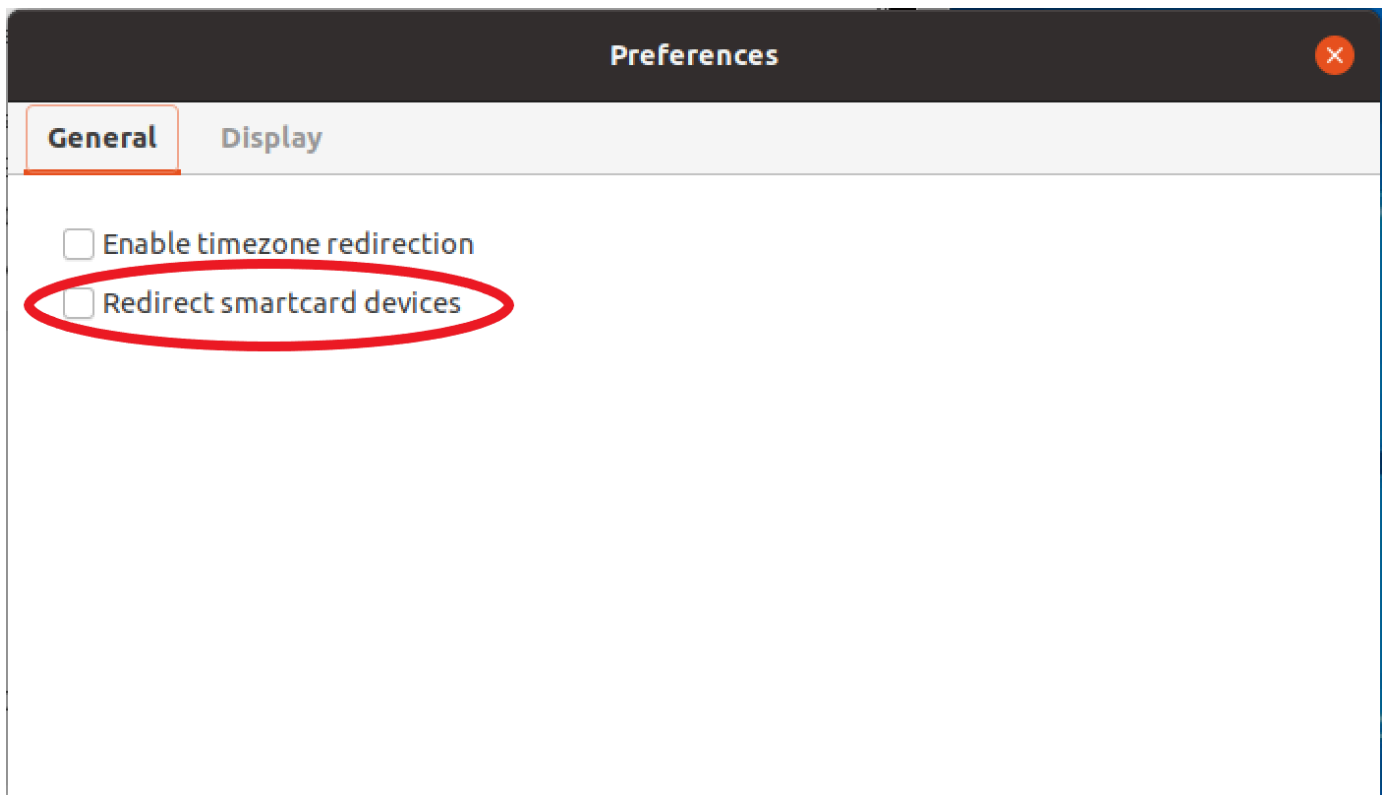
Connecting to a macOS client

1. Launch the client and connect to the NICE DCV session.
2. Choose the **DCV Viewer** icon.
3. Select the **General** tab in the **Preferences** window.
4. Check the **Redirect smartcard devices** checkbox.



Connecting to a Linux client

1. Launch the client and connect to the NICE DCV session.
2. Choose the **Settings** icon.
3. Select the **General** tab in the **Preferences** window.
4. Check the **Redirect smartcard devices** checkbox.



Using a smart card on Linux servers

- Open a terminal and launch the application using the `dcvscrun` command followed by the application name and arguments.

Example

For example, to launch `firefox` with smart card support, use the following command:

```
$ dcvscrun firefox
```

⚠ Important

If you enabled smart card caching, run the following command in the same terminal that you set and exported the `DCV_PCSC_ENABLE_CACHE` environment variable in.

Releasing a smart card

Releasing from a Windows client

1. Choose the **Settings** icon.
2. Select **Removable Devices** from the drop-down list.
3. Disable the **Smart Card** toggle.

Releasing from a macOS and Linux clients

1. Choose the **Settings** icon.
2. Select the **General** tab in the **Preferences** window.
3. Uncheck the **Redirect smartcard devices** checkbox.

Smart card data caching (optional)

To have the NICE DCV server cache smart card data, you will need to enable the smart card caching feature. By default, smart card caching is disabled. With smart card caching enabled, the server caches the results of recent calls to the client's smart card. This helps to reduce the amount of traffic that is transferred between the client and the server and improves performance.

You cannot enable smart card caching if it's disabled on the server. For more information, see [Configuring Smart Card Caching](#) in the *NICE DCV Administrator Guide*

Enabling smart card caching on Windows servers

1. Launch the client and connect to the NICE DCV session.
2. Open a terminal window.
3. Run one of the following commands:
 - To enable smart card caching for the current terminal window:

```
C:\> set DCV_PCSC_ENABLE_CACHE=1
```

- To enable smart card caching permanently for all applications on the server:

```
C:\> setx DCV_PCSC_ENABLE_CACHE 1
```

Enabling smart card caching on Linux servers

1. Launch the client and connect to the NICE DCV session.

Note

Make sure to run the following command in the same terminal that you intend to launch the application.

2. Open a terminal window where you ran the applicaiton with `dcvscrun`.
3. Export the `DCV_PCSC_ENABLE_CACHE` with the value 1.

Example

For example, you might run the command:

```
$ DCV_PCSC_ENABLE_CACHE=1 dcvscrun APPLICATION
```

or

```
$ DCV_PCSC_ENABLE_CACHE=1  
$ dcvscrun APPLICATION
```

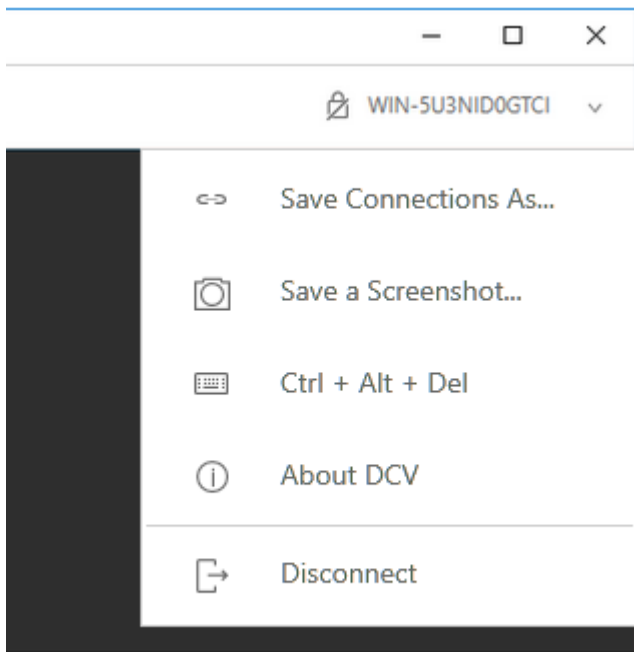
Saving a screenshot

You can use NICE DCV to save a screenshot of the NICE DCV session. This functionality is available on the Windows, web browser, Linux, and macOS clients. The steps for saving a screenshot are similar on all clients.

You must be authorized to use this feature. If you aren't authorized, the functionality isn't available in the client. For more information, see [Configuring NICE DCV Authorization](#) in the *NICE DCV Administrator Guide*. If you aren't authorized to save screenshots, the client also avoids the external tools that are running on your client computer to capture a screenshot of the NICE DCV client. Images that are obtained by these tools either show a black rectangle instead of the NICE DCV client window or only show the background desktop. This functionality is available only on Windows and macOS clients.

To save a screenshot

1. Launch the client, and connect to the NICE DCV session.
2. In the client, choose **Session, Save a Screenshot**.



3. Choose a location and the name for the screenshot file.

Collaborating on a NICE DCV session

NICE DCV users can collaborate on the same session, enabling screen and mouse sharing. Users can join authorized sessions while session owners can disconnect users from any session collaboration. To take advantage of this feature, users must be joining the same session identified by the same session ID.

Requirements

By default, the only user that can connect to a NICE DCV session is the owner of that session.

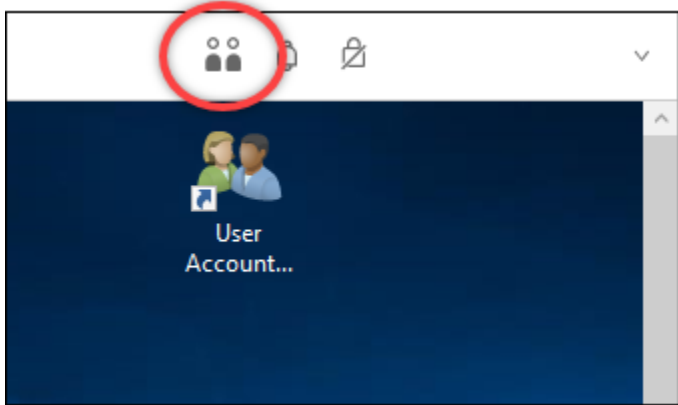
For users to collaborate on the same session, the active permissions applied to the session need to be updated to include the `display` parameter. For more information on editing the permissions file, see [Configuring NICE DCV authorization](#).

Note

Administrator privileges are required to edit the permissions file.

To collaborate on NICE DCV sessions for Windows or Linux based servers:

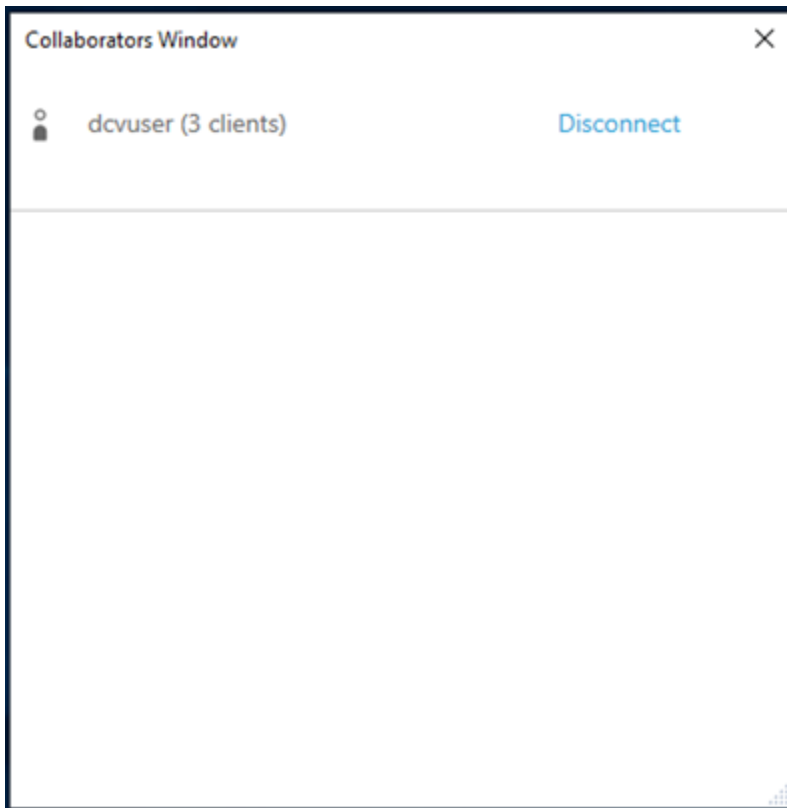
1. Choose the **Collaborators** icon on the NICE DCV client located in the DCV toolbar.



A **Collaborators Window** will open showing all of the connected NICE DCV sessions available.

2. Select a session to join.
3. Choose **Disconnect**, to remove one or all client connections, except yours, from the DCV session.

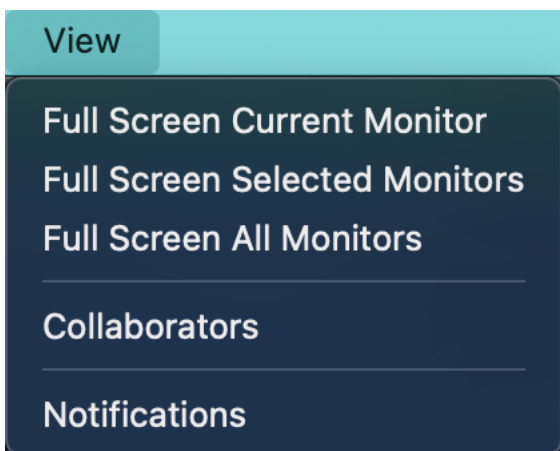
This option is only available for session owners.



4. Choose **Disconnect** to remove an user from an active session.

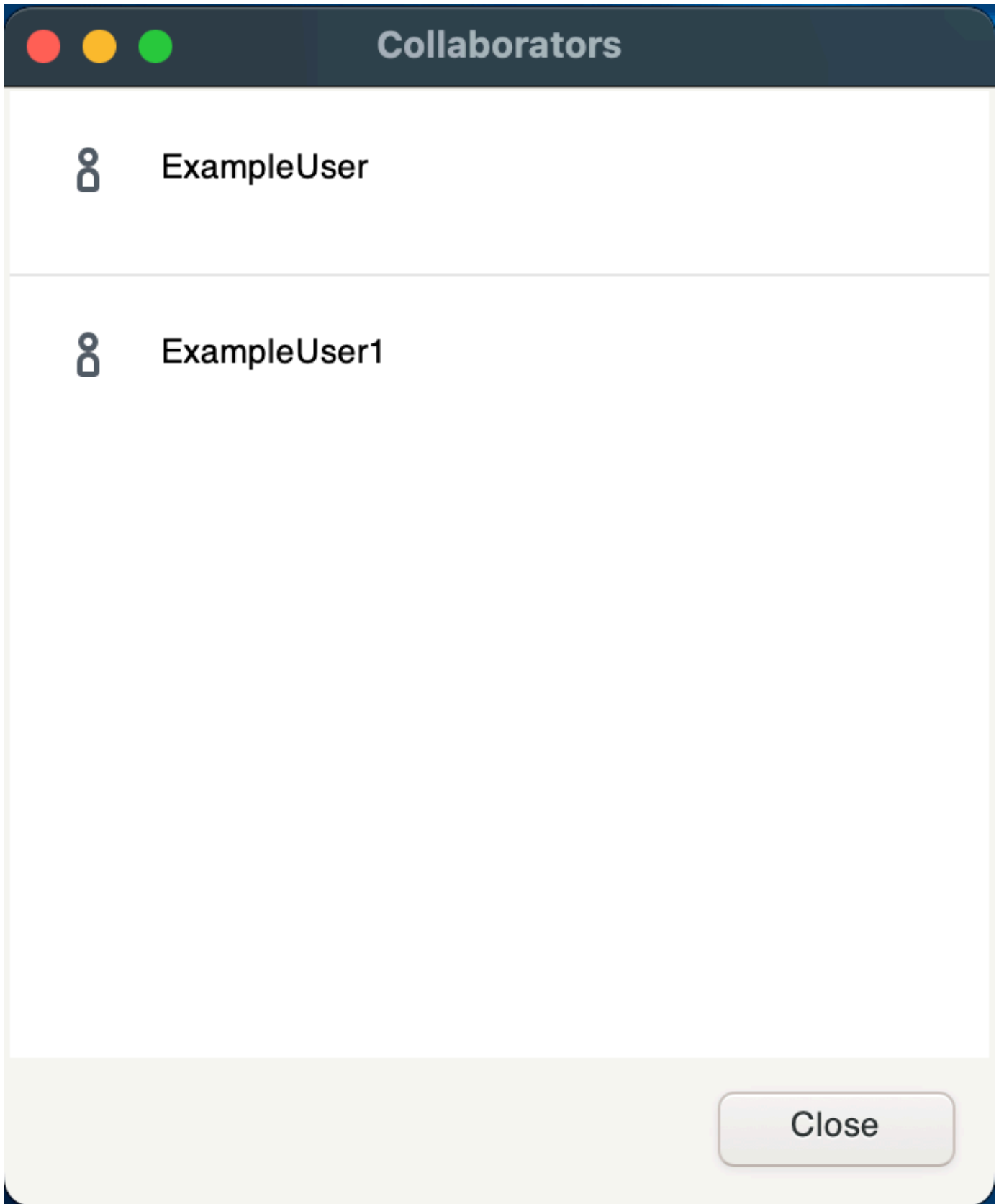
To collaborate on NICE DCV sessions for macOS:

1. Go to **View** on the top toolbar.



2. Choose **Collaborators** from the drop-down menu.

A **Collaborators Window** will open showing all of the connected NICE DCV sessions available.



3. Select the session to join.

4. Choose **Disconnect** to remove one or all client connections, except yours, from the DCV session.

This option is only available for session owners.

Using multiple monitors

DCV is capable of extending full screen resolution across a single monitor, a set of selected monitors, or all available monitors.

You can also manually specify custom display layouts. For more information, see [Managing the NICE DCV Session Display Layout](#) in the *NICE DCV Administrator Guide*.

Note

If the requested layout is not supported by the server, the layout might be adjusted to match the display limits of your server. If the layout cannot be adjusted, the request fails and the changes are not applied.

NICE DCV can configure a resolution according to the settings and the server system configuration.

- Web client resolution is limited by default to 1920x1080 (from web-client-max-head-resolution server setting).
- Native clients are limited by default to 4096x2160 (from max-head-resolution).

Note that the available resolutions and number of monitors depend on the configuration of the server, make sure to follow the [prerequisites guide](#) to properly setup the system environment and drivers for best performance.

Note

Maximum supported per-monitor resolution is 4096x4096 for up to 4 monitors. Higher resolutions or more than 4 monitors are not supported in any configuration.

Topics

- [Extending full-screen across all monitors](#)

- [Extending full-screen across selected monitors](#)
- [Exiting full screen on multiple monitors](#)

Extending full-screen across all monitors

You can use the NICE DCV clients to extend the display for a session across all at full screen resolution.

With the Windows, Linux, and macOS clients, the extended display matches your physical display layout and screen resolutions.

With the web browser client, the session display can be extended to up to two screens with 1920x1080 screen resolution. When the display is extended, the additional screen is opened in a new browser window. The second extends the display to the right of the original screen. Ensure that you position the screens accordingly.

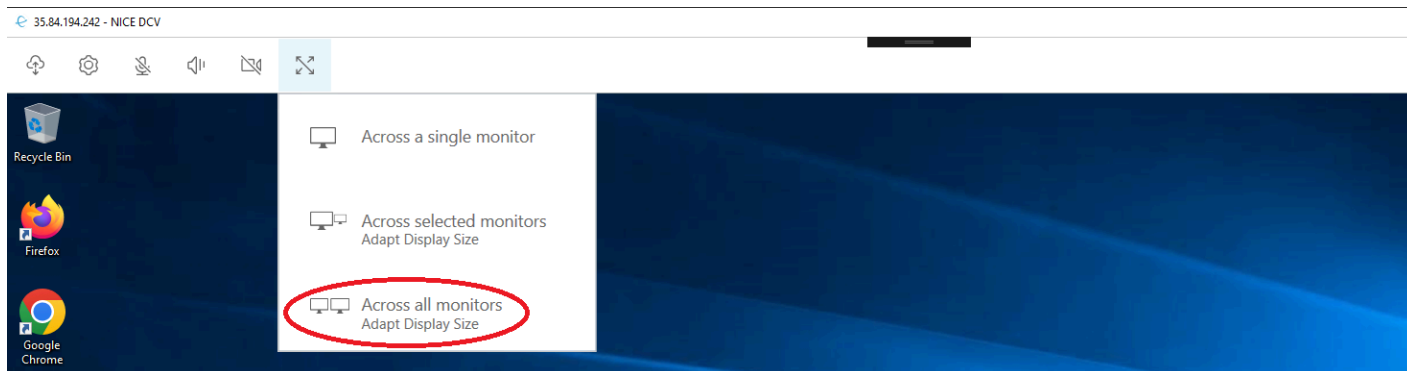
Example

For example, three monitors are connected to your local computer. The server extends the display for a session across all three monitors and matches the specific screen resolutions of your display.

To enable this feature, do one of the following depending on your client.

- **Windows client**

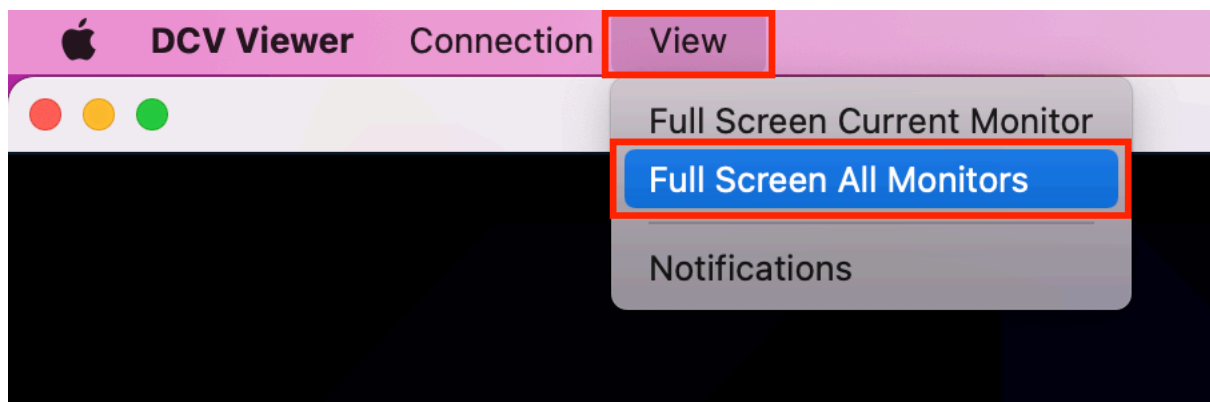
1. Go to the toolbar at the top of the window.
2. Choose the **Full Screen** icon.
3. Select **Across all monitors** from the drop-down menu.



- **macOS client**

1. Go to the toolbar at the top of the window.

2. Choose **View** from the toolbar at the top of window.
3. Select **Full Screen All Monitors** from the drop-down menu.



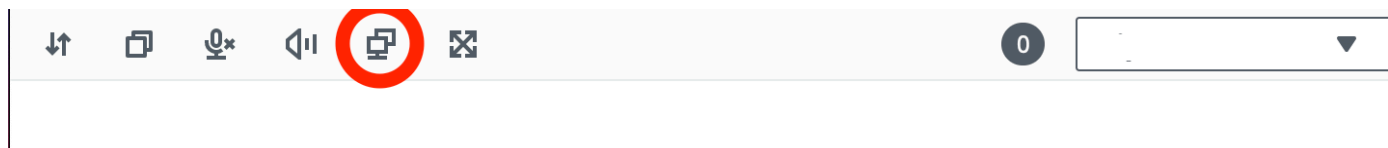
- **Linux client**

1. Go to the toolbar at the top of the window.
2. Choose the **Full Screen** icon.



- **Web browser client**

1. Go to the toolbar at the top of the window.
2. Choose the **Multiscreen** icon.



Extending full-screen across selected monitors

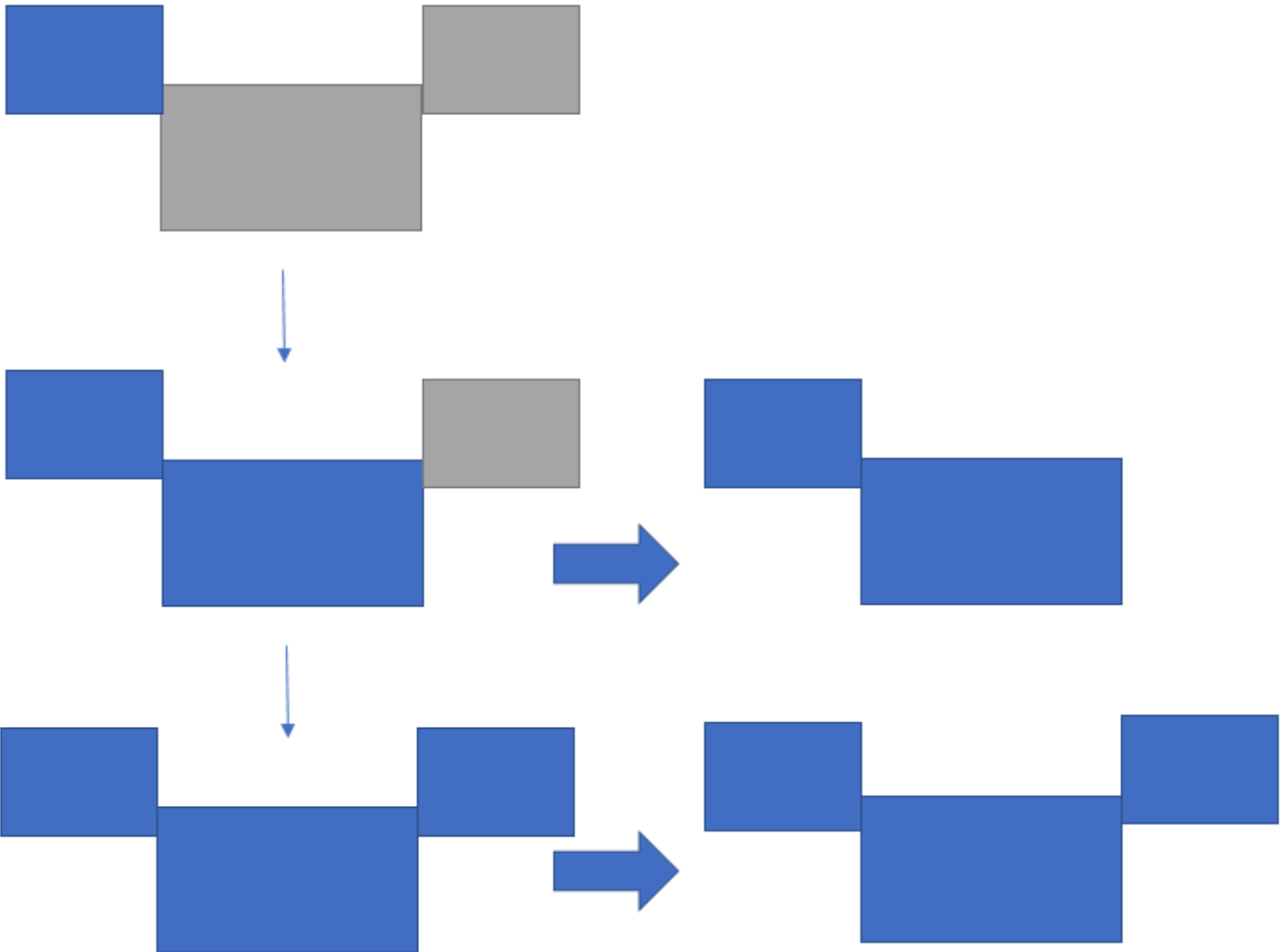
If there are three or more monitors connected, DCV can also extend full-screen across a selection of those available monitors. If your selected monitors cannot go full screen, an error message will appear and you will need to perform the procedure again.

Selected monitors must be set adjacent, or sharing a side with each other, in your display setting.

Examples of adjacent monitor placement.

Note

The blue boxes are DCV enabled monitors.
The gray boxes are other monitors.



Examples of nonadjacent monitor placement.



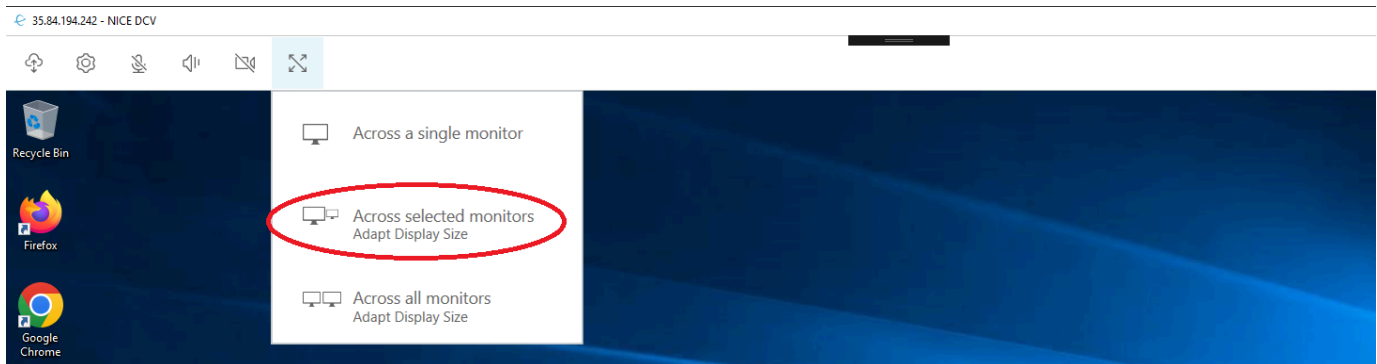
If your monitors are not set adjacent in your Windows display configuration, you will need to exit DCV and change your Display settings on your local machine.

- **Windows client**

1. Go to the top menu.
2. Select the **Full Screen** icon.

Note

The **Full Screen** drop-down menu will appear.



3. Select **Across selected monitors** from the drop down menu.

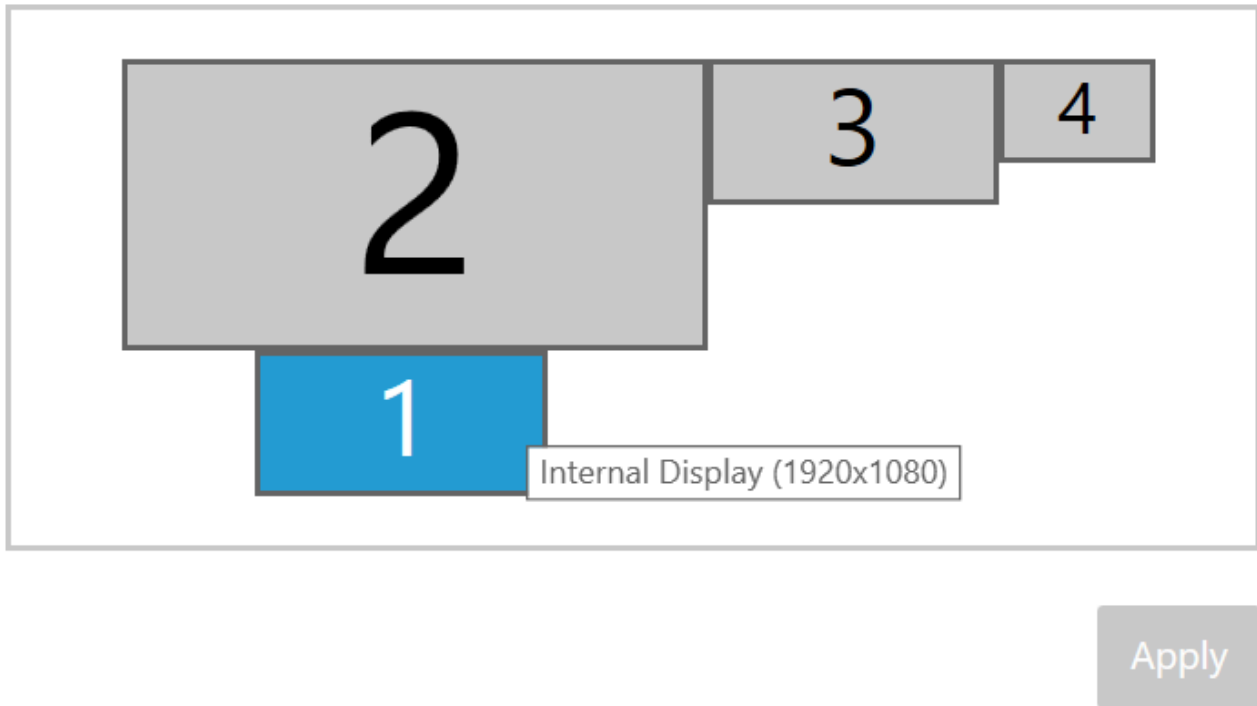
Note

The **Across selected monitors** window will appear displaying your current monitor layout.

Full Screen Across Selected Monitors

**Select the monitors you wish to make full screen.**

Please note, selected monitors must be configured adjacent to each other. For example, an unused monitor cannot be configured between two selected monitors.



4. Select which monitors you want DCV to be displayed full screen.

5. Click **Apply**.

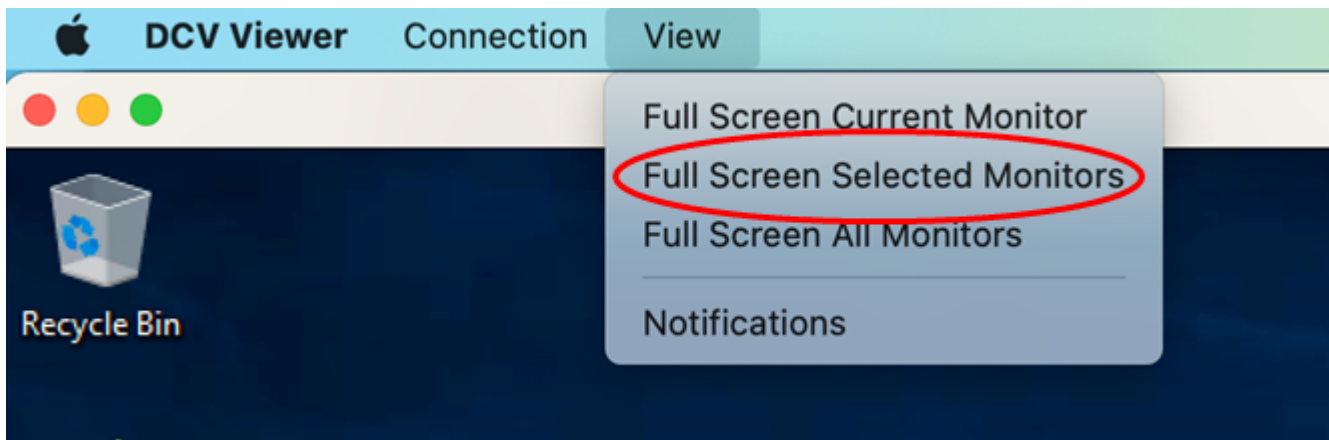
• macOS client

1. Go to the top menu.

2. Select **View**.

Note

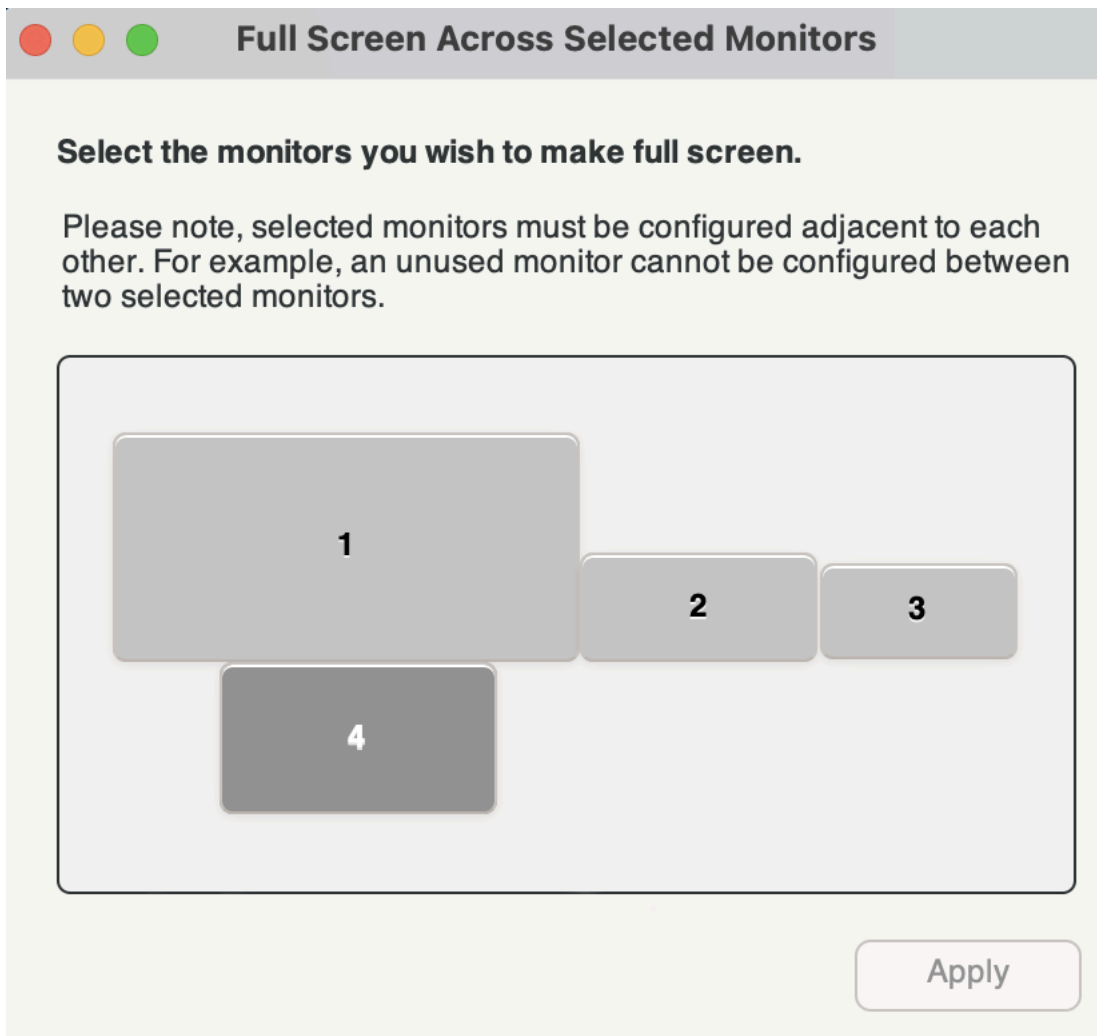
The **View** drop-down menu will appear.



3. Select **Full Screen Selected Monitors** from the drop down menu.

Note

The **Full Screen Selected Monitors** window will appear displaying your current monitor layout.



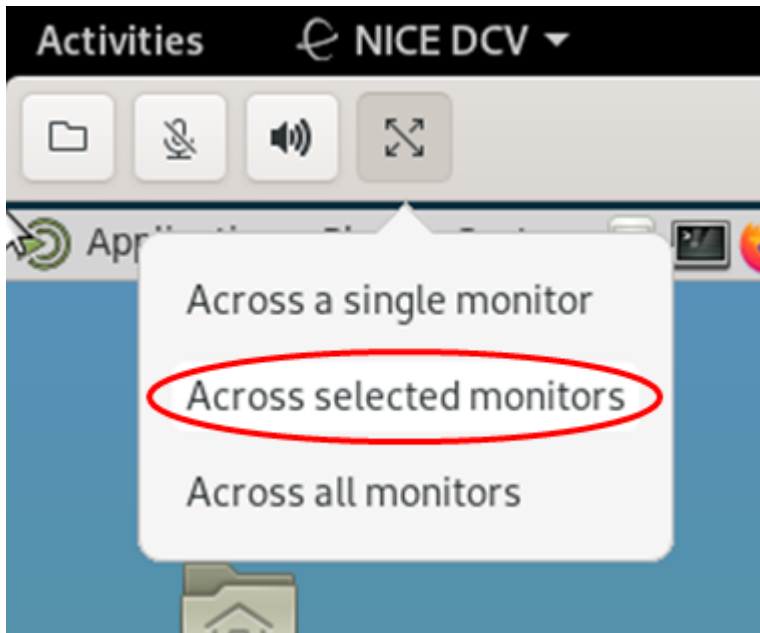
4. Select which monitors you want DCV to be displayed full screen.
5. Click **Apply**.

- **Linux client**

1. Go to the top menu.
2. Select **Full Screen** icon.

Note

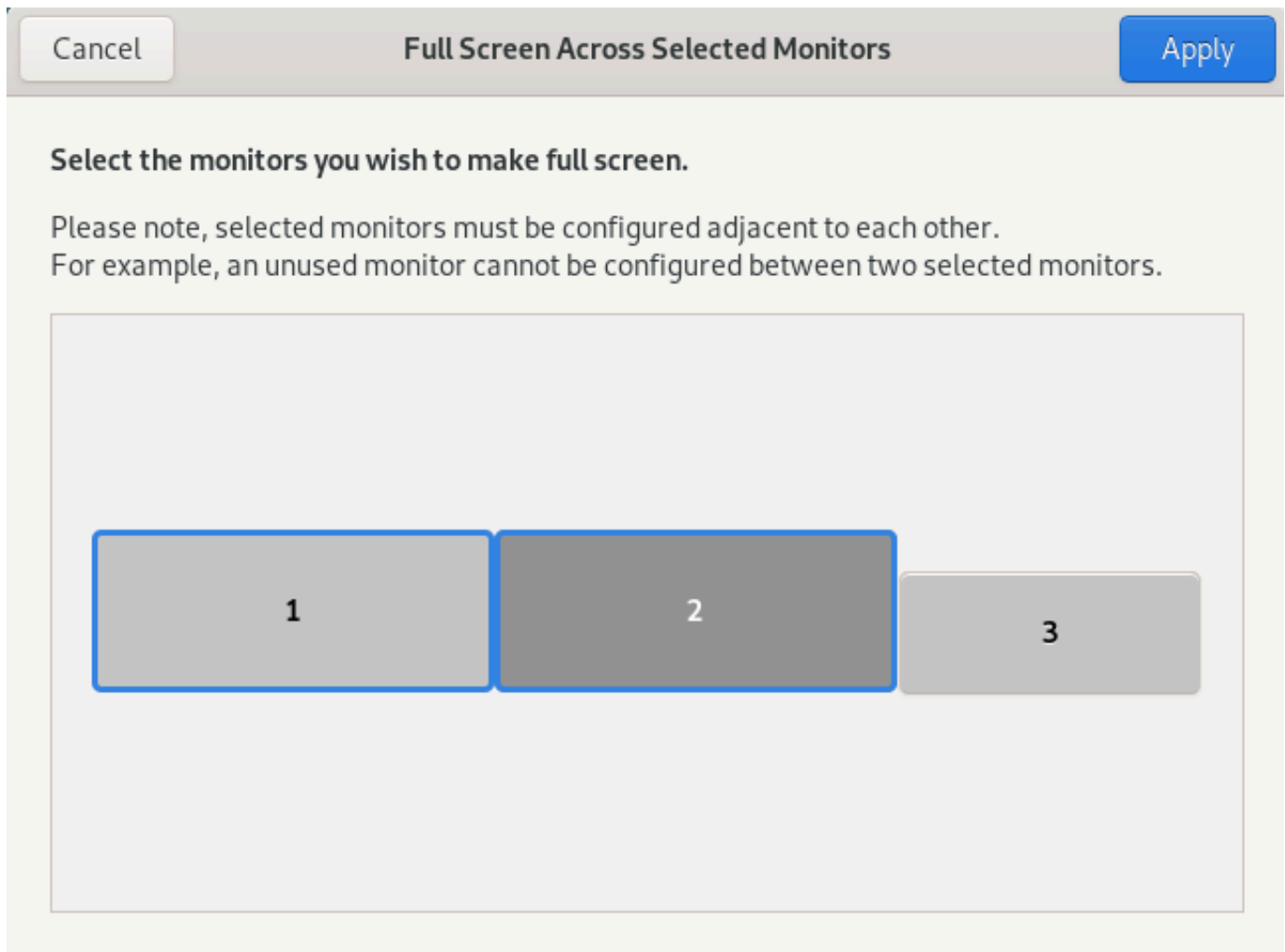
The **Full Screen** drop-down menu will appear.



3. Select **Across selected monitors** from the drop down menu.

Note

The **Across selected monitors** window will appear displaying your current monitor layout.



4. Select which monitors you want DCV to be displayed full screen.
5. Click **Apply**.

Exiting full screen on multiple monitors

After you extend the displays or enter full screen mode, a tab appears at the top-center edge of the screen. To exit full screen mode, choose the tab and then select **Exit fullscreen**.

Note

By default, DCV will save your display settings. If DCV detects a different monitor configuration, the display settings will be reset.

Using USB remotization

Note

This feature is for installable Windows clients only.

With NICE DCV you can use specialized USB devices such as 3D pointing devices and two-factor authentication USB dongles. These devices must be connected to your computer for them to interact with applications running on a NICE DCV server.

Note

Graphic tablets, gamepads, and smart card readers are automatically supported by NICE DCV and do not require USB remotization to be used.

You must be authorized to use this feature. If you are not authorized, the functionality is not available in the client. For more information, see [Configuring NICE DCV Authorization](#) in the *NICE DCV Administrator Guide*.

After this feature is enabled, the most commonly used USB devices are supported. You can connect them to your computer and use them on the server without additional configuration required.

However, some specialized USB devices aren't supported in the default configuration. Unsupported devices do not appear in the **Settings** menu after they're connected. These devices must be added to the USB Device **Allow List** on the NICE DCV Server before they can be used. After they are added to this list, they will appear in the **Settings** menu on the client.

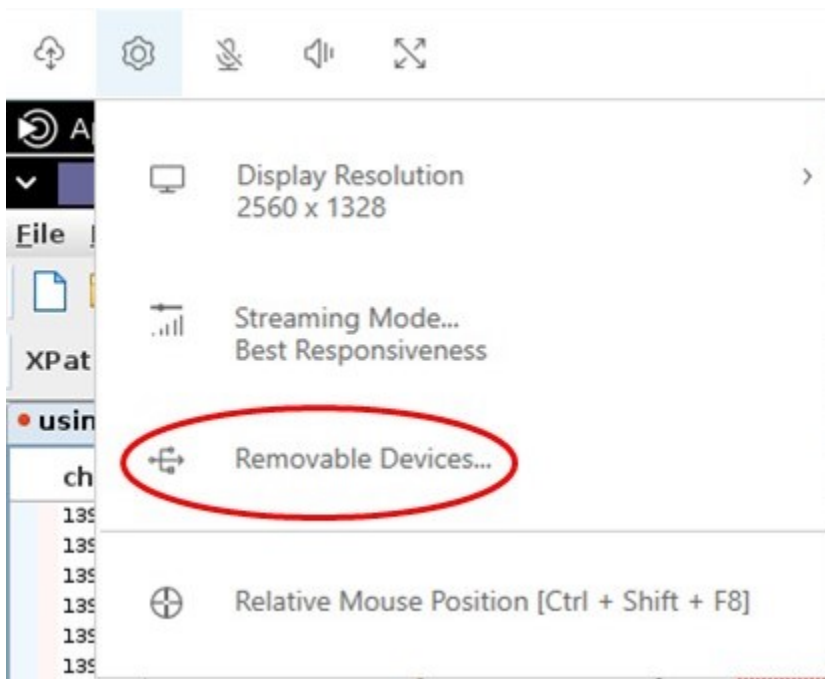
For information on this or any additional configuration that may be required on the NICE DCV server, see [Enabling USB Remotization](#) and in the *NICE DCV Administrator Guide*.

Using a USB device on a NICE DCV server

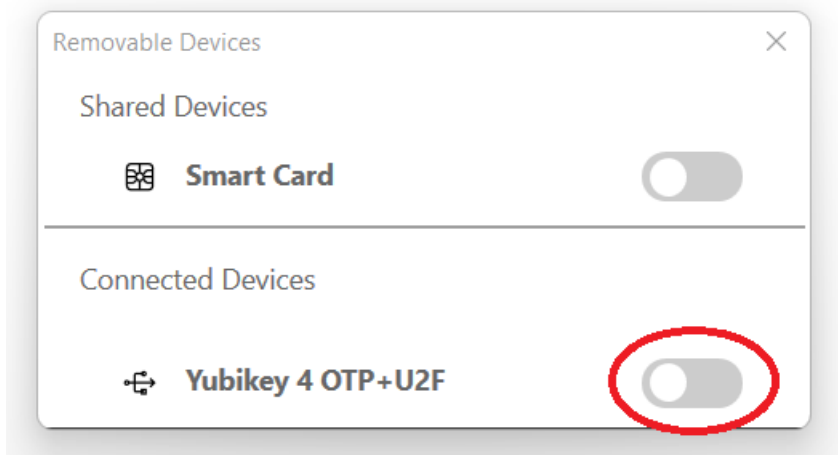
1. Connect the USB device in any open USB slot on your computer.
2. Go to your DCV client session.
3. Choose the **Settings** icon located in the upper left of the window.



4. Select **Removable Devices...** from the dropdown menu.



5. Move the slider next to the USB device in the list.



Your USB device is ready to use now.

Using a webcam

With NICE DCV, you can use a webcam connected to your local client computer in a remote application that runs in a NICE DCV session. For each session, only one connected client can use a webcam at a time. This is especially important in environments where multiple clients connect to the same session.

Webcam functionality is supported with all NICE DCV clients. However, with the web browser client, webcam functionality is only supported with Chromium-based browsers, such as Google Chrome or Microsoft Edge. It isn't supported on Mozilla Firefox or Apple Safari.

Webcam functionality is supported on Windows NICE DCV servers only. It's not supported on Linux NICE DCV servers.

You must be authorized to use this feature. If you are not authorized, the functionality is not available in the client. For more information, see [Configuring NICE DCV Authorization](#) in the *NICE DCV Administrator Guide*.

If you have multiple webcams connected to your local client computer, you can select the webcam that you want to use. The selected camera is used automatically when the webcam is enabled using the webcam toolbar icon.

Topics

- [Using a webcam on Windows, Linux and macOS clients](#)
- [Using a webcam on the web browser client](#)

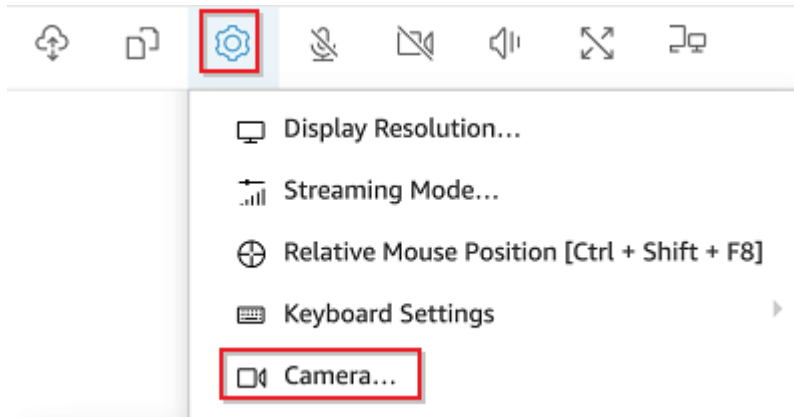
Using a webcam on Windows, Linux and macOS clients

The steps for selecting the camera to use are similar across the Windows, Linux and macOS clients.

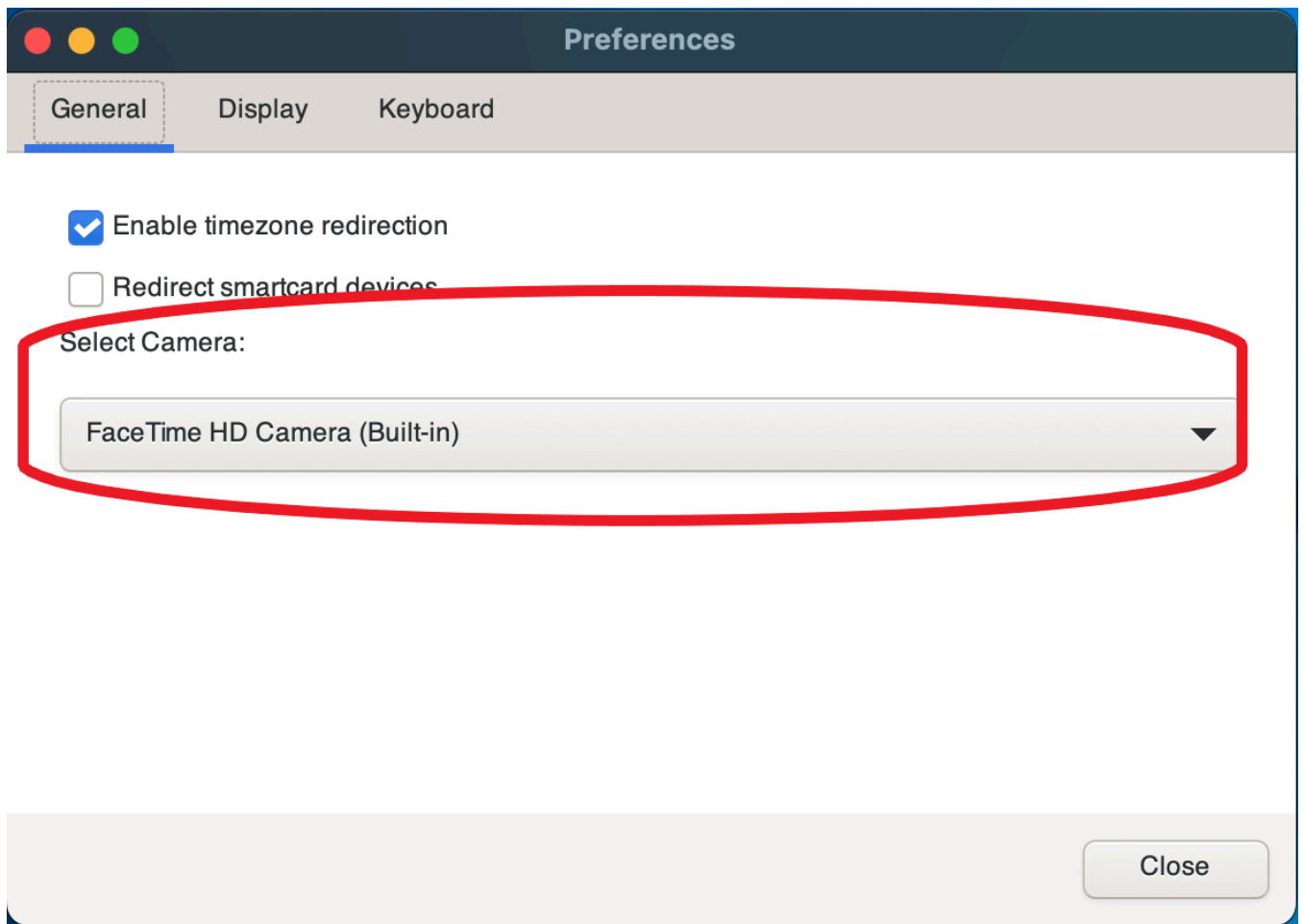
To select the webcam to use

1. Launch the client and connect to the NICE DCV session.
2. Do one of the following depending on your client.
 - Windows and Linux clients
 1. Choose the **Settings** icon.
 2. Select **Camera**.

3. Select the camera from the drop-down list



- macOS client
 1. Choose the **DCV Viewer** icon.
 2. Select the **General** tab.
 3. Select the arrow down arrow in the **Select Camera:** field to open a drop-down list of cameras.
 4. Select the camera from the drop-down list



Note




- The camera menu items appears only if you're authorized to use a webcam in the session. If you don't see the camera menu items, you might not be authorized to use a webcam.
- You can't change the webcam selection while the webcam is in use, or while another client enabled a webcam in the session.

To start using your webcam in a session

You must first enable it. Use the webcam icon on the toolbar to enable or disable your webcam for use in the session. You can also use the icon to determine its current state. The webcam icon appears on the toolbar only if the following is the case:

- You're authorized to use a webcam.

- You have at least one webcam connected to your local computer.
- No other users enabled a webcam for use in the session.

Toolbar icon	Description
	<p>Your webcam is disabled in the session. Other clients can enable a webcam for use in the session.</p> <p>Click the icon to enable your webcam in the session. If you didn't previously select the webcam to use, the default webcam is used.</p>
	<p>Your webcam is enabled in the session, but it isn't in use. While your webcam is enabled, no other clients that are connected to the session can use a webcam.</p> <p>Click the icon to disable your webcam in the session.</p>
	<p>Your webcam is in use by a remote application in the NICE DCV session. No other clients can enable a webcam while your webcam is in use.</p> <p>Click the icon to disable your webcam in the session.</p>

Troubleshooting

Topics

- [Webcam doesn't work on Windows 10](#)
- [Client application says that the webcam is in use](#)

Webcam doesn't work on Windows 10

Windows 10 provides built-in privacy settings that manage access to the device camera. If you're running Windows 10 on your client computer, these privacy settings might prevent use of the webcam.

Note

If you're connecting to a Windows 2019 NICE DCV server, you might need to perform these steps on the NICE DCV server as well.

To modify the privacy settings on your computer, do the following:

1. Choose the search icon on the toolbar.
2. Enter Settings and press **Enter**.
3. In the left-hand panel, choose **Camera**.
4. For **Allow apps to access your camera**, switch the toggle to the **On** position.
5. You might need to restart your computer for the changes to take effect.

Client application says that the webcam is in use

Only one application can use the webcam at a time. If you're using the webcam in multiple applications, first close the applications where it's no longer needed.

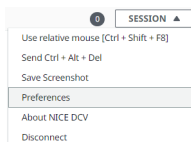
Using a webcam on the web browser client

Webcam functionality is only supported with Chromium-based browsers, such as Google Chrome or Microsoft Edge. It isn't supported on Mozilla Firefox or Apple Safari.

The steps for selecting the camera to use are the same across all supported web browsers..

To select the webcam to use


1. Launch the client and connect to the NICE DCV session.
2. In the client, choose **Session, Preferences**.



3. Under the **Camera** tab, select the camera to use.

Preferences ✕

General | **Display** | **Keyboard** | **Camera**

 Camera available. Check the browser settings to change this site's camera permission. [Read more !\[\]\(15a01675795da3c0924461c44b8bf202_img.jpg\)](#)

Camera
Select which camera to activate.

FaceTime HD Camera (Built-in) (05ac:8514) ▲

OBS Virtual Camera (m-de:vice)

FaceTime HD Camera (Built-in) (05ac:8514)

Cancel Save

4. Close the **Preferences** modal.




Note

- The camera menu items appears only if you're authorized to use a webcam in the session. If you don't see the camera menu items, you might not be authorized to use a webcam.
- You can't change the webcam selection while the webcam is in use, or while another client enabled a webcam in the session.
- If the camera permission settings have not been expressly granted or denied by the user, you're prompted to allow camera detection before being able to select the camera to use.
- In case the camera permission settings have been expressly granted or denied by the user, you would be able to change such setting following this procedure:
 1. At the top left of your browser window, click the area on the address bar left of the URL.
 2. In the popup window that opened, select the desired camera permission setting to be applied.

To start using your webcam in a session

You must first enable it. Use the webcam icon on the toolbar to enable or disable your webcam for use in the session. You can also use the icon to determine its current state. The webcam icon appears on the toolbar only if the following is the case:

- You're authorized to use a webcam.
- You have at least one webcam connected to your local computer.
- No other users enabled a webcam for use in the session.

Toolbar icon	Description
	<p>Your webcam is disabled in the session. Other clients can enable a webcam for use in the session.</p> <p>Click the icon to enable your webcam in the session. If you didn't previously select the webcam to use, the default webcam is used.</p>
	<p>Your webcam is enabled in the session, but it isn't in use. While your webcam is enabled, no other clients that are connected to the session can use a webcam.</p> <p>Click the icon to disable your webcam in the session.</p>
	<p>Your webcam is in use by a remote application in the NICE DCV session. No other clients can enable a webcam while your webcam is in use.</p> <p>Click the icon to disable your webcam in the session.</p>

Troubleshooting

Client application says that the webcam is in use

Only one application can use the webcam at a time. If you're using the webcam in multiple applications, first close the applications where it's no longer needed.

Using accurate audio/video synchronization

The **Accurate Audio/Video synchronization** setting enables a mode that minimizes the time difference in audio and video playback. This mode is useful in workloads that require the video and audio to be accurately synchronized, such as lip sync.

Note

This feature may produce a lag in the perceived responsiveness of the remote system.

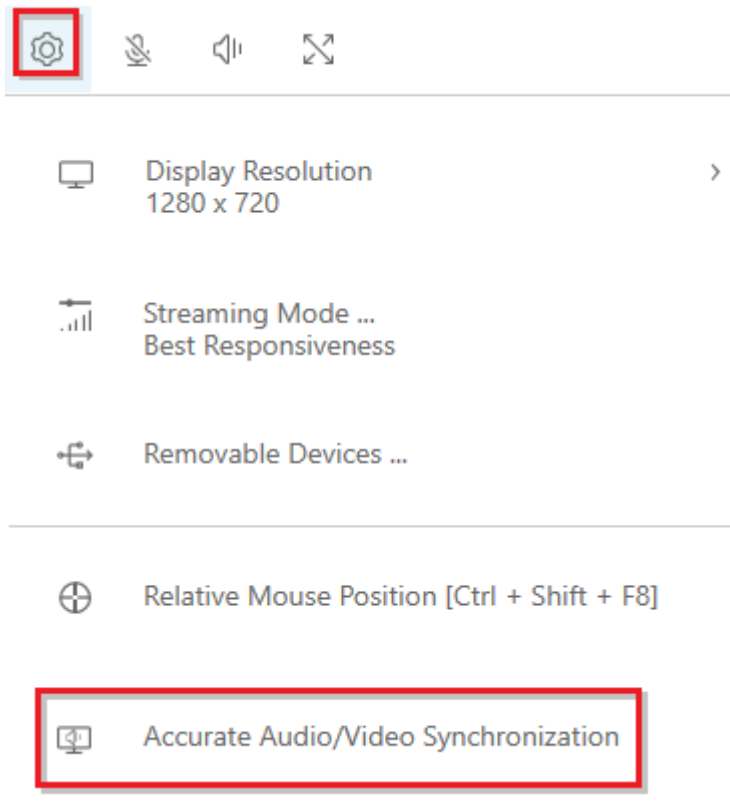
Accurate Audio/Video Synchronization functionality is supported on Windows and Linux servers with hardware GPU acceleration, and for console sessions only. It is supported on all native clients.

Note

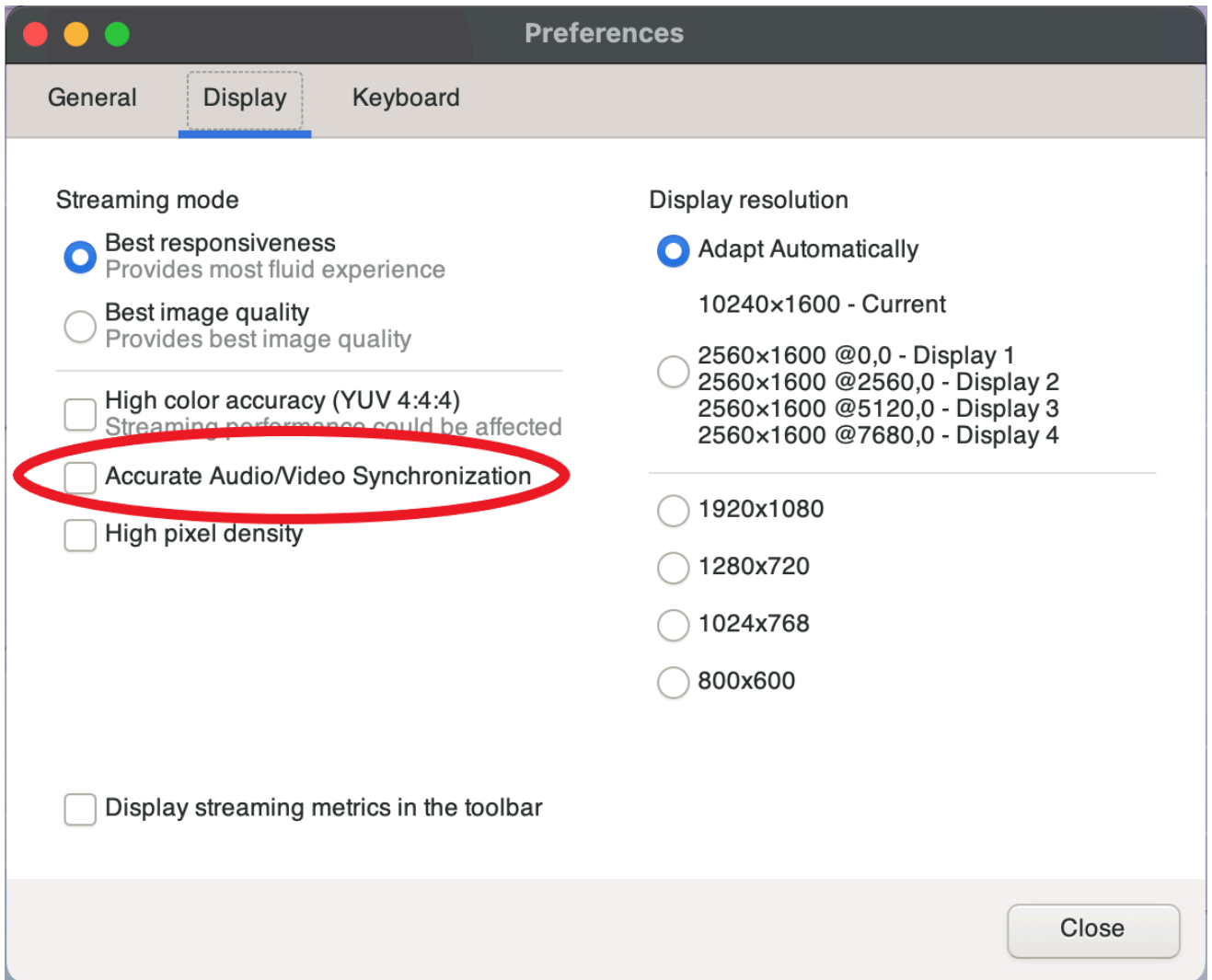
Accurate Audio/Video Synchronization is not supported on web based clients.

To enable or disable Audio/Video Synchronization

1. Launch the client and connect to the NICE DCV session.
2. Do one of the following depending on your client.
 - Windows clients
 1. Choose the **Settings** icon.
 2. Select **Accurate Audio/Video Synchronization** from the drop-down menu.

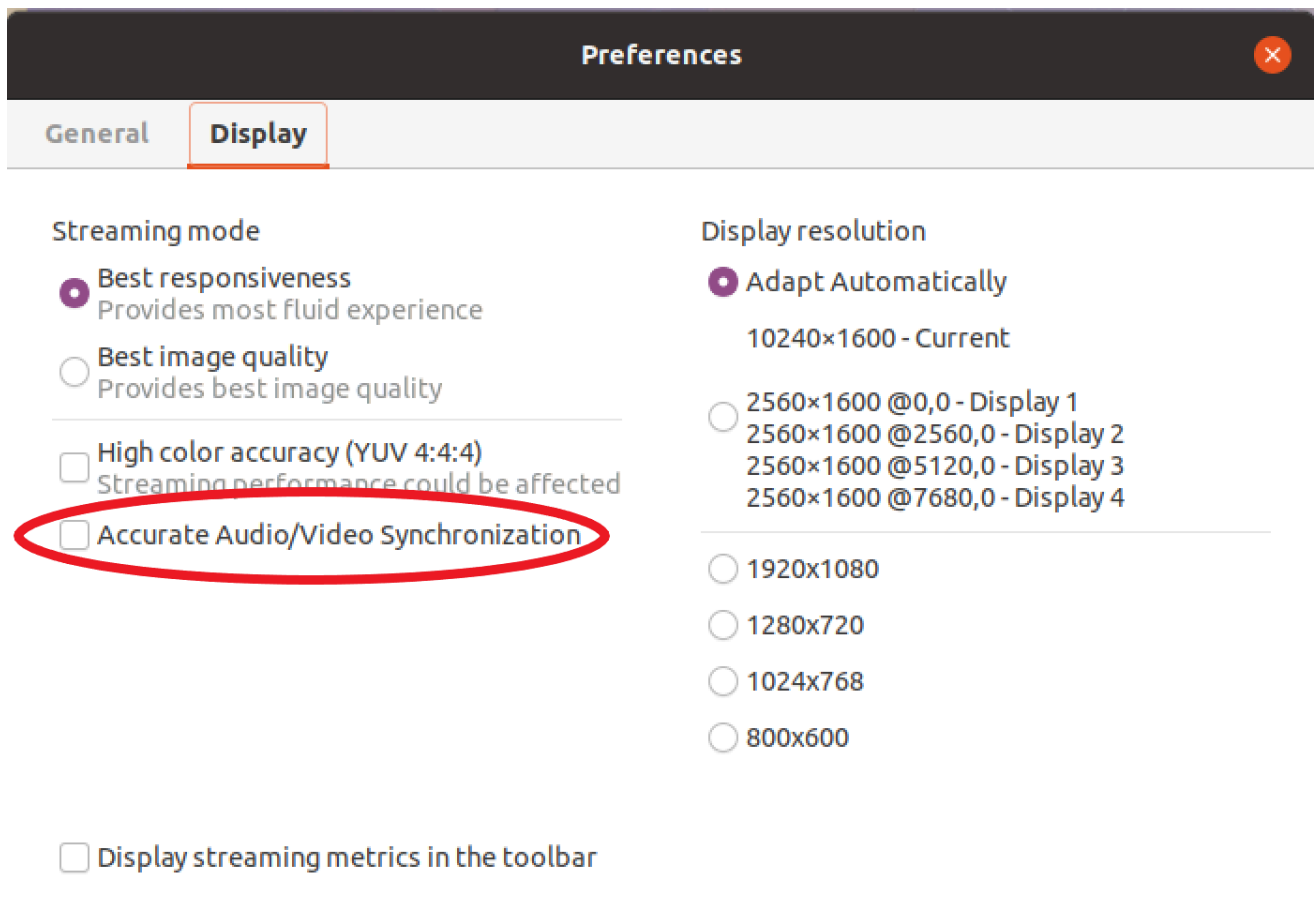


- macOS clients
 1. Choose the **DCV Viewer** icon.
 2. Select **Preferences** from the drop-down menu.
 3. Check the box for **Accurate Audio/Video Synchronization**.



- Linux clients

1. Choose the **Settings** icon.
2. Select **Preferences** from the drop-down menu.
3. Check the box for **Accurate Audio/Video Synchronization**.



Using high color accuracy

By default, NICE DCV uses YUV 4:2:0 chroma subsampling when compressing the display output and then updates the parts of the screen that are not changing over time to a full lossless RGB implementation. This default behavior aims to strike a balance between performance and image fidelity, though it may introduce chroma artifacts. By enabling the High color accuracy setting, the YUV chroma subsampling will be set to 4:4:4, thus increasing color fidelity. However this will increase network bandwidth and could affect performance of clients, especially at high resolution, because most client machines do not support HW accelerated decoding when using YUV 4:4:4.

The steps for setting the high color accuracy depend on the client used.

Topics

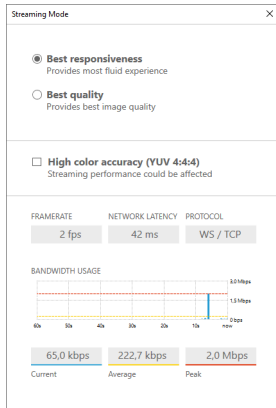
- [High color accuracy on native clients](#)
- [High color accuracy on Web browser client](#)

High color accuracy on native clients

As long as you are using a NICE DCV Server and a NICE DCV Client both having version 2022.0 or later, please follow these steps to enable high color accuracy:

Enabling high color accuracy on Windows clients

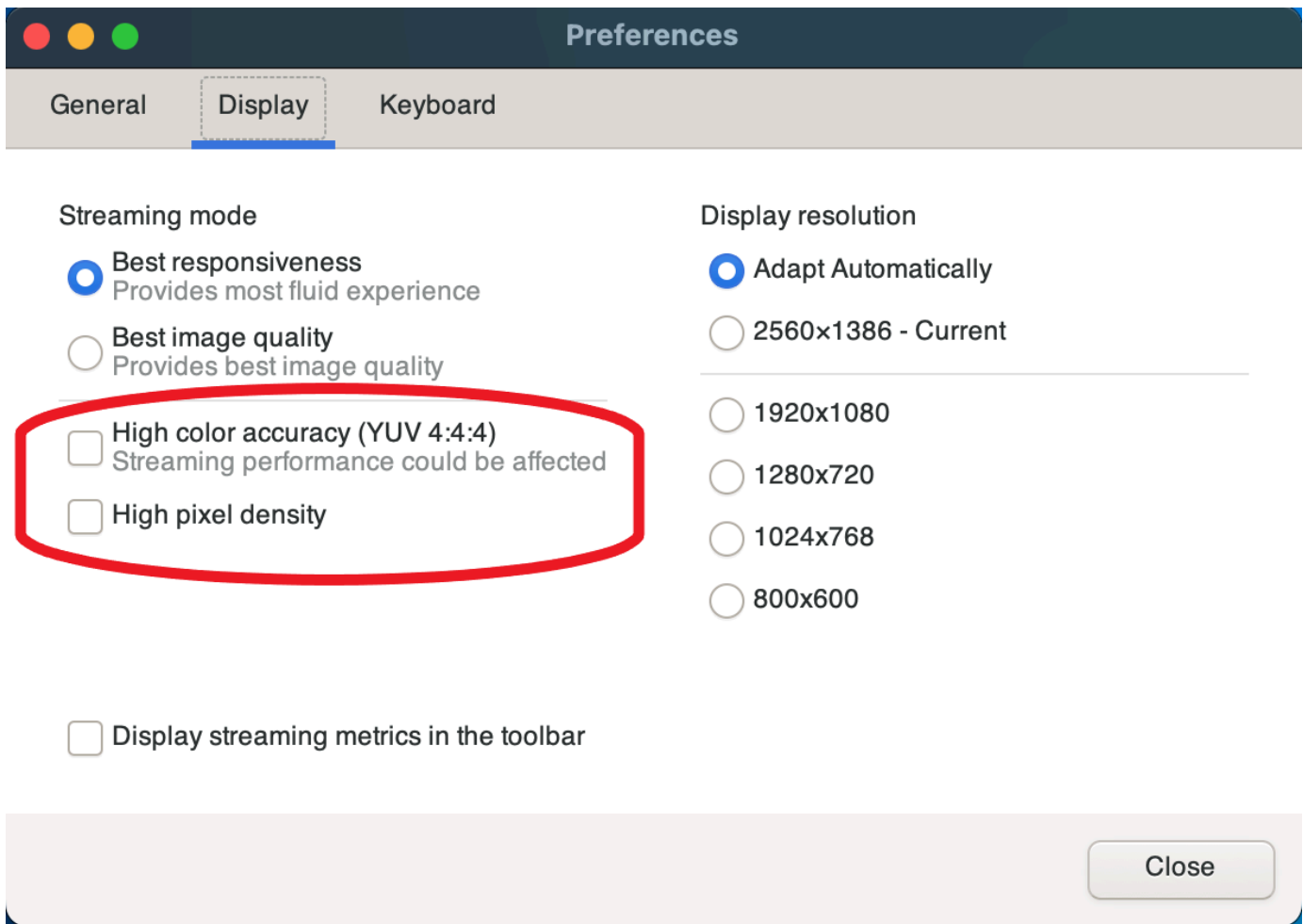
1. Choose the **Settings** icon.
2. Select **Streaming Mode** from the drop-down menu.



3. Check the High color accuracy (YUV 4:4:4) checkbox in the **Streaming Mode** window.
4. Close the **Streaming Mode** window.

Enabling high color accuracy on macOS clients

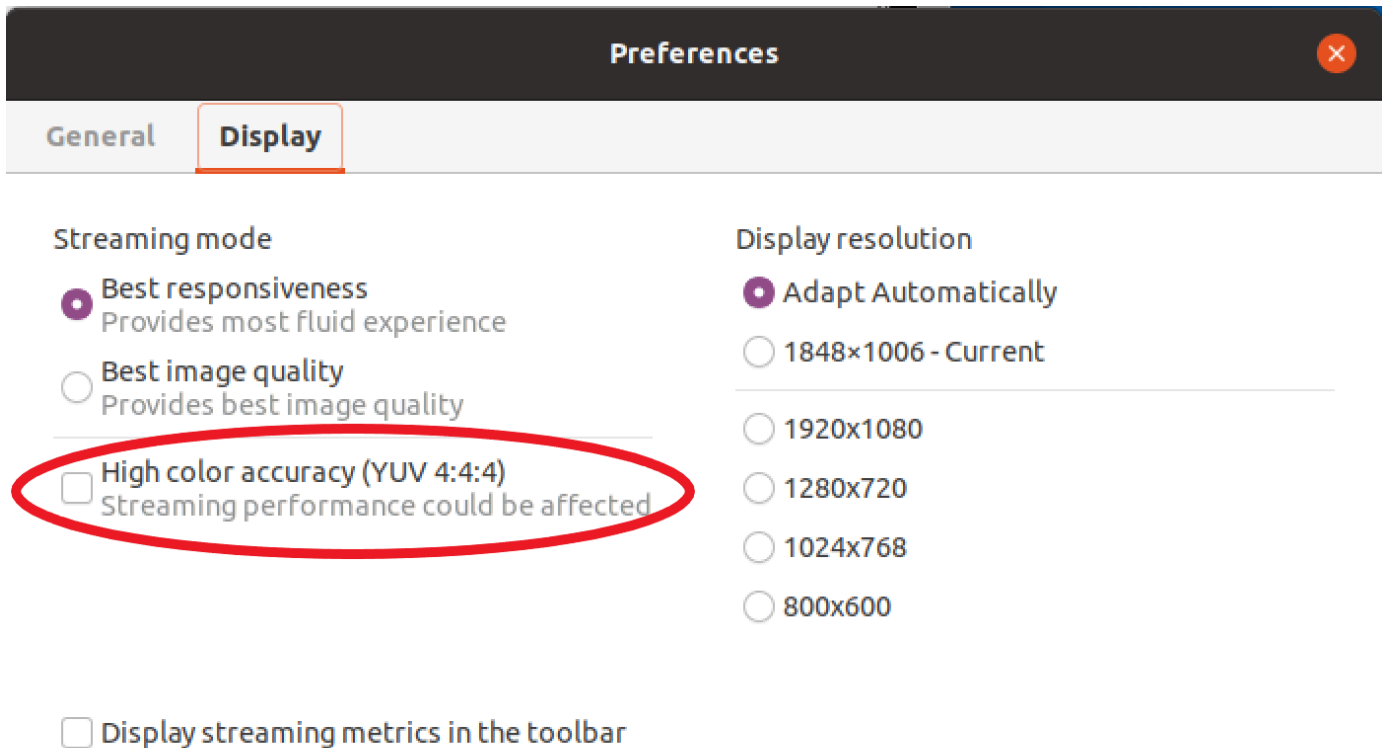
1. Choose the **DCV Viewer** icon.
2. Select **Preferences** from the drop-down menu.
3. Select the **Display** tab in the **Preferences** window.
4. Check one or both of the following checkboxes:
 - High color accuracy (YUV 4:4:4)
 - High pixel density



5. Close the **Preferences** window.

Enabling high color accuracy on Linux clients

1. Choose the **Settings** icon.
2. Select **Preferences** from the drop-down menu.
3. Select the **Display** tab in the **Preferences** window.
4. Check the checkbox for **High color accuracy (YUV 4:4:4)**.



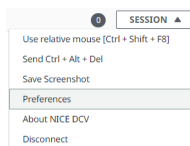
5. Close the **Preferences** window.

High color accuracy on Web browser client

In order to use high color accuracy on Web browser client you need a NICE DCV Server with version 2022.0 or later, as well as a browser supporting the [VideoDecoder](#) interface of the Web Codecs API.

The steps for enabling the high color accuracy are the same across all supported web browsers.

1. In the client, choose **Session, Preferences**.



2. Under the **Display** tab, if the high color accuracy feature is available, the corresponding toggle will be visible and allows to specify whether to enable or disable the YUV chroma subsampling set to 4:4:4:

Preferences ✕

General | **Display** | Keyboard | Camera

Streaming mode

Best responsiveness
Provide most fluid experience.

Best quality
Provide best image quality.

High color accuracy (YUV 4:4:4)

Enabled
Streaming performance could be affected.

Streaming metrics in the toolbar

Enabled

Display resolution

Adapt automatically

1378x906 (Current)

1920x1080

1440x900

1024x768

800x600

Cancel Save

3. Save and close the **Preferences** modal.

Using a connection file

Using the Windows, Linux, or macOS native client, you can create a connection file that you can use to instantly connect to a NICE DCV session.

Contents

- [Creating the connection file](#)
- [Supported parameters](#)
- [Running the connection file](#)

Creating the connection file

The connection file is a text-based file with a `.dcv` file extension. The format of the `.dcv` file is similar to that of an `.ini` file. The file includes `[groups]` followed by the parameters and their values. The groups and parameters take the following format:

```
[group_name]  
parameter_name=parameter_value
```

For example:

```
[options]  
fullscreen=true
```

You can create a connection file for a specific NICE DCV session directly from the client. Or, alternatively, you can create a connection file from scratch using a text editor.

Note

The procedure for creating a connection file from scratch using a text editor is the same for the Windows, Linux, and macOS clients.

To create a connection file from the client

1. Open the client.
2. Connect to the server and session where you are creating the file.
3. Select the hostname for the NICE DCV server in the top-right corner and choose **Save Connection As**.
4. In the **Save As** window, enter a file name and destination folder, and choose **Save**.

By default, when you create a connection file, the file includes the format, host, port, user, and proxytype parameters. These parameters are required to connect to the session that the file was created from. You can manually customize or add parameters at any time by editing the file using a text editor.

To create a connection file from scratch using a text editor

1. Create a .dcv file with the following file name format: *file_name*.dcv
2. Open the .dcv file using your preferred text editor.

3. Add the `[version]` group and format parameter to the top of the file in the following format:

```
[version]
format=1.0
```

⚠ Important

If the `.dcv` file doesn't include the `[version]` group and format parameter, parsing fails.

4. Add the required parameter groups using the following format:

```
[group_name]
```

For more information about the parameter groups, see [Supported parameters](#).

5. Add the parameters and parameter values after the groups using the following format:

```
parameter_name=parameter_value
```

ℹ Note

- Parameter names are case sensitive.
- Don't enclose string parameter values in quotation marks.

For more information about the parameters and parameter values, see [Supported parameters](#).

6. Save the changes and close the `.dcv` file.

You can also use this procedure to add additional parameters to an existing connection file at any time.

Supported parameters

Currently, the `.dcv` file supports parameters in three parameter groups—`[version]`, `[connect]`, and `[options]`. The following tables list the groups and their available parameters.

Groups


- [\[version\] parameters](#)
- [\[connect\] parameters](#)
- [\[options\] parameters](#)

[version] parameters

Important

This is a required group. If your .dcv file doesn't include this group, parsing fails.

The following table lists the parameters that can be specified in the [version] group.

Parameter	Type	Default value	Description
format	string		<div data-bbox="776 1052 1002 1092" data-label="Section-Header"> <h3> Important</h3> </div> <div data-bbox="820 1108 1002 1768" data-label="Text"> <p>This is a required parameter . The parameter value must be 1.0. If your .dcv file doesn't include this parameter , parsing fails.</p> </div>

[connect] parameters

The following table lists the parameters that can be specified in the [connect] group.

Parameter	Type	Default value	Description
host	String		The hostname of the NICE DCV server hosting the session.
port	Integer	8443	The port to use when connecting to the NICE DCV server.
weberlpath	String		A custom path on the NICE DCV server for connection. For example, if you specify <code>customPath</code> , the client attempts to connect to <code>host:port/customPath</code> .
sessionid	String		The ID of the NICE DCV session to connect to.
authtoken	String		The authentication token to be used for the connection. If you specify an <code>authtoken</code> , you

Parameter	Type	Default value	Description
			must also specify a <code>sessionid</code> . When using <code>authtoken</code> , you can omit the <code>user</code> and <code>password</code> parameters.
<code>user</code>	String		The user name to use when connecting to the NICE DCV server.
<code>password</code>	String		The password to use when connecting to the NICE DCV server. The password isn't encrypted.
<code>proxytype</code>	String	SYSTEM	The proxy type to be used. Valid values include HTTPS, HTTP, SOCKS5 SOCKS , SYSTEM, or NONE DIRECT . If you specify SYSTEM, your computer's proxy settings are used.

Parameter	Type	Default value	Description	
proxyhost	String		The address of the proxy server to be used if connecting through a proxy server.	
proxyport	Integer		The port to be used if connecting through a proxy server.	
proxyuser	String		The user name to be used for proxy authentication.	
proxypassword	String		The password to be used for proxy authentication. The password isn't encrypted.	

Parameter	Type	Default value	Description
transport	String	websocket	The protocol to use for data transport. Specify <code>websocket</code> to use the WebSocket (TCP) protocol for data transport, or specify <code>quic</code> to use the QUIC (UDP) protocol for data transport. If you enable QUIC, the QUIC protocol is used for data transport and WebSocket is used for authentication traffic. If you enable WebSocket, the WebSocket protocol is used for both data transport and authentication traffic.
webport	Integer	8443	The port to use for WebSocket (TCP) traffic.
quicport	Integer	8443	The port to use for QUIC (UDP) traffic.

Parameter	Type	Default value	Description
certificatevalidationpolicy	String	ask-user	The policy for validating an untrusted certificate. Values include <code>strict</code> , <code>accept-untrusted</code> , and <code>ask-user</code> .

[options] parameters

The following table lists the parameters that can be specified in the [options] group.

Parameter	Type	Default value	Description
fullscreen	Boolean	false	Indicates whether the client starts in full screen mode.
useallmonitors	Boolean	false	Indicates whether the client uses all monitors when starting full screen mode.
promptreconnect	Boolean	true	Indicates whether the client prompts you to reconnect after you disconnect from a session. If the parameter is set to <code>true</code> , you're redirected

Parameter	Type	Default value	Description
			d to the sign-in screen when you disconnect. If the parameter is set to false, the client closes when you disconnect.
enableyuv444decoding	Boolean	false	Indicates whether to enable the High color accuracy (YUV 4:4:4) when encoding dynamic video content.

Running the connection file

To run .dcv connection file, navigate to the file and double-click it.

Or, specify the file path as an argument for the dcvviewer command.

- Windows client

```
C:\> dcvviewer.exe path\connection_file_name.dcv
```

- Linux and macOS client

```
$ dcvviewer path/connection_file_name.dcv
```

Set certificate validation policy

NICE DCV uses a secure TLS connection for communication between the server and client. The certificate validation policy determines how the NICE DCV client responds when a certificate can't be verified as trustworthy. Set one of the following options in the connection file:

- **Strict:** Prohibits the connection if there is any problem validating the TLS certificate.
- **Ask user:** Prompts the user to determine whether to trust the certificate when a certificate can't be verified.
- **Accept untrusted:** Connects to the server even if the TLS certificate is self signed and can't be validated by the client.

For information about editing the connection file, see [???](#).

Using WebAuthn redirection

NICE DCV offers the WebAuthn Redirection feature, specifically designed for use with Google Chrome and Microsoft Edge browsers. This functionality enables authentication in session for web applications. This feature operates through a dedicated browser extension that, once installed, redirects the WebAuthn requests from the web application to the DCV client.

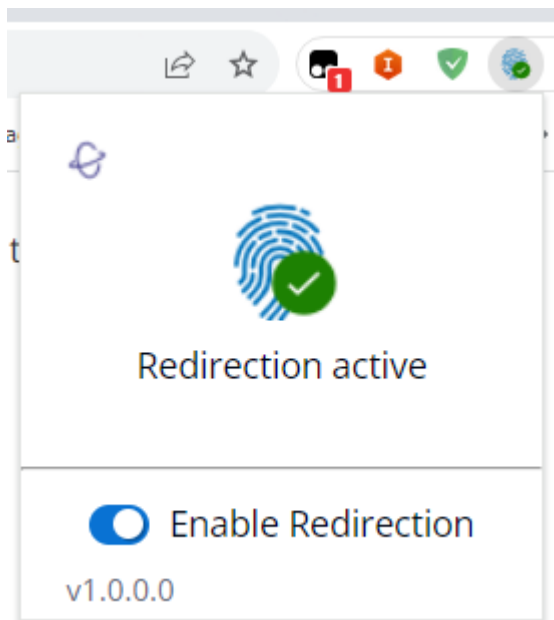
Authorization is required to use this feature. Otherwise, it is not available in the client. For more information, see [Configuring NICE DCV Authorization in the NICE DCV Administrator Guide](#).

Note

WebAuthn redirection is supported only on Windows, Linux, and macOS clients. It is not supported on the web browser client.





Webauthn Redirection user interface

The extension opens a user interface used to monitor and control the Webauthn Redirection feature.



- **Extension Icon:** Located in the main body of user interface, this icon displays the feature's current state.

The icon will be one of the following:

Icon	Name	Usage
	Inactive	Redirection is inactive. This occurs when you disable the extension.
	Ok (Active)	Redirection is active and connected to the underlying NICE DCV software on the host.
	Processing	Redirection is executing an operation in progress or is attempting to connect to the underlying NICE DCV software in the host.
	Error	There is an error connecting to the underlying NICE DCV software on the host.

- **Status Message:** Located in the main body of user interface, the message will explain the current operational status.
- **Redirection Toggle:** Located at the bottom of the user interface, this switch enables or disables the feature.
 - Enabling redirection allows WebAuthn requests to be intercepted by the extension and forwarded to the client.
 - Disabling redirection allows WebAuthn requests to be processed locally by the browser.

Troubleshooting NICE DCV

This chapter describes how to identify and troubleshoot problems that you might have with NICE DCV client.

Topics

- [Using the Log Files](#)

For additional support, use any of the following resources.

- If you are a NICE DCV on-premises customer and you need additional help, contact your NICE DCV reseller.
- If you are using NICE DCV on Amazon EC2, you can log a support ticket with [AWS support](#).
- If you do not have an AWS support plan, you can seek help from the NICE DCV community by posting your question on the [AWS re:Post](#).

Using the Log Files

Use the NICE DCV client log files to identify and troubleshoot problems with your NICE DCV client. Logs aren't enabled by default on Windows clients. After logs are enabled, the log files are stored in the following location on your NICE DCV client:

- Windows client

```
C:\ProgramData\client.log
```

Note

By default, the ProgramData folder might be hidden. If you don't see the ProgramData folder, set your file browser to show hidden items. Alternatively, enter %programdata% in the address bar and press **Enter**.

- Linux or macOS client

```
~/local/share/NICE/dcvviewer/log/viewer.log
```

To enable NICE DCV to store log files on a Windows client

1. Navigate to the folder where the `dccviewer.exe` file is located. (By default, this is `C:\Program Files (x86)\NICE\DCV\Client\bin\.`) Then, open a command prompt window.
2. Launch NICE DCV client using the command line interface.

```
dccviewer --log-level info --log-file-name C:/ProgramData/client.log
```

Or add the following configuration to the [connection file](#):

```
[debug]  
logfile=C:/ProgramData/client.log  
loglevel=info
```


Release notes and document history for NICE DCV

This page provides the release notes and document history for NICE DCV.

Topics

- [NICE DCV release notes](#)
- [Document history](#)

NICE DCV release notes

This section provides an overview of the major updates, feature releases, and bug fixes for NICE DCV. All the updates are organized by release data. We update the documentation frequently to address the feedback that you send us.

Topics

- [DCV 2023.1-16388 — March 5, 2024](#)
- [DCV 2023.1-16388 — December 19, 2023](#)
- [DCV 2023.1-16220 — November 9, 2023](#)
- [DCV 2023.0-15487 — June 29, 2023](#)
- [DCV 2023.0-15065 — May 3, 2023](#)
- [DCV 2023.0-15022 — April 21, 2023](#)
- [DCV 2023.0-14852 — March 28, 2023](#)
- [DCV 2022.2-14521 — February 17, 2023](#)
- [DCV 2022.2-14357 — January 18, 2023](#)
- [DCV 2022.2-14175 — December 21, 2022](#)
- [DCV 2022.2-14126 — December 9, 2022](#)
- [DCV 2022.2-13907 — November 11, 2022](#)
- [DCV 2022.1-13300 — August 4, 2022](#)
- [DCV 2022.1-13216 — July 21, 2022](#)
- [DCV 2022.1-13067 — June 29, 2022](#)
- [DCV 2022.0-12760 — May 23, 2022](#)

- [DCV 2022.0-12627 — May 19, 2022](#)
- [DCV 2022.0-12123 — March 23, 2022](#)
- [DCV 2022.0-11954 — February 23, 2022](#)
- [DCV 2021.3-11591 — December 20, 2021](#)
- [DCV 2021.2-11445 — November 18, 2021](#)
- [DCV 2021.2-11190 — October 11, 2021](#)
- [DCV 2021.2-11135 — September 24, 2021](#)
- [DCV 2021.2-11048 — September 01, 2021](#)
- [DCV 2021.1-10851 — July 30, 2021](#)
- [DCV 2021.1-10598 — June 10, 2021](#)
- [DCV 2021.1-10557 — May 31, 2021](#)
- [DCV 2021.0-10242 — April 12, 2021](#)
- [DCV 2020.2-9662 — December 04, 2020](#)
- [DCV 2020.2-9508 — November 11, 2020](#)
- [DCV 2020.1-9012 — September 30, 2020](#)
- [DCV 2020.1-9012 — August 24, 2020](#)
- [DCV 2020.1-8942 — August 03, 2020](#)
- [DCV 2020.0-8428 — April 16, 2020](#)
- [DCV 2019.1-7644 — October 24, 2019](#)
- [DCV 2019.1-7423 — September 10, 2019](#)
- [DCV 2019.0-7318 — August 5, 2019](#)
- [DCV 2017.4-6898 — April 16, 2019](#)
- [DCV 2017.3-6698 — February 24, 2019](#)
- [DCV 2017.2-6182 — October 8, 2018](#)
- [DCV 2017.1-5870 — August 6, 2018](#)
- [DCV 2017.1-5777 — June 29, 2018](#)
- [DCV 2017.0-5600 — June 4, 2018](#)
- [DCV 2017.0-5121 — March 18, 2018](#)

- [DCV 2017.0-4334 — January 24, 2018](#)
- [DCV 2017.0-4100 — December 18, 2017](#)

DCV 2023.1-16388 — March 5, 2024

Build numbers	Changes and bug fixes	
<ul style="list-style-type: none"> • nice-dcv-server: 10 	<ul style="list-style-type: none"> • Fixed a problem with extensions in the Windows Client when display scaling is set to a value different from 100%. 	
<ul style="list-style-type: none"> • nice-dcv-client (Windows): 8993 	<ul style="list-style-type: none"> • Fixed a problem with relative mouse mode and High DPI mice in the Windows Client. • Fixed a problem with the release of keyboard combinations using the Shift key in the Windows Client. 	
<ul style="list-style-type: none"> • nice-dcv-viewer (macOS): 6203 		
<ul style="list-style-type: none"> • nice-dcv-viewer (Linux): 6203 		
<ul style="list-style-type: none"> • nice-xdcv: 565 		
<ul style="list-style-type: none"> • nice-dcv-gl: 1047 		
<ul style="list-style-type: none"> • nice-dcv-gltest: 325 		

Build numbers	Changes and bug fixes	
<ul style="list-style-type: none"> nice-dcv-simple-external-authentication: 228 		

DCV 2023.1-16388 — December 19, 2023

Build numbers	Changes and bug fixes	
<ul style="list-style-type: none"> nice-dcv-server: 16388 nice-dcv-client (Windows): 8934 nice-dcv-viewer (macOS): 6203 nice-dcv-viewer (Linux): 6203 	<ul style="list-style-type: none"> Fixed a race condition in the agent startup on Windows which could cause streaming failures and excessive logging. Fixed last interaction time reported in <code>dcv list-connections</code> when the idle timeout setting is changed at runtime. Fixed a compatibility problem with NVIDIA GRID drivers 528.89 on Windows server. Fixed video decoding problems in the Web Client that could result in streaming failures. Fixed a problem with full screen on multiple monitors on the Windows client when display resolution change is disabled on the server. Fixed a problem with webcam resolution on the Linux and macOS clients. Fixed a problem with double and triple mouse click on the Linux and macOS clients. 	

Build numbers	Changes and bug fixes	
<ul style="list-style-type: none"> nice-xdcv: 565 nice-dcv-gl: 1047 nice-dcv-gltest: 325 nice-dcv-simple-external-authenticator: 228 	<ul style="list-style-type: none"> Fixed a problem WebAuthN redirection on the Linux and macOS clients. 	

DCV 2023.1-16220 — November 9, 2023

Build numbers	New features	Changes and bug fixes
<ul style="list-style-type: none"> nice-dcv-server: 16220 nice-dcv-client (Windows): 8908 	<p>NICE DCV added the following features:</p> <ul style="list-style-type: none"> Support for the redirection of in-session WebAuthN requests from web applications running in remote Google Chrome or Microsoft Edge browsers. Redirected requests are channeled to the client, allowing FIDO2 compliant authenticators 	<ul style="list-style-type: none"> Added support transparent images to the clipboard on Windows. Fixed a problem with concurrent access to the clipboard on Windows which prevented cut and paste operations to succeed with some applications.

Build numbers	New features	Changes and bug fixes
<ul style="list-style-type: none"> • nice-dcv-viewer (macOS): 6125 • nice-dcv-viewer (Linux): 6125 • nice-xdcv: 565 • nice-dcv-gl: 1047 • nice-dcv-gltest: 325 • nice-dcv-simple-external-authentication: 228 	<ul style="list-style-type: none"> • such as YubiKey or Windows Hello to validate user identity. • A new Indirect Display Driver (IDD) for Windows hosts optimizes the graphics pipeline and significantly reduces overall CPU usage by protocol. • The Windows Performance Counters can now be used to track various DCV protocol metrics such as frame rates, network bandwidth, CPU usage, and more, which can help users to understand the performance of their network and DCV protocol. 	<ul style="list-style-type: none"> • Fixed a problem that could result in the monitor scaling factor being reset to 100% NICE DCV Server on Windows • Added settings to automatically disconnect clients on user logout and on screen lock for console sessions on Windows and Linux • Fixed problems in the audio stack that could result in noises and sound artifacts. • Webcam streaming can be resumed when reconnecting without closing the application on the server • Improved relative mouse behavior with a high dpi mouse on Windows native client • Fixed issues with SmartCard support in the macOS native client • Fixed support for high pixel density on Linux native client • Improved user interface accessibility on the Web client and on the Windows native client • Fixed limitations with some keyboard layouts when using the Web client on macOS

Build numbers	New features	Changes and bug fixes
		<ul style="list-style-type: none"> • Updated third party dependencies to the latest versions • Xdcv was updated to version 21.1.9 of XServer • Removed support for Windows Server 2012R2, Ubuntu 18.04 and Suse Enterprise Linux 15SP4 • Bug fixes and performance improvements

DCV 2023.0-15487 — June 29, 2023

Build numbers	Changes and bug fixes	
<ul style="list-style-type: none"> • nice-dcv-server: 1! • nice-dcv-client (Windows): 8771 • nice-dcv-viewer (macOS): 5629 • nice-dcv-viewer 	<ul style="list-style-type: none"> • Fixed a problem in the Web client which could cause wrong colors when using Chrome 114 or newer. • Fixed the el7 rpm packages of NICE DCV server and Xdcv to avoid an error on uninstall. • Fixed a compatibility problem with NVIDIA GRID drivers 528.89 on Windows server. • Fixed a problem which could prevent the clipboard from working correctly on some Windows applications. • The dcv-gl package now requires the latest version of the NICE DCV server package to ensure configuration is correct when the package is installed or updated. 	

Build numbers	Changes and bug fixes	
<ul style="list-style-type: none"> (Linux): 5629 • nice-xdcv: 551 • nice-dcv-gl: 1039 • nice-dcv-gltest: 318 • nice-dcv-simple-external-authenticator: 208 	<ul style="list-style-type: none"> • Fixed a problem on Windows client that could result in the wrong resolution being used after a resize. • Fixed support for IPv6 addresses in the macOS and Linux clients. • The macOS client now allows to configure Control + click as a right click. • The Web client now allows the use of special keys and combinations when in full screen on supported browsers. • Updated the OpenSSL third party library. 	

DCV 2023.0-15065 — May 3, 2023

Build numbers	Changes and bug fixes	
<ul style="list-style-type: none"> • nice-dcv-server: 1! • nice-dcv- 	<ul style="list-style-type: none"> • Fixed an issue with close-session that could prevent release of license tokens. • Fixed crash in macOS native client on BigSur. 	

Build numbers	Changes and bug fixes	
<p>client (Windows): 8671</p> <ul style="list-style-type: none">• nice-dcv-viewer (macOS): 5483• nice-dcv-viewer (Linux): 5483• nice-xdcv: 547• nice-dcv-gl: 1027• nice-dcv-gltest: 318• nice-dcv-simple-external-authenticator: 208		

DCV 2023.0-15022 — April 21, 2023

Build numbers	Changes and bug fixes
<ul style="list-style-type: none"> nice-dcv-server: 1! 	<ul style="list-style-type: none"> Fixed a concurrency problem which could prevent streaming from working correctly after a screen resize.
<ul style="list-style-type: none"> nice-dcv-client (Windows): 8671 	<ul style="list-style-type: none"> Fixed a race condition on the NICE DCV server that could cause failures in QUIC connections. Fixed a crash in NICE DCV server related to applications with hidden cursors.
<ul style="list-style-type: none"> nice-dcv-viewer (macOS): 5456 	<ul style="list-style-type: none"> Fixed a problem with Japanese keyboard input on Windows server. Improved audio/video synchronization for the Webcam stream.
<ul style="list-style-type: none"> nice-dcv-viewer (Linux): 5456 	<ul style="list-style-type: none"> Updated the ICU and libxml2 third party libraries. Updated Xdcv to version 21.1.8 of XServer and fixed a problem with XKB that could prevent virtual sessions from starting.
<ul style="list-style-type: none"> nice-xdcv: 547 	<ul style="list-style-type: none"> Fixed a problem that could cause video decoding failure on Windows, macOS and Linux native clients.
<ul style="list-style-type: none"> nice-dcv-gl: 1027 	<ul style="list-style-type: none"> Fixed problems with settings on the macOS and Linux native clients.
<ul style="list-style-type: none"> nice-dcv-gltest: 318 	
<ul style="list-style-type: none"> nice-dcv-simple- 	

Build numbers	Changes and bug fixes	
external-authenticators: 206		

DCV 2023.0-14852 — March 28, 2023

Build numbers	New features	Changes and bug fixes
<ul style="list-style-type: none"> • nice-dcv-server: 1. • nice-dcv-client (Windows): 8655 • nice-dcv-viewer (macOS): 5388 • nice-dcv-viewer (Linux): 5388 • nice-xdcv: 527 	<p>NICE DCV added the following features:</p> <ul style="list-style-type: none"> • Added support for full-screen on selected monitors for NICE DCV client on macOS and Linux. • Added support to initiate file upload by drag and drop for all clients. • Added Red Hat Enterprise Linux 9, Rocky Linux 9, and CentOS Stream 9. • Added support for time zone redirection for NICE DCV Server on Linux. 	<ul style="list-style-type: none"> • Fixed some problems in the QUIC transport which could cause incorrect bandwidth estimation and visual artifacts. • Updates to the user interface of the macOS and Linux clients. • Windows installers now consistently use NICE DCV in user visible application names. • Reworked implementation of clipboard support on Windows for increased robustness. • Fixed a problem with the Caps Lock key when using German keyboard layout on Windows.

Build numbers	New features	Changes and bug fixes
<ul style="list-style-type: none"> • nice-dcv-gl: 1022 • nice-dcv-gltest: 318 • nice-dcv-simple-external-authenticator: 206 		

DCV 2022.2-14521 — February 17, 2023

Build numbers	Changes and bug fixes
<ul style="list-style-type: none"> • nice-dcv-server: 14521 • nice-dcv-client (Windows): 8570 • nice-dcv-viewer (macOS): 5125 • nice-dcv-viewer (Linux): 4804 • nice-xdcv: 519 • nice-dcv-gl: 1012 • nice-dcv-gltest: 307 • nice-dcv-simple-external-authenticator: 198 	<ul style="list-style-type: none"> • Fixed problems with Japanese and Spanish keyboards on the macOS client. • Fixed a problem with numpad keys on the Windows NICE DCV Server. • Fixed a memory leak with QUIC connections. • Improved stability of Windows NICE DCV Client when using old video drivers. • Updated the OpenSSL and libsoup third party libraries. • Updated Xdcv to version 21.1.7 of XServer.

DCV 2022.2-14357 — January 18, 2023

Build numbers	Changes and bug fixes
<ul style="list-style-type: none">nice-dcv-server: 14357nice-dcv-client (Windows): 8522nice-dcv-viewer (macOS): 4804nice-dcv-viewer (Linux): 4804nice-xdcv: 487nice-dcv-gl: 1012nice-dcv-gltest: 307nice-dcv-simple-external-authenticator: 198	<ul style="list-style-type: none">Fixed a crash with virtual sessions on Suse Linux 12 which started happening with the latest updates to the Suse packages.Fixed a memory leak in DCV-GL related to the handling of X Pixmaps.Integrate DCV-GL with the <code>xrestop</code> tool, so that X Pixmaps are associated to the corresponding process.Improve webcam and audio redirection on Windows server to be more consistent with Windows' native behavior: the stream is not interrupted in case of OS events.Improve how the Windows NICE DCV Client handles input methods.Fixed a problem with the clipboard in the Windows NICE DCV Client related to text using only the carriage return character as the line separator.

DCV 2022.2-14175 — December 21, 2022

Build numbers	Changes and bug fixes
<ul style="list-style-type: none">nice-dcv-server: 14175nice-dcv-client (Windows): 8472nice-dcv-viewer (macOS): 4804nice-dcv-viewer (Linux): 4804nice-xdcv: 487nice-dcv-gl: 983	<ul style="list-style-type: none">Fixed a leak of file descriptors in the server when using WebSocket connections.Xdcv was updated to version 21.1.6 of XServer.

Build numbers	Changes and bug fixes
<ul style="list-style-type: none"> nice-dcv-gltest: 307 nice-dcv-simple-external-authenticator: 198 	

DCV 2022.2-14126 — December 9, 2022

Build numbers	Changes and bug fixes
<ul style="list-style-type: none"> nice-dcv-server: 14126 nice-dcv-client (Windows): 8472 nice-dcv-viewer (macOS): 4804 nice-dcv-viewer (Linux): 4804 nice-xdcv: 481 nice-dcv-gl: 983 nice-dcv-gltest: 301 nice-dcv-simple-external-authenticator: 198 	<ul style="list-style-type: none"> Fixed a problem in the Windows server when using the Korean keyboard. Fixed a problem with USB redirection on the Windows server that could cause a hang on Windows 11. Fixed a problem with log rotation on the server when the 'rotate' parameter is set to 0. Fixed a problem in the macOS and Linux clients which could cause the stream to freeze under specific network conditions. Fixed a problem in the Windows native client not properly resizing when going fullscreen. Fixed a problem in the macOS and Linux clients which could cause a crash during file upload. Fixed a problem in the macOS client which could cause the audio to stop working. Fixed a problem in the Linux client which could cause a crash when using a NVIDIA GPU. Fixed a problem in the Web Client which could cause the Time Zone redirection UI to go out of synchronization with the server.

Build numbers	Changes and bug fixes
	<ul style="list-style-type: none"> • Fixed a problem in the Web Client which could prevent the post-session page from loading. • Updated the libTIFF and MIT-Kerberos open source dependencies.

DCV 2022.2-13907 — November 11, 2022

Build numbers	New features	Changes and bug fixes
<ul style="list-style-type: none"> • nice-dcv-server: 1: • nice-dcv-client (Windows): 8427 • nice-dcv-viewer (macOS): 4653 • nice-dcv-viewer (Linux): 4653 • nice-xdcv: 481 	<p>NICE DCV added the following features:</p> <ul style="list-style-type: none"> • Added support for full-screen on selected monitors for NICE DCV client on Windows. • Added support for high pixel density displays native client on macOS. • Added printer redirection for NICE DCV client on macOS and Linux. • Added support for time zone redirection for NICE DCV Server on Windows. • Added a GNOME-Shell extension for Ubuntu 22.04 to support single sign on for console sessions. • Added VAAPI based encoder on AMD GPUs when using the open source drivers. 	<ul style="list-style-type: none"> • Updated Web client user interface to the Cloudscape design style. • Fixed memory leak inside the agent triggered by client reconnection. • Added support for systems using GDM3 when using virtual sessions on Ubuntu 20.04. • Fixed problem intermittently causing black screen in virtual session on Ubuntu 20.04. • Fixed a problem in the Web client causing a missing clipboard update when changing tab. • Fixed a problem with the Enter key of the numeric keypad.

Build numbers	New features	Changes and bug fixes
<ul style="list-style-type: none"> • nice-dcv-gl: 983 • nice-dcv-gltest: 301 • nice-dcv-simple-external-authenticator: 198 		

DCV 2022.1-13300 — August 4, 2022

Build numbers	Changes and bug fixes
<ul style="list-style-type: none"> • nice-dcv-server: 13300 • nice-dcv-client (Windows): 8261 • nice-dcv-viewer (macOS): 4279 • nice-dcv-viewer (Linux): 4251 • nice-xdcv: 433 • nice-dcv-gl: 973 • nice-dcv-gltest: 295 • nice-dcv-simple-external-authenticator: 193 	<ul style="list-style-type: none"> • Do not automatically unlock Windows when more than a collaborator is connected to a session. • Fixed a problem when the server fails to load the specified certificate file. • Fixed a problem causing audio distortion on the macOS client.

DCV 2022.1-13216 — July 21, 2022

Build numbers	Changes and bug fixes
<ul style="list-style-type: none"> nice-dcv-server: 13216 nice-dcv-client (Windows): 8261 nice-dcv-viewer (macOS): 4251 nice-dcv-viewer (Linux): 4251 nice-xdcv: 433 nice-dcv-gl: 966 nice-dcv-gltest: 295 nice-dcv-simple-external-authenticator: 193 	<ul style="list-style-type: none"> Fixed a problem in all clients that resulted in a failure to connect to NICE DCV server 2019.1 and older. Fixed a problem with SmartCard redirection on Windows server. Fixed a problem that could cause the streaming to fail when connecting to a NICE DCV server on a host with a GPU.

DCV 2022.1-13067 — June 29, 2022

Build numbers	New features	Changes and bug fixes
<ul style="list-style-type: none"> nice-dcv-server: 13067 nice-dcv-client (Windows): 8248 nice-dcv-viewer (macOS): 4241 nice-dcv-viewer 	<p>NICE DCV added the following features:</p> <ul style="list-style-type: none"> Added support for Ubuntu 22.04 and Rocky Linux 8.5 and higher for the server. Added support for Ubuntu 22.04 for the native client. Improved collaboration experience for the Windows, macOS and Linux native clients. 	<ul style="list-style-type: none"> Improved performance, up to a 30% reduction of overall CPU consumption on non-GPU servers. Log rotation can now be configured in the settings specifying a time interval or a size limit. Fixed problems in the QUIC transport which could cause the initial handshake to fail. Fixed a problem that could cause relative mouse motion on Linux server to not work as expected for some applications.

Build numbers	New features	Changes and bug fixes
(Linux): 4241 <ul style="list-style-type: none"> • nice-xdcv: 433 • nice-dcv-gl: 966 • nice-dcv-gltest: 295 • nice-dcv-simple-external-authenticator: 193 		

DCV 2022.0-12760 — May 23, 2022

Build numbers	Changes and bug fixes
<ul style="list-style-type: none"> • nice-dcv-server: 12760 • nice-dcv-client (Windows): 8145 • nice-dcv-viewer (macOS): 4131 • nice-dcv-viewer (Linux): 4131 • nice-xdcv: 424 • nice-dcv-gl: 961 	Changes: Fixed a problem preventing successful connection of the Web Client when specifying the web-url-path option.

Build numbers	Changes and bug fixes
<ul style="list-style-type: none"> nice-dcv-gltest: 291 nice-dcv-simple-external-authenticator: 188 	

DCV 2022.0-12627 — May 19, 2022

Build numbers	Changes and bug fixes
<ul style="list-style-type: none"> nice-dcv-server: 12627 nice-dcv-client (Windows): 8145 nice-dcv-viewer (macOS): 4131 nice-dcv-viewer (Linux): 4131 nice-xdcv: 424 nice-dcv-gl: 961 nice-dcv-gltest: 291 nice-dcv-simple-external-authenticator: 188 	<p>Changes:</p> <ul style="list-style-type: none"> Fixed some problems in the QUIC transport which could cause incorrect bandwidth estimation and visual artifacts. Fixed a problem with the Audio service in the installer of the Windows server which could cause the update process to fail. Fixed a problem with the USB handling in the installer of the Windows client which could cause the uninstall process to fail. Fixed a problem when saving a screenshot in the macOS and Linux clients. Updated the OpenSSL, zlib and gdk-pixbuf third party libraries.

DCV 2022.0-12123 — March 23, 2022

Build numbers	New features	Changes and bug fixes
<ul style="list-style-type: none"> nice-dcv-server: 12123 nice-dcv-client (Windows): 7920 nice-dcv-viewer (macOS): 3973 	<p>NICE DCV added the following features:</p> <ul style="list-style-type: none"> Added option to enable high color accuracy to the macOS and Linux clients. 	<p>Changes:</p> <ul style="list-style-type: none"> Improved bandwidth estimation and image quality when using the QUIC transport.

Build numbers	New features	Changes and bug fixes
<ul style="list-style-type: none"> nice-dcv-viewer (Linux): 3973 nice-xdcv: 424 nice-dcv-gl: 961 nice-dcv-gltest: 291 nice-dcv-simple-external-authenticator: 188 		<p>Fixes:</p> <ul style="list-style-type: none"> Fixed visual artifacts in console sessions on Linux when using NVIDIA drivers 510.xx. Fixed problem with DualShock 4 controllers connected via Bluetooth in the Windows native client. Fixed possible crash in the macOS client when enabling the webcam.

DCV 2022.0-11954 — February 23, 2022

Build numbers	New features	Changes and bug fixes
<ul style="list-style-type: none"> nice-dcv-server: 11954 nice-dcv-client (Windows): 7866 nice-dcv-viewer (macOS): 3929 nice-dcv-viewer (Linux): 3929 nice-xdcv: 424 nice-dcv-gl: 961 nice-dcv-gltest: 291 nice-dcv-simple-external-authenticator: 188 	<p>NICE DCV added the following features:</p> <ul style="list-style-type: none"> Game controller support for Windows Server and Windows native client. The NICE DCV Web Client now leverages WebCodecs on browsers that support it. Added option to enable high color accuracy to the Windows and Web clients. Improved collaboration experience: users get notified when someone joins the session 	<p>Changes:</p> <ul style="list-style-type: none"> TLS certificates can now be updated without restarting the NICE DCV Server. It is now possible to configure the NICE DCV Server to listen on a specific network interface or on specific IPv4 or IPv6 addresses. The 'DCV Printer' is now automatically configured also on Linux systems.

Build numbers	New features	Changes and bug fixes
	<ul style="list-style-type: none"> Added CentOS 8 Stream to the list of supported Linux distributions. 	<ul style="list-style-type: none"> The NICE DCV processes on Windows are now executed at higher priority. <p>Fixes:</p> <ul style="list-style-type: none"> Fixed a crash on agent restart on Windows 2016 when using instances with a GPU. Fixed a crash on Windows when logging out of a session while some USB devices are redirected from the NICE DCV Client. Normalize user names that contain a Windows domain when performing authorization checks. Improved relative mouse mode in the Windows Client. Fixed a problem with the synchronization of the CapsLock key.

DCV 2021.3-11591 — December 20, 2021

Build numbers	New features	Changes and bug fixes
<ul style="list-style-type: none"> nice-dcv-server: 11591 nice-dcv-client (Windows): 7801 	<p>NICE DCV added the following features:</p>	<ul style="list-style-type: none"> The init script for Linux virtual sessions does not load the user's bash profile

Build numbers	New features	Changes and bug fixes
<ul style="list-style-type: none"> nice-dcv-viewer (macOS): 3829 nice-dcv-viewer (Linux): 3829 nice-xdcv: 415 nice-dcv-gl: 952 nice-dcv-gltest: 284 nice-dcv-simple-external-authenticator: 176 	<ul style="list-style-type: none"> The user interface of the Web Client has been updated. EC2 G5 and G5g instances are now supported. Windows Server 2022 and Windows 11 are now supported operating systems. 	<ul style="list-style-type: none"> any more, thus avoiding recurring problems with environment variables overriding the system's default values. The nice-dcv-ext-authenticator now requires Python 3.

DCV 2021.2-11445 — November 18, 2021

Build numbers	Changes and bug fixes
<ul style="list-style-type: none"> nice-dcv-server: 11445 nice-dcv-client (Windows): 7792 nice-dcv-viewer (macOS): 3797 nice-dcv-viewer (Linux): 3797 nice-xdcv: 411 nice-dcv-gl: 946 nice-dcv-gltest: 279 nice-dcv-simple-external-authenticator: 160 	<p>Fixes:</p> <ul style="list-style-type: none"> Fixed a problem preventing the client from working correctly on macOS Monterey. Improved security in the server on Windows. Fixed a bug which could cause multi-monitor layouts to not be applied correctly, in particular when using the Web Client. Fixed a problem which could cause the Delete key to not work correctly with some Windows applications. Marked the Web client package on Linux as mutually exclusive with old versions of the server package, which included the Web client itself.

DCV 2021.2-11190 — October 11, 2021

Build numbers	Changes and bug fixes
<ul style="list-style-type: none">nice-dcv-server: 11190nice-dcv-client (Windows): 7788nice-dcv-viewer (macOS): 3776nice-dcv-viewer (Linux): 3776nice-xdcv: 411nice-dcv-gl: 946nice-dcv-gltest: 279nice-dcv-simple-external-authenticator: 160	<p>Fixes:</p> <ul style="list-style-type: none">Fixed a problem in the Windows client which prevented the user from dismissing the certificate validation dialog when connecting to a server with an expired certificate.Fixed a problem with the middle click button on Stylus pens not working as expected on native clients.Fixed a regression in Xdcv which prevented legacy X11 fonts to be loaded.Fixed a problem in the macOS and Linux clients with keyboard combinations not working correctly when using a keyboard layout which uses dead keys.

DCV 2021.2-11135 — September 24, 2021

Build numbers	Changes and bug fixes
<ul style="list-style-type: none">nice-dcv-server: 11135nice-dcv-client (Windows): 7781nice-dcv-viewer (macOS): 3740nice-dcv-viewer (Linux): 3740nice-xdcv: 408nice-dcv-gl: 944nice-dcv-gltest: 279nice-dcv-simple-external-authenticator: 160	<p>Fixes:</p> <ul style="list-style-type: none">Fixed a problem with QUIC packet size negotiation that can cause connectivity and performance problems when using a 2021.2 client to connect with an older server.Fixed a bug with NVIDIA device selection that could cause NVENC encoder to fail.Fixed problems on machines with Windows and a NVIDIA GPU that could cause

Build numbers	Changes and bug fixes
	<p>compression artifacts and color accuracy artifacts.</p> <ul style="list-style-type: none"> • Fixed a bug with modifier keys on Linux server which could cause some keyboard combinations to not work as expected. • Fixed a performance regression for macOS clients on machines with the M1 CPU. • Fixed a bug in the macOS client which would cause some keyboard combinations to not work as expected. • Fixed a problem with how touch events are handled in Linux virtual sessions that could cause termination of the session.

DCV 2021.2-11048 — September 01, 2021

Build numbers	New features	Changes and bug fixes
<ul style="list-style-type: none"> • nice-dcv-server: 11048 • nice-dcv-client (Windows): 7774 • nice-dcv-viewer (macOS): 3690 • nice-dcv-viewer (Linux): 3690 • nice-xdcv: 406 • nice-dcv-gl: 944 • nice-dcv-gltest: 279 • nice-dcv-simple-external-authenticator: 160 	<p>NICE DCV added the following features:</p> <ul style="list-style-type: none"> • Web client clipboard improvements. With these improvements, you can now copy and paste PNG format images using the NICE DCV web client on Google Chrome and Microsoft Edge. • A screenshot blocking feature for the Windows and macOS clients. This feature adds an additiona 	<p>Changes:</p> <ul style="list-style-type: none"> • The NICE DCV web client is now a separate package on Linux and an optional component in the Windows installer. With this change, customers can decide whether to deploy the web client. • The H.264 High Profile is now supported when the NVENC encoder is used. Using NVENC encoder with NVIDIA GPUs, you can

Build numbers	New features	Changes and bug fixes
	<p>l layer of security by preventing users from taking screenshots of NICE DCV session content. When enabled, any screenshots that a user capture result in a blank screen.</p> <ul style="list-style-type: none"> • Streaming quality improvements. Streaming quality improved specifically through better “build-to-lossless” performance when using the QUIC protocol. • A certificate-validation-policy option to specify the behavior of your client was added. You can use it when the server presents an untrusted X.509 certificate, such as a self-signed certificate. • The number of channels configured in the Audio Driver at run time can be changed. • The Pressure2K option was added to the dcvinput Xorg module. You can use this to change the pressure sensitivity range of the stylus from 0-65335 to 0-2048, for compatibility 	<p>reduce bandwidth usage while maintaining the same image quality.</p> <ul style="list-style-type: none"> • NICE DCV server now uses all available GPUs for compression on machines with more than one GPU. • All Windows drivers shipped with NICE DCV are now WHQL certified. • OpenSSL was updated to version 1.1.1. • Xdcv was updated to version 1.20.13 of XServer. <p>Fixes:</p> <ul style="list-style-type: none"> • Fixed a problem with numpad keys on macOS clients. • Fixed an issue that prevented some USB devices (for example, gamepads) to be properly redirected to Windows servers. • Fixed a bug where modifier keys couldn't be properly released on disconnection. • Fixed a crash in the Linux native client when using Ubuntu 20.04 and Intel GPUs.

Build numbers	New features	Changes and bug fixes
	<p>with applications, such as Mari and Nuke</p> <ul style="list-style-type: none"> • Support for the experimental WebCodecs API on Google Chrome and Microsoft Edge was added. When you enable this API in the browser, the NICE DCV web client can use it to accelerate video decoding and deliver higher frame rates. 	

DCV 2021.1-10851 — July 30, 2021

Build numbers	Changes and bug fixes
<ul style="list-style-type: none"> • nice-dcv-server: 10851 • nice-dcv-client (Windows): 7744 • nice-dcv-viewer (macOS): 3590 • nice-dcv-viewer (Linux): 3560 • nice-xdcv: 392 • nice-dcv-gl: 937 • nice-dcv-gltest: 275 • nice-dcv-simple-external-authenticator: 154 	<p>Changes:</p> <ul style="list-style-type: none"> • We improved stability on the Windows, Linux, and macOS clients. <p>Fixes:</p> <ul style="list-style-type: none"> • Fixed a bug that caused screen flickering with AMD and NVIDIA graphic adapters on Windows servers. • Fixed a sporadic issue when connecting to a Linux server running multiple sessions. • Fixed bugs that were related to handling of non-western keyboard layouts on Linux server.

Build numbers	Changes and bug fixes
	<ul style="list-style-type: none"> Fixed visual artifact on the connection window in the Windows client. Fixed several bugs and improved device compatibility in the USB redirection driver on Windows.

DCV 2021.1-10598 — June 10, 2021

Build numbers	Changes and bug fixes
<ul style="list-style-type: none"> nice-dcv-server: 10598 nice-dcv-client (Windows): 7713 nice-dcv-viewer (macOS): 3473 nice-dcv-viewer (Linux): 3473 nice-xdcv: 392 nice-dcv-gl: 937 nice-dcv-gltest: 275 nice-dcv-simple-external-authenticator: 154 	<ul style="list-style-type: none"> Fixed a problem in the Windows installer of the server to prefill the <code>session_owner</code> field with the current user. Improved the overall stability of the macOS and Linux clients.

DCV 2021.1-10557 — May 31, 2021

Build numbers	New features	Changes and bug fixes
<ul style="list-style-type: none"> nice-dcv-server: 10557 nice-dcv-client (Windows): 7713 nice-dcv-viewer (macOS): 3450 nice-dcv-viewer (Linux): 3454 nice-xdcv: 392 	<ul style="list-style-type: none"> NICE DCV added client option to enable accurate Audio/Video synchronization when connecting to a server with a GPU. NICE DCV added support for microphone on Linux console sessions. 	<ul style="list-style-type: none"> Reduced CPU usage on Windows server hosts without a GPU. Fixed a problem with reading <code>.dcv</code> connection files in the macOS and Linux clients.

Build numbers	New features	Changes and bug fixes
<ul style="list-style-type: none"> nice-dcv-gl: 937 nice-dcv-gltest: 275 nice-dcv-simple-external-authenticator: 154 		<ul style="list-style-type: none"> Added fallback to software decoding for macOS machines that don't support hardware accelerated decoding. Added support for macOS client to read CA certificates that are stored in the system keychain.

DCV 2021.0-10242 — April 12, 2021

Build numbers	New features	Changes and bug fixes
<ul style="list-style-type: none"> nice-dcv-server: 10242 nice-dcv-client (Windows): 7643 nice-dcv-viewer (macOS): 3186 nice-dcv-viewer (Linux): 3294 nice-xdcv: 380 nice-dcv-gl: 912 nice-dcv-gltest: 266 nice-dcv-simple-external-authenticator: 134 	<ul style="list-style-type: none"> Added webcam redirection support for Windows NICE DCV servers. Added printer redirection support for Linux NICE DCV servers. Added support for M1 processors on macOS clients. Added multi-monitor display support for macOS clients. 	<ul style="list-style-type: none"> Optimized GPU and CPU resource usage on Linux servers and on Amazon EC2 instances with an NVIDIA GPU. Added support for GPU accelerated video encoding using AMD GPUs on Amazon EC2 G4ad instances for Linux NICE DCV servers. Optimized audio processing to reduce audio latency Changed the default for clients to the QUIC protocol if the protocol is enabled on the server.

Build numbers	New features	Changes and bug fixes
		<ul style="list-style-type: none"> • Added a new <code>get-screenshot</code> command to the DCV command line tool. • Added a force logout option that uses the <code>--logout-user</code> option of the <code>close-session</code> command. You can use this option when closing a console session.

DCV 2020.2-9662 — December 04, 2020

Build numbers	Changes and bug fixes
<ul style="list-style-type: none"> • nice-dcv-server: 9662 • nice-dcv-client (Windows): 7490 • nice-dcv-viewer (macOS): 2117 • nice-dcv-viewer (Linux): 3007 • nice-xdcv: 359 • nice-dcv-gl: 881 • nice-dcv-gltest: 259 • nice-dcv-simple-external-authenticator: 125 	<ul style="list-style-type: none"> • Enhanced the security protocols used in the web browser client. • Increased performance and robustness of Amazon EC2 G4ad instances used with the Windows client. • Fixed a problem with port selection in the connection settings dialog of the Windows client.

DCV 2020.2-9508 — November 11, 2020

Build numbers	New features	Changes and bug fixes
<ul style="list-style-type: none"> • nice-dcv-server: 9508 • nice-dcv-client (Windows): 7459 	<ul style="list-style-type: none"> • Added support for the QUIC (UDP-based) transport protocol. 	<ul style="list-style-type: none"> • Changed the default the NICE DCV frame rate limiter to 60 FPS for console

Build numbers	New features	Changes and bug fixes
<ul style="list-style-type: none">• nice-dcv-viewer (macOS): 2078• nice-dcv-viewer (Linux): 1737• nice-xdcv: 359• nice-dcv-gl: 881• nice-dcv-gltest: 259• nice-dcv-simple-external-authenticator: 125	<ul style="list-style-type: none">• Added support for SLES 15 and Ubuntu 20.4.• Added smart card support for Windows NICE DCV servers.	<p>sessions that are hosted on servers and EC2 instances with an NVIDIA GPU.</p> <ul style="list-style-type: none">• Optimized the GPU and CPU resources used on Windows NICE DCV servers that are hosted on EC2 instances with an NVIDIA GPU.• Added the <code>list-endpoints</code> NICE DCV CLI command. This lists the current active endpoints.• The <code>version</code> NICE DCV CLI command supports the <code>--json</code> option.• On Linux servers, the <code>create-session</code> NICE DCV CLI command now supports the <code>--disable-login-monitor</code> option.• Improved compatibility with different display managers on Linux NICE DCV servers.• Fixed several issues in the handling of keyboard input.• The USB devices allow list file is now dynamically reloaded.

DCV 2020.1-9012 — September 30, 2020

Build numbers	Changes and bug fixes
<ul style="list-style-type: none"> nice-dcv-server: 9012 nice-dcv-client (Windows): 7342 nice-dcv-viewer (macOS): 1986 nice-dcv-viewer (Linux): 1545 nice-xdcv: 338 nice-dcv-gl: 840 nice-dcv-gltest: 246 nice-dcv-simple-external-authenticator: 111 	<ul style="list-style-type: none"> Added missing macOS client icons.

DCV 2020.1-9012 — August 24, 2020

Build numbers	Changes and bug fixes
<ul style="list-style-type: none"> nice-dcv-server: 9012 nice-dcv-client (Windows): 7342 nice-dcv-viewer (macOS): 1910 nice-dcv-viewer (Linux): 1545 nice-xdcv: 338 nice-dcv-gl: 840 nice-dcv-gltest: 246 nice-dcv-simple-external-authenticator: 111 	<ul style="list-style-type: none"> Fixed Amazon S3 access in AWS GovCloud Region Web-based client improvements

DCV 2020.1-8942 — August 03, 2020

Build numbers	New features	Changes and bug fixes
<ul style="list-style-type: none"> nice-dcv-server: 8942 	<ul style="list-style-type: none"> The Linux NICE DCV server now supports AWS 	<ul style="list-style-type: none"> Added support for the new NICE DCV Virtual Display

Build numbers	New features	Changes and bug fixes
<ul style="list-style-type: none"> • nice-dcv-client (Windows): 7342 • nice-dcv-viewer (macOS): 1910 • nice-dcv-viewer (Linux): 1545 • nice-xdcv: 338 • nice-dcv-gl: 840 • nice-dcv-gltest: 246 • nice-dcv-simple-external-authenticator: 111 	<p>Graviton2-based Arm instances, such as M6g, C6g, and R6g. For more information, see AWS Graviton Processor.</p> <ul style="list-style-type: none"> • Added support for RHEL 8.x and CentOS 8.x on Linux NICE DCV server. • Added support for printer redirection when using a Windows NICE DCV server and the Windows NICE DCV client. • Added stylus support with pressure sensitivity on macOS and Linux native NICE DCV client. • Added surround sound 5.1 support for Linux NICE DCV server and Linux NICE DCV client. • Added touch screen support for Linux NICE DCV native client. • You can now associate a custom name to a NICE DCV session. • Support for hardware accelerated decoding and rendering on the macOS native NICE DCV client. 	<p>driver on Amazon EC2 instances that don't have a GPU.</p> <ul style="list-style-type: none"> • Resolved the issue that caused visual artifacts as a result of colorspace conversion when using the NVENC encoder. • The <code>dcv list-sessions</code> command now always includes the console session, if one is present • On newer Linux distributions, the agent for console sessions is now started as part of the desktop session to better support newer display managers, such as GDM3. • Native clients now automatically open when activating a URL with the <code>dcv://</code> scheme. • Improved how the macOS native client and web client handle keyboard modifiers. • Improved visual and fbconfig selection in DCV-GL to improve support for some applications. • Reduced CPU usage during file transfer

Build numbers	New features	Changes and bug fixes
		<ul style="list-style-type: none"> Improved WebGL rendering in the web browser client to reduce resource usage.

DCV 2020.0-8428 — April 16, 2020

Build numbers	New features	Changes and bug fixes
<ul style="list-style-type: none"> nice-dcv-server: 8428 nice-dcv-client (Windows): 7238 nice-dcv-viewer (macOS): 1716 nice-dcv-viewer (Linux): 1358 nice-xdcv: 296 nice-dcv-gl: 759 nice-dcv-gltest: 229 nice-dcv-simple-external-authenticator: 87 	<ul style="list-style-type: none"> Added on-screen stylus and touch support on Linux server. Added 7.1 surround sound playback support on Windows server to Windows native client. Added hardware acceleration and stylus support on Linux native client. Added a new API command to set display layout on the server side. Added multi-monitor web client display support on the Microsoft Edge browser (version 79.0.309 or later). 	<ul style="list-style-type: none"> The toolbar grip on the Windows client can now be hidden while in full screen mode. Added NTLM proxy support on Windows native client. Improved support for Windows headless physical hosts using NVIDIA adapters. Removed support for the legacy NVIDIA NvIFR library. Added support for Windows Graphic Capture API on latest Windows 10. Added support for Amazon EC2 Instance Metadata Service (IMDS) v2 on EC2 instances. DCV CLI provides new <code>on-client-connected</code> / <code>disconnected</code> commands to detect

Build numbers	New features	Changes and bug fixes
		<p>when a client connects or disconnects from a session.</p> <ul style="list-style-type: none"> • Added support for specifying the host name to bind certificates for the external authenticator. • DCV-GL now uses the GL Vendor-Neutral Dispatch library (GLvnd) on systems that support it.

DCV 2019.1-7644 — October 24, 2019

Build numbers	Changes and bug fixes
<ul style="list-style-type: none"> • nice-dcv-server: 7644 • nice-dcv-client (Windows): 7114 • nice-dcv-viewer (macOS): 1535 • nice-dcv-viewer (Linux): 1124 • nice-xdcv: 226 • nice-dcv-gl: 544 • nice-dcv-gltest: 220 • nice-dcv-simple-external-authenticator: 77 	<ul style="list-style-type: none"> • Fixed an issue in the integration API used by NICE EnginFrame and other session managers. • Fixed an issue with the 32-bit version of the Windows native client.

DCV 2019.1-7423 — September 10, 2019

Build numbers	Changes and bug fixes
<ul style="list-style-type: none"> • nice-dcv-server: 7423 • nice-dcv-client (Windows): 7087 • nice-dcv-viewer (macOS): 1535 	<ul style="list-style-type: none"> • Improved security for DCV server on Windows.

Build numbers	Changes and bug fixes
<ul style="list-style-type: none"> nice-dcv-viewer (Linux): 1124 nice-xdcv: 226 nice-dcv-gl: 544 nice-dcv-gltest: 220 nice-dcv-simple-external-authenticator: 77 	<ul style="list-style-type: none"> Fixed a rendering problem with Autodesk Maya on Linux. Added improvements and bug fixes related to keyboard handling.

DCV 2019.0-7318 — August 5, 2019

Build numbers	New features	Changes and bug fixes
<ul style="list-style-type: none"> nice-dcv-server: 7318 nice-dcv-client (Windows): 7059 nice-dcv-viewer (macOS): 1530 nice-dcv-viewer (Linux): 968 nice-xdcv: 224 nice-dcv-gl: 529 nice-dcv-gltest: 218 nice-dcv-simple-external-authenticator: 72 	<ul style="list-style-type: none"> Multiple monitor support on Web client. Stylus input support on Windows Server 2019. Audio in/out on macOS and Linux native clients. Enhanced clipboard capability on Linux server (middle-click paste). 	<ul style="list-style-type: none"> Added improved compatibility for pressure sensitivity for Windows touch input. Improved behavior on systems that have heterogeneous graphic adapters on Windows. Reduced time required to detect inactive connections (for example, in response to changes from wired to Wi-Fi networks on the client). Reduced logging when the cursor icon can't be captured on Linux. Support for disabling the Composite extension in the virtual sessions Xdcv component. Added the option to a limit on the number of concurrent virtual sessions.

Build numbers	New features	Changes and bug fixes
		<ul style="list-style-type: none"> • Improved script compatibility for systems with Bash 5 installed. • Changed default for OpenGL and GLES to be detected and used automatically for rendering on the Linux client. • Updated the DCV-GL on-screen buffer when the visibility of a GL window changes. • Fixed the mouse wheel detection in the Windows client on Windows 7. • Fixed a problem that caused the Windows client to fail when loading libraries on some Windows 7 systems. • Improved printing on the Windows client when printing documents with landscape orientation.

DCV 2017.4-6898 — April 16, 2019

Build numbers	New features	Changes and bug fixes
<ul style="list-style-type: none"> • nice-dcv-server: 6898 • nice-dcv-client (Windows): 6969 	<ul style="list-style-type: none"> • New native client for macOS. 	<ul style="list-style-type: none"> • The Windows native client now uses hardware acceleration for decoding

Build numbers	New features	Changes and bug fixes
<ul style="list-style-type: none"> • nice-dcv-viewer (macOS): 1376 • nice-dcv-viewer (Linux): 804 • nice-xdcv: 210 • nice-dcv-gl: 490 • nice-dcv-gltest: 216 • nice-dcv-simple-external-authenticator: 70 		<p>and rendering, if available in the system.</p> <ul style="list-style-type: none"> • The dcv command line tool now uses the same options and output format on both Windows and Linux. • The dcv command line tool now reports information about licenses. • Clients now show a warning to the user before disconnection due to inactivity. • Improved support for keyboard combinations that use multiple modifiers. • Improved robustness of the interaction with the Reprise License Manager for communication failures. • The <code>dcvusers</code> command line tool now defaults to saving data to the dcv user home directory on Linux. • Followed the same ordering used by the <code>nvidia-smi</code> tool when using the NVENC hardware encoder with multiple GPUs on Linux. • The Linux client now receives and handles printed files from the Windows DCV printer.

DCV 2017.3-6698 — February 24, 2019

Build numbers	New features	Changes and bug fixes
<ul style="list-style-type: none"> • nice-dcv-server: 6698 • nice-dcv-client: 5946 • nice-dcv-viewer (Linux): 683 • nice-xdcv: 207 • nice-dcv-gl: 471 • nice-dcv-gltest: 210 • nice-dcv-simple-external-authenticator: 66 	<ul style="list-style-type: none"> • Added support for Kerberos (GSSAPI) authentication. • Added support for touch events on Windows versions that support it. • Automatically unlock Windows sessions when using system authentication (Windows Credential Provider). 	<ul style="list-style-type: none"> • Added an option to opt in to Y'UV444 encoding. • The EL6 RPM now includes the NVENC encoder module. • Windows system authentication now accepts the <code>name@domain</code> format. • Yubikey USB devices are now added to the allow list. • Improved Japanese keyboard support. • Input authorization permissions are more fine-grained. Added <code>pointer</code> permission to handle virtual cursors. Relative mouse mode depends on mouse (for motion injection) and <code>pointer</code> (for motion feedback). Added <code>keyboard-sas</code> permission to handle SAS on Windows (<code>Control+A</code> <code>lt+ Del</code>). <code>keyboardsas</code> depends on keyboard permission. • Fixed a problem with empty clipboard events in the Web client on browsers that

Build numbers	New features	Changes and bug fixes
		<p>support the async clipboard API.</p> <ul style="list-style-type: none">• Fixed a race on the capture module that prevented clients from receiving the first frame.• Improvements to handling of concurrent file storage transfers.• Fixed NvIFR on Windows with newer NVIDIA drivers. New drivers changed behavior. The driver version is now detected automatically and memory handling is performed accordingly.• Never stop retrying re-acquiring an RLM license token. This allows you to recover from a <code>licensing error</code> state even after extended time periods.• Added an option to set full screen keyboard shortcut in the Windows client.• Improved auto-fit logic when dragging window across multiple monitors in the Windows client.• Fixed the <code>prompt-reconnect</code> option when disconnection is not triggered by Ulin the Windows client.

Build numbers	New features	Changes and bug fixes
		<ul style="list-style-type: none"> • Fixed DCV-GL incompatibility with NVIDIA driver 410.xx. • Fixed regressions in DCV-GL with the Matlab and Blender applications.

DCV 2017.2-6182 — October 8, 2018

Build numbers	New features	Changes and bug fixes
<ul style="list-style-type: none"> • nice-dcv-server: 6182 • nice-dcv-client: 5890 • nice-dcv-viewer (Linux): 503 • nice-xdcv: 180 • nice-dcv-gl: 427 • nice-dcv-gltest: 201 • nice-dcv-simple-external-authenticator: 58 	<ul style="list-style-type: none"> • Added audio playback support on Linux virtual sessions. • Improved smart card performance. • Added file transfer support on the Linux client. 	<ul style="list-style-type: none"> • Improvements and bug fixes related to keyboard handling. • Changing the log level in the configuration no longer requires a server restart. • The Windows server installer now skips installation of Microsoft C runtime redistributable if it's already installed. • When running on EC2, if accessing S3 for the license fails, a notification is displayed in the user interface. • The Linux dcv command line tool now supports <code>list-connections</code> and <code>describe-session</code> sub-commands and includes

Build numbers	New features	Changes and bug fixes
		<p>an option to emit JSON output.</p> <ul style="list-style-type: none">• Added a <code>cuda-devices</code> setting in the <code>display</code> section. This configures the server to distribute NVENC encoding over different CUDA devices.• Improved robustness of session creation code when handling multiple concurrent commands.• Increased the default clipboard limit to 20 MB.• The Windows client now detects legacy <code>.dcv</code> files and launches the DCV 2016 Endstation (if installed).• The DCV simple external authenticator now always uses the system Python interpreter instead of the one set in the environment.• Improved the read-back strategy of DCV-GL for improved performance and robustness.• DCV-GL now checks if a window changed size after a front buffer readback. This fixes a rendering problem with the Coot application.

DCV 2017.1-5870 — August 6, 2018

Build numbers	New features	Changes and bug fixes
<ul style="list-style-type: none"> nice-dcv-server: 5870 nice-dcv-client: 5813 nice-dcv-viewer (Linux): 450 nice-xdcv: 170 nice-dcv-gl: 366 nice-dcv-gltest: 198 nice-dcv-simple-external-authenticator: 53 	<p>Released package for Ubuntu 18.04. When working in console mode, the system must be configured to use LightDM or another display manager of your choice because GDM does not expose the required X11 display information. Virtual sessions are not affected by this limitation.</p>	<ul style="list-style-type: none"> The license setting is now read when a session is created. This allows the administrator to change this setting without restarting the server. Resolved stability problem in the Windows client that caused the program to exit unexpectedly on some systems. Reduced logging in a possible error condition.

DCV 2017.1-5777 — June 29, 2018

Build numbers	New features	Changes and bug fixes
<ul style="list-style-type: none"> nice-dcv-server: 5777 nice-dcv-client: 5777 nice-dcv-viewer (Linux): 438 nice-xdcv: 166 nice-dcv-gl: 366 nice-dcv-gltest: 189 nice-dcv-simple-external-authenticator: 51 	<ul style="list-style-type: none"> Added a Linux native client. Added support for 3DConnexion mouses and USB storage devices. Windows session locked automatically when the last client disconnects. 	<ul style="list-style-type: none"> Performance improvements in the Linux version. Changed the default HW encoder on NVIDIA devices to NVENC to avoid problems with NvIFR in new NVIDIA drivers. Improved smart card support on Linux. Fixed file permissions for uploaded files when using Linux console sessions.

DCV 2017.0-5600 — June 4, 2018

Build numbers	New features	Changes and bug fixes
<ul style="list-style-type: none"> nice-dcv-server: 5600 nice-dcv-client: 5600 nice-xdcv: 160 nice-dcv-gl: 279 nice-dcv-gltest: 184 nice-dcv-simple-external-authenticator: 48 	<ul style="list-style-type: none"> Added support for multiple monitors on Linux. Windows client performance improvements. Used new Clipboard API on Chrome 66+. Added NVENC encoder for Windows. 	<ul style="list-style-type: none"> Usage on EC2 now requires ability to reach S3 from the instance running DCV server. Performance improvements to server frame processing and Windows client decoding. Fixed keyboard issues related to NumPad and blocked modifiers. Prevent file descriptor leak when using an external authenticator on Linux. Fixed possible errors in smart card connection.

DCV 2017.0-5121 — March 18, 2018

Build numbers	New features	Changes and bug fixes
<ul style="list-style-type: none"> nice-dcv-server: 5121 nice-dcv-client: 5121 nice-xdcv: 146 nice-dcv-gl: 270 nice-dcv-gltest: 184 nice-dcv-simple-external-authenticator: 46 	<ul style="list-style-type: none"> Windows native client is now DPI aware. Added support for relative mouse movement mode. 	<ul style="list-style-type: none"> Prevented hang on Ansys cfx5solve on Linux. Fixed possible agent hang on Windows 10. Improved the Web Client user interface. Normalized Windows user name when a domain is specified.

Build numbers	New features	Changes and bug fixes
		<ul style="list-style-type: none">• Fixed the external authenticator on RHEL6.

DCV 2017.0-4334 — January 24, 2018

Build numbers	Changes and bug fixes
<ul style="list-style-type: none">• nice-dcv-server: 4334• nice-dcv-client: 4334• nice-xdcv: 137• nice-dcv-gl: 254• nice-dcv-gltest: 184• nice-dcv-simple-external-authenticator: 45	<ul style="list-style-type: none">• Improved keyboard handling.• Fixed DBus problem on RHEL6 where closing of a session doesn't allow a new one to be created.• Improved support for SOCKS5 proxy on the native client.• Addressed the bug that cause crashes on Headwave when running on virtual sessions and on Chimera when running on virtual sessions.• Improved font support on virtual sessions.

DCV 2017.0-4100 — December 18, 2017

Build numbers
<ul style="list-style-type: none">• nice-dcv-server: 4100• nice-dcv-client: 4100• nice-xdcv: 118• nice-dcv-gl: 229• nice-dcv-gltest: 158• nice-dcv-simple-external-authenticator: 35

Document history

The following table describes the documentation for this release of NICE DCV.

Change	Description	Date
NICE DCV Version 2023.1	NICE DCV fixes to the Windows Client 2023.1. For more information, see DCV 2023.1-16388 — March 5, 2024 .	March 5, 2024
NICE DCV Version 2023.1	NICE DCV fixes to 2023.1. For more information, see DCV 2023.1-16388 — December 19, 2023 .	December 19, 2023
NICE DCV Version 2023.1	NICE DCV 2023.1 is now available. For more information, see DCV 2023.1-16220 — November 9, 2023 .	November 9, 2023
NICE DCV Version 2023.0	NICE DCV no longer supports end of life operating systems.	June 30, 2023
NICE DCV Version 2023.0	NICE DCV fixes to 2023.0. For more information, see DCV 2023.0-15487 — June 29, 2023 .	June 29, 2023
NICE DCV Version 2023.0	NICE DCV fixes to 2023.0. For more information, see DCV 2023.0-15065 — May 3, 2023 .	May 3, 2023
NICE DCV Version 2023.0	NICE DCV updates and fixes to 2023.0. For more information, see DCV 2023.0-14887 — April 21, 2023 .	April 21, 2023

Change	Description	Date
	on, see DCV 2023.0-15022 — April 21, 2023.	
NICE DCV Version 2023.0	NICE DCV 2023.0 is now available. For more information, see DCV 2023.0-14852 — March 28, 2023.	March 28, 2023
NICE DCV Version 2022.2	NICE DCV 2022.2 is now available. For more information, see DCV 2022.2-13907 — November 11, 2022.	November 11, 2022
NICE DCV Version 2022.1	NICE DCV 2022.1 is now available. For more information, see DCV 2022.1-13067 — June 29, 2022.	June 29, 2022
NICE DCV Version 2022.0	NICE DCV 2022.0 is now available. For more information, see DCV 2022.0-11954 — February 23, 2022.	February 23, 2022
NICE DCV Version 2021.3	NICE DCV 2021.3 is now available. For more information, see DCV 2021.3-11591 — December 20, 2021.	December 20, 2021
NICE DCV Version 2021.2	NICE DCV 2021.2 is now available. For more information, see DCV 2021.2-11048 — September 01, 2021.	September 01, 2021
NICE DCV Version 2021.1	NICE DCV 2021.1 is now available. For more information, see DCV 2021.1-10557 — May 31, 2021.	May 31, 2021

Change	Description	Date
NICE DCV Version 2021.0	NICE DCV 2021.0 is now available. For more information, see DCV 2021.0-10242 — April 12, 2021 .	April 12, 2021
NICE DCV Web Client SDK	The NICE DCV Web Client SDK is now available. The NICE DCV Web Client SDK is a JavaScript library that you can use to develop your own NICE DCV web browser client applications that your end users can use to connect to and interact with a running NICE DCV session. For more information, see the NICE DCV Web Client SDK Developer Guide .	March 24, 2021
NICE DCV Version 2020.2	NICE DCV 2020.2 is now available. For more information, see DCV 2020.2-9508 — November 11, 2020 .	November 11, 2020
NICE DCV Version 2020.1	NICE DCV 2020.1 is now available. For more information, see DCV 2020.1-8942 — August 03, 2020 .	August 03, 2020

Change	Description	Date
NICE DCV Version 2020.0	NICE DCV 2020.0 includes support for surround sound 7.1, touch and stylus, and multi-monitor using the new Microsoft Edge browser. For more information, see Installing the NICE DCV Server in the <i>NICE DCV Administrator Guide</i> .	April 16, 2020
HTTP response headers	The NICE DCV server can be configured to send additional HTTP response headers.	August 26, 2019
macOS client	NICE DCV now offers a macOS client. For more information, see macOS Client in the <i>NICE DCV User Guide</i> .	April 18, 2019
Smart card caching	The NICE DCV server can now cache smart card data received from the client to help improve performance. For more information, see Configuring Smart Card Caching in the <i>NICE DCV Administrator Guide</i> .	October 08, 2018
Linux client	NICE DCV offers Linux clients for RHEL 7, CentOS 7, SLES 12, and Ubuntu 16.04/18.04. For more information, see Linux Client in the <i>NICE DCV User Guide</i> .	August 29, 2018

Change	Description	Date
Updated Parameter reference	The parameter reference was updated. For more information, see NICE DCV Server Parameter reference in the <i>NICE DCV Administrator Guide</i> .	August 07, 2018
USB remotization	NICE DCV enables clients to use specialized USB devices, such as 3D pointing devices or graphic tablets. For more information, see Enabling USB Remotization in the <i>NICE DCV Administrator Guide</i> .	August 07, 2018
Initial release of NICE DCV	First publication of this content.	June 05, 2018