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# NICE DCV

## User Guide



## **NICE DCV: User Guide**

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# 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 \(p. 1\)](#)
- [Step 2: Choose a NICE DCV Client \(p. 1\)](#)

## 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 be able to connect to it. Contact your NICE DCV administrator if you do not have the following information:

- The NICE DCV server's IP address or host name
- The port over which the NICE DCV server is configured to communicate. Port 8443 is the default port used by the NICE DCV server.
- The session ID
- A user name and password 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 native Windows client
- A web browser client
- A Linux client
- A macOS client

For more information about the available clients, see [NICE DCV Clients \(p. 2\)](#).

After you have chosen your preferred 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 \(p. 8\)](#).

# 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 best suits your needs.

## Topics

- [Requirements \(p. 2\)](#)
- [Supported Features \(p. 3\)](#)
- [Windows Client \(p. 4\)](#)
- [Web Browser Client \(p. 5\)](#)
- [Linux Client \(p. 6\)](#)
- [macOS Client \(p. 7\)](#)

## Requirements

For a good user experience with NICE DCV, ensure that the client computers meet the following minimum requirements. Keep in mind that your experience is largely dependent on the number of pixels streamed from the NICE DCV server to the NICE DCV client.

	Native Windows client	Web browser client	Linux client	macOS client
<b>Software</b>	<p>The Native Windows client is supported on 32-bit and 64-bit versions of the following operating systems:</p> <ul style="list-style-type: none"> <li>• Windows 7</li> <li>• Windows 8.1</li> <li>• Windows 10</li> </ul> <p>The client also requires the following additional software:</p> <ul style="list-style-type: none"> <li>• .NET Framework 4.6.2</li> <li>• Microsoft Visual C ++ Redistributable for Visual Studio. For more information and download instructions, see</li> </ul>	<p>The web browser client is supported on the following browsers across all desktop operating systems:</p> <ul style="list-style-type: none"> <li>• Firefox</li> <li>• Chrome</li> <li>• Edge</li> <li>• Internet Explorer 11</li> <li>• Safari 11</li> </ul> <p>The web browser client also requires WebGL and asm.js.</p> <p><b>Note</b> The web browser client is not supported on mobile operating systems,</p>	<p>The Linux client is supported on the following modern Linux operating systems:</p> <ul style="list-style-type: none"> <li>• RHEL 7.x and CentOS 7.x</li> <li>• RHEL 8.x and CentOS 8.x</li> <li>• SUSE Linux Enterprise 15.x</li> <li>• Ubuntu 16.04, 18.04, and 20.04</li> </ul>	<p>The macOS client requires macOS High Sierra or later.</p>

	Native Windows client	Web browser client	Linux client	macOS client
	the <a href="#">Microsoft Support</a> website.	such as Android and iOS.		
<b>Network</b>	The client must be able to connect to the NICE DCV server, and it must be able to communicate over the required port (8443 by default).			

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	Windows client (p. 4)	Web browser client (p. 5)	Linux client (p. 6)	macOS client (p. 7)
<a href="#">Connect to Windows NICE DCV servers (p. 8)</a>	✓	✓	✓	✓
<a href="#">Connect to Linux NICE DCV servers (p. 8)</a>	✓	✓	✓	✓
<a href="#">QUIC UDP transport protocol (p. 8)</a>	✓	✗	✓	✓
<a href="#">Manage streaming modes (p. 12)</a>	✓	✓	✓	✓
<a href="#">Transfer files (p. 13)</a>	✓	✓	✓	✓
<a href="#">Print from sessions (p. 14)</a>	✓	✓	✓	✓
<a href="#">Copy and paste (p. 15)</a>	✓	✓	✓	✓
<a href="#">Smart card support (p. 16)</a>	✓	✗	✓	✓
<a href="#">USB remotization support (p. 19)</a>	✓ (installable client)	✗	✗	✗
<a href="#">Connection file support (p. 20)</a>	✓	✗	✓	✓
Stereo 2.0 audio playback	✓	✓	✓	✓
Surround sound audio playback	✓ (Up to 7.1)	✗	✓ (Up to 5.1)	✗
Stereo 2.0 audio recording (on Windows servers)	✓	✓	✓	✓
Touchscreen	✓ (Windows 8 and later)	✓ *	✓	✗
Stylus (on Linux and Windows 10 and Server 2019 servers)	✓ (Windows 10 and later)	✓ **	✓	✓

Feature	Windows client (p. 4)	Web browser client (p. 5)	Linux client (p. 6)	macOS client (p. 7)
Multiple monitor support	✓	✓	✓	✗

\* Supported with Opera, Firefox version 52 and later, and Edge version 18 and later, and Chrome version 22 and later.

\*\* Supported on Windows 10 only, with Edge version 79 and later and Chrome.

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 natively on the Windows operating system.

For more information about connecting to a NICE DCV session using the Windows client, see [Connecting to a NICE DCV Session Using the Windows Client \(p. 8\)](#).

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

### Contents

- [Installable Windows Client \(p. 4\)](#)
- [Portable Windows Client \(p. 5\)](#)

## Installable Windows Client

You can use an installation wizard to install the client. The wizard walks you through a series of steps that let you customize your client installation. Or you can use the command line to perform an unattended installation, which uses default settings to automate the installation procedure.

### To install the Windows client using the installation wizard

1. Download the [Windows client installer](#).
2. Run the installer.
3. On the **Welcome** screen, choose **Next**.
4. On the **End-User License Agreement** screen, read the license agreement and, 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** and choose **Will be installed on local hard drive, Next**. This installs the drivers required to support some specialized USB devices, such as 3D pointing devices and graphic tablets.

#### Note

Using specialized USB devices requires additional client and server configuration. For more information, see [Using USB Remotization \(p. 19\)](#).

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:\> msixexec.exe /i nice-dcv-client-Release-2020.2-7490.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. For example:

```
C:\> msixexec.exe /i nice-dcv-client-Release-2020.2-7490.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. The portable Windows client does not require installation. This enables you to copy the client to a USB drive and execute it directly from the USB drive using any Windows computer that meets the minimum requirements.

### To use the portable Windows client

1. Download the portable [Windows client zip file](#).
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. It does not require installation. The web browser client is supported on the following browsers across all desktop operating systems:

- Firefox
- Chrome
- Edge
- Internet Explorer 11
- Safari 11

For more information about connecting to a NICE DCV session using the web browser client, see [Connecting to a NICE DCV Session Using the Web Browser \(p. 9\)](#).

### 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 only allows you to copy and paste text to and from your clipboard.

- It uses the web browser's proxy configuration.

## Linux Client

The Linux client runs natively on the operating system and let you to connect to NICE DCV sessions hosted on Windows and Linux NICE DCV servers.

The Linux client is installed 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 more information about connecting to a NICE DCV session using the Linux client, see [Connecting to a NICE DCV Session Using the Linux Client \(p. 10\)](#).

### 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, you must import the NICE GPG key. Open a terminal window and import the NICE GPG key.

- RHEL 7.x/8.x, CentOS 7.x/8.x, 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 operating system.

- RHEL 7.x and CentOS 7.x

```
$ wget https://d1uj6qtbmh3dt5.cloudfront.net/2020.2/Clients/nice-dcv-viewer-2020.2.3007-1.el7.x86_64.rpm
```

- RHEL 8.x and CentOS 8.x

```
$ wget https://d1uj6qtbmh3dt5.cloudfront.net/2020.2/Clients/nice-dcv-viewer-2020.2.3007-1.el8.x86_64.rpm
```

- Ubuntu 16.04

```
$ wget https://d1uj6qtbmh3dt5.cloudfront.net/2020.2/Clients/nice-dcv-viewer_2020.2.3007-1_amd64.ubuntu1604.deb
```

- Ubuntu 18.04

```
$ wget https://d1uj6qtbmh3dt5.cloudfront.net/2020.2/Clients/nice-dcv-viewer_2020.2.3007-1_amd64.ubuntu1804.deb
```

- Ubuntu 20.04

```
$ wget https://d1uj6qtbmh3dt5.cloudfront.net/2020.2/Clients/nice-dcv-viewer_2020.2.3007-1_amd64.ubuntu2004.deb
```

- SUSE Linux Enterprise 15

```
$ curl-O https://d1uj6qtbmh3dt5.cloudfront.net/2020.2/Clients/nice-dcv-viewer-2020.2.3007-1.sles15.x86_64.rpm
```

### 3. Install the Linux client.

- RHEL 7.x and CentOS 7.x

```
$ sudo yum install nice-dcv-viewer-2020.2.3007-1.el7.x86_64.rpm
```

- RHEL 8.x and CentOS 8.x

```
$ sudo yum install nice-dcv-viewer-2020.2.3007-1.el8.x86_64.rpm
```

- Ubuntu 16.04

```
$ sudo dpkg --install nice-dcv-viewer_2020.2.3007-1_amd64.ubuntu1604.deb
```

- Ubuntu 18.04

```
$ sudo dpkg --install nice-dcv-viewer_2020.2.3007-1_amd64.ubuntu1804.deb
```

- Ubuntu 20.04

```
$ sudo dpkg --install nice-dcv-viewer_2020.2.3007-1_amd64.ubuntu2004.deb
```

- SUSE Linux Enterprise 15

```
$ sudo zypper install nice-dcv-viewer-2020.2.3007-1.sles15.x86_64.rpm
```

## macOS Client

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

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

For more information about connecting to a NICE DCV session using the macOS client, see [Connecting to a NICE DCV Session Using the macOS Client \(p. 11\)](#).

### To install the macOS client

1. Download the [macOS client installer](#).
2. Run the downloaded `.dmg` file.

If you get an error stating that the application cannot be installed because it is 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 have chosen your preferred NICE DCV client, you can use it to connect to and interact with a NICE DCV session.

## Topics

- [Connecting to a NICE DCV Session \(p. 8\)](#)
- [Managing Streaming Modes \(p. 12\)](#)
- [Transferring Files \(p. 13\)](#)
- [Printing \(p. 14\)](#)
- [Copying and Pasting \(p. 15\)](#)
- [Using a Smart Card \(p. 16\)](#)
- [Using Multiple Screens \(p. 18\)](#)
- [Using USB Remotization \(p. 19\)](#)
- [Using a Connection File \(p. 20\)](#)

## Connecting to a NICE DCV Session

After the NICE DCV session is 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 \(p. 1\)](#).

If you are connecting to a console session, contact your NICE DCV server administrator to ensure that the session has been started and to confirm the server and session details. If you are 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 \(p. 8\)](#)
- [Connecting to a NICE DCV Session Using the Web Browser \(p. 9\)](#)
- [Connecting to a NICE DCV Session Using the Linux Client \(p. 10\)](#)
- [Connecting to a NICE DCV Session Using the macOS Client \(p. 11\)](#)

## Connecting to a NICE DCV Session Using the Windows Client

The steps for connecting to a NICE DCV session are the same for 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 proxy server's hostname or IP address and communication port. If the HTTP proxy server requires authentication, select the **Proxy server requiring password** check box and enter your user name and password.
- To connect to the NICE DCV server through a specific SOCKS5 proxy server, choose **Get through SOCKSv5 proxy**. Specify the proxy server's hostname or IP address and communication port. If the SOCKSv5 proxy server requires authentication, select the **Proxy server requiring password** check box and enter your user name and password.
- To use the QUIC transport protocol (which is based on UDP) for data transport, choose the **Advanced** tab, and then choose **QUIC (with Datagram Extension)**.

If you choose QUIC, authentication traffic is still transported over the WebSocket (TCP) port. By default, both QUIC and WebSocket traffic is transported over port 8443. If your administrator configured the NICE DCV server to use different ports, specify the ports to use.

You can only use QUIC if it has been enabled on the server. 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
```

For example, the following connects to a session named `my-session`, which is hosted on a NICE DCV server with the hostname `my-dcv-server.com`, over port 8443:

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

4. Choose **Connect**.
5. Enter your user name and password and choose **Login**.
  - Note**  
By default, the connection is terminated after three unsuccessful login attempts. To try again, restart the connection.
6. If you are prompted to verify the server's certificate, confirm the certificate's fingerprint with your NICE DCV administrator. If the fingerprint is valid, choose **Trust**.

## Connecting to a NICE DCV Session Using the Web Browser

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 your web browser's documentation.

### **Note**

The web browser client does not support the QUIC (UDP) transport protocol.

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

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

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

For example, the following URL connects to a session named `my-session`, which is hosted on a NICE DCV server with the hostname `my-dcv-server.com`, over port 8443:

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

2. Enter your user name and password 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 is not trusted. If you're unsure about the authenticity of the certificate, confirm it with your NICE DCV administrator. Proceed if it is safe to do so.

**Note**

This step varies depending on the web browser that you are 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 proxy server's hostname or IP address, and communication port. If the HTTP proxy server requires authentication, select the **Proxy server requiring password** check box and enter your user name and password.
  - To connect to the NICE DCV server through a specific HTTPS proxy server, choose **Get through web proxy (HTTPS)**. Specify the proxy server's hostname or IP address, and communication port. If the web proxy server requires authentication, select the **Proxy server requiring password** check box and enter your user name and password.
  - To use the QUIC transport protocol (which is based on UDP) for data transport, choose the **Advanced** tab, and then choose **QUIC (with Datagram Extension)**.

If you choose QUIC, authentication traffic is still transported over the WebSocket (TCP) port. By default, both QUIC and WebSocket traffic is transported over port 8443. If your administrator configured the NICE DCV server to use different ports, specify the ports to use.

You can only use QUIC if it has been enabled on the server. 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
```

For example, the following connects to a session named `my-session`, which is hosted on a NICE DCV server with the hostname `my-dcv-server.com`, over port 8443:

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

4. Choose **Connect**.
5. Enter your user name and password and choose **Login**.

**Note**

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

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

## 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 cannot be opened because it is 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 proxy server's host name or IP address, and communication port. If the HTTP proxy server requires authentication, select the **Proxy server requiring password** check box and enter your user name and password.
  - To connect to the NICE DCV server through a specific HTTPS proxy server, choose **Get through web proxy (HTTPS)**. Specify the proxy server's host name or IP address, and communication port. If the web proxy server requires authentication, select the **Proxy server requiring password** check box and enter your user name and password.
  - To use the QUIC transport protocol (which is based on UDP) for data transport, choose the **Advanced** tab, and then choose **QUIC (with Datagram Extension)**.

If you choose QUIC, authentication traffic is still transported over the WebSocket (TCP) port. By default, both QUIC and WebSocket traffic is transported over port 8443. If your administrator configured the NICE DCV server to use different ports, specify the ports to use.

You can only use QUIC if it has been enabled on the server. 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
```

For example, the following connects to a session named `my-session`, which is hosted on a NICE DCV server with the host name `my-dcv-server.com`, over port 8443:

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

4. Choose **Connect**.

5. Enter your user name and password and choose **Login**.

**Note**

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

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

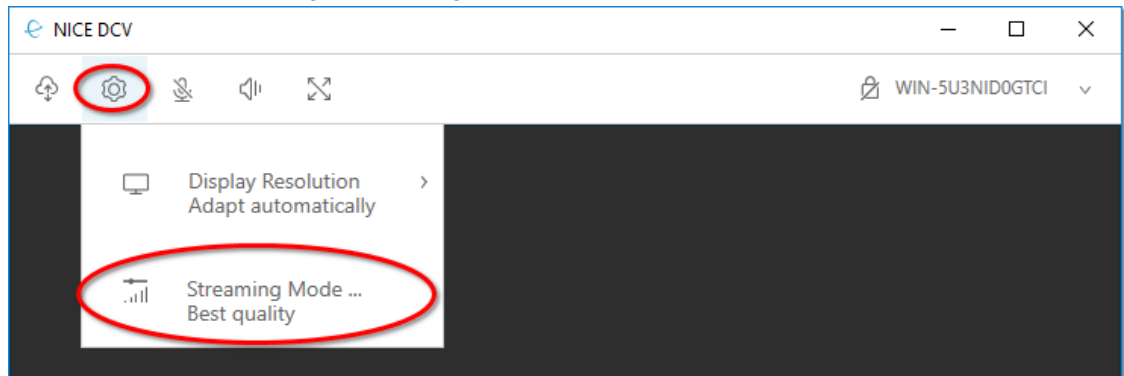
## Managing Streaming Modes

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 reduces the image quality to improve the frame rate. Prioritizing image quality reduces the responsiveness to provide better image quality.

This functionality is available on the Windows client, web browser client, Linux client, and macOS client. The steps for setting the streaming mode are the same across all clients.

### To change the streaming mode

1. In the client, choose **Settings, Streaming Mode**.



2. In the Streaming Mode window, choose one of the following options:
  - **Best responsiveness** — This option focuses on a faster response. It might result in lower image quality.
  - **Best quality** — This option focuses on higher image quality. It might result in a slower response.
3. (Optional) For information about network performance, choose **Display Streaming Metrics**. For more information, see [Managing Streaming Modes \(p. 12\)](#).
4. Close the **Streaming Mode** window.

## Streaming Metrics

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

The streaming metrics provide the following real-time information:

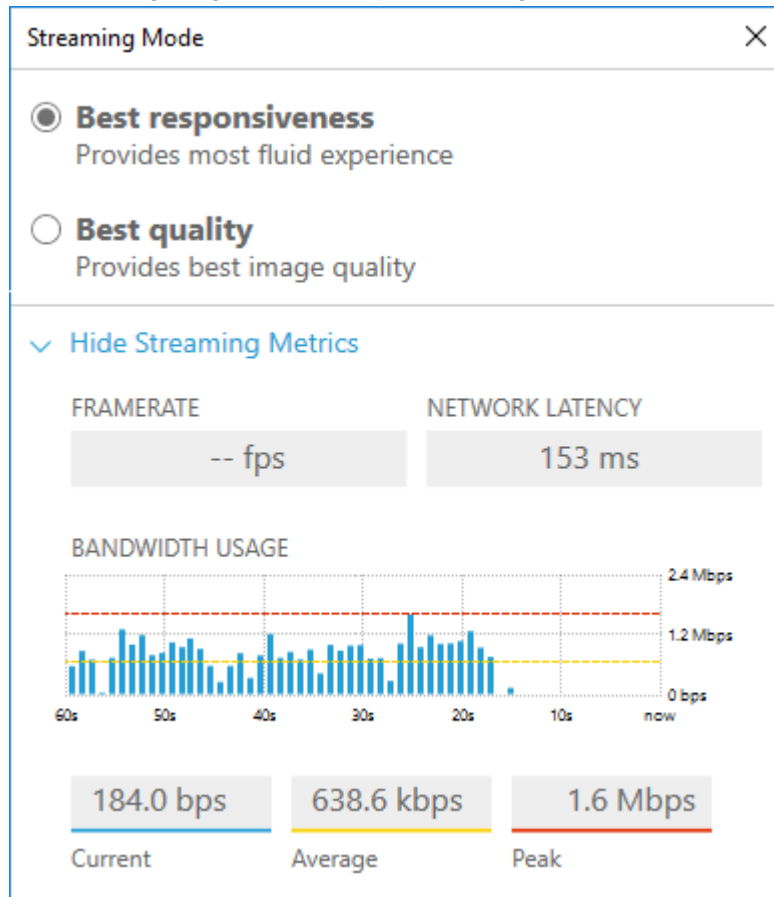
**Note**

Metrics are displayed for the current NICE DCV session connection.



- **Framerate**—Indicates the number of frames received from the NICE DCV server per 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, and the blue line shows the current (real-time) throughput.

The following image shows example streaming metric data.



## Transferring Files

NICE DCV enables you to upload files to and download files from NICE DCV session storage. For more information about enabling and configuring 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. The steps for uploading, downloading, and renaming files are similar on all clients.

### Topics

- [Downloading a File \(p. 14\)](#)

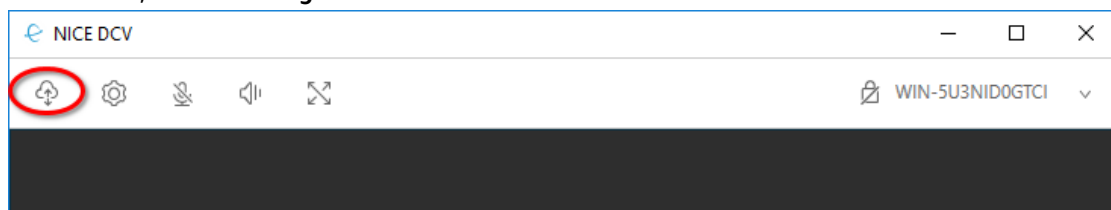
- [Uploading a File \(p. 14\)](#)
- [Renaming a File \(p. 14\)](#)

## Downloading a File

If you are using the Windows client, the file is downloaded to your desktop. If you are using the Linux, macOS, or 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 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 is specified by the NICE DCV server administrator.

### To upload a file from your computer to the session storage

1. In the client, choose **Storage**.
2. (Optional) To upload the file to a new folder, choose **Create Folder**, enter a folder name, and then open the folder.
3. In the **File Storage** window, choose **Upload File**, browse to and select the file to upload, and then choose **Open**.

## 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 next to the file to rename and choose **Rename**.
3. Enter the new file name and press **Enter**.

## Printing

NICE DCV enables you to print content from a NICE DCV session hosted on a Windows NICE DCV server only. The available printing devices depend on the client you're using.

- If you're using the Windows client, you can print to the physical printer connected to your client computer, or you can print to a `.PDF` document using the NICE DCV virtual printer.
- If you're using the Linux or macOS client, you can print to a `.PDF` document using the NICE DCV virtual printer.
- If you're using the web browser client with Google Chrome, Mozilla Firefox, or Apple Safari, you can print to a `.PDF` document using the NICE DCV virtual printer.
- If you're using the web browser client with Microsoft Edge or Internet Explorer, you can print to a `.XPS` 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**.
  - **DCV Printer**
  - **<local printer> - DCV Redirected** (Windows client only)
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 are using the web browser client, after the download has completed, choose **Show in folder**.
  - If you are using the Windows client, the printer dialog is automatically opened when the file is downloaded.
  - If you are 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 is no longer available for download.

## Copying and Pasting

NICE DCV lets you 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 \(p. 16\)](#)
- [Web Browser Client \(p. 16\)](#)

## Windows, Linux, and macOS Clients

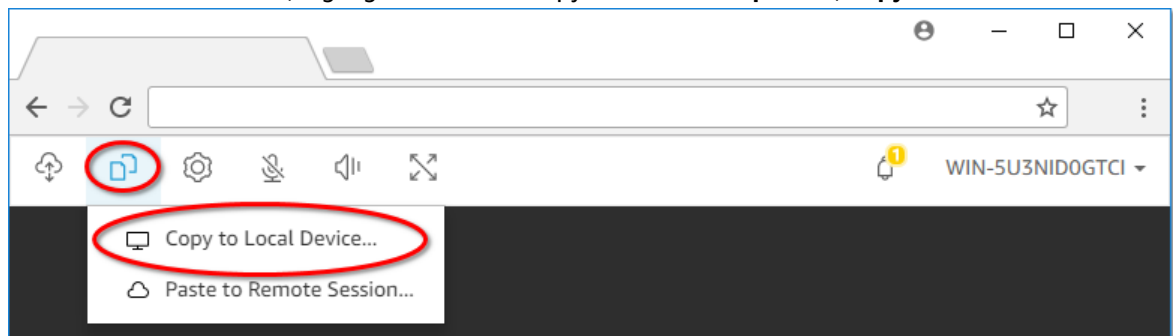
The Windows, Linux, and macOS clients enable you to copy and paste text and images between your local computer and the NICE DCV session using the keyboard shortcuts and context (right-click) menu shortcuts.

## Web Browser Client

The web browser client enables you to copy and paste only text between your local computer and the NICE DCV session. The copy and paste keyboard shortcuts and context menu shortcuts are not supported in the session.

### To copy text from the session for use on your local computer

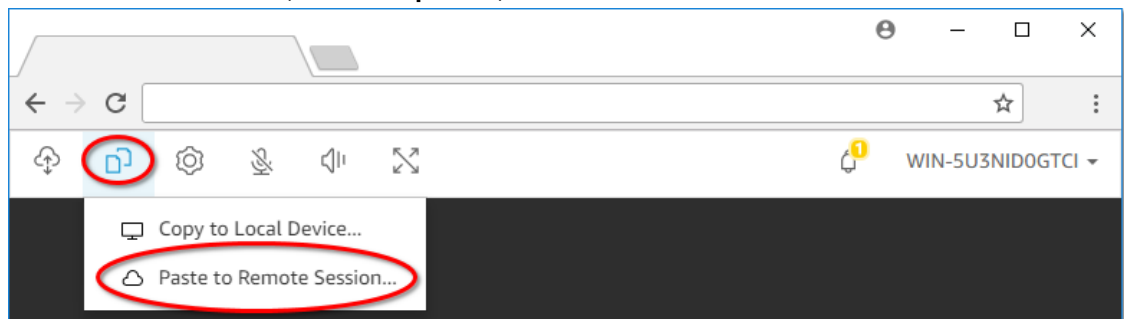
In the web browser client, highlight the text to copy and choose **Clipboard, Copy to Local Device**.



The text is now placed in your computer's clipboard. You can paste it using the paste keyboard shortcut or context menu shortcut.

### To copy text from your local computer into the session

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**.



The text is now placed in the NICE DCV session clipboard. You can paste it using the host operating system's paste shortcuts.

## Using a Smart Card

NICE DCV enables you to use one or more smart cards connected to your client computer, 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 with the Windows, Linux, and macOS clients only. It is not supported with the web browser client.

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*.

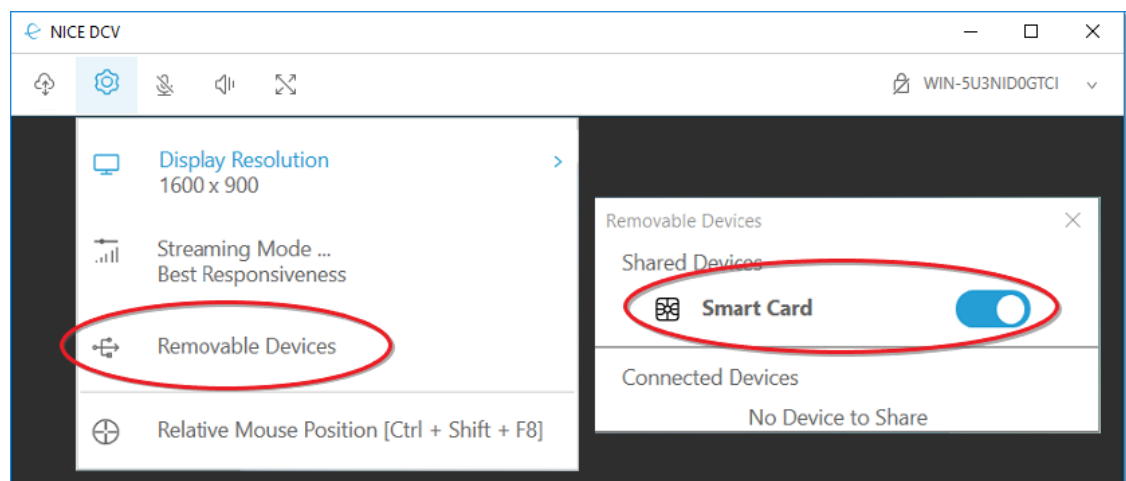
### To use a smart card

1. Launch the client and connect to the NICE DCV session.
2. Connect the smart card to the session or release it.

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

When you're done using the smart card in the 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.

- a. In the client, choose **Settings, Removable Devices**.
- b. To connect a smart card, enable the **Smart Card** toggle. To release control of the smart card, disable the **Smart Card** toggle.



3. (Optional) To have the NICE DCV server cache smart card data, enable the smart card caching feature. Smart card caching is disabled by default. 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 is permanently disabled on the server. For more information, see [Configuring Smart Card Caching](#) in the *NICE DCV Administrator Guide*.

To enable smart card caching, you need to set and export the `DCV_PCSC_ENABLE_CACHE` environment variable. In the session, open a terminal window and run the following command:

- Windows server

To enable smart card caching for the current terminal window, run the following command.

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

To enable smart card caching permanently for all applications on the server, run the following command.

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

- Linux server

```
$ export DCV_PCSC_ENABLE_CACHE=1
```

**Note**

Be sure to run the following command in the same terminal from which you intend to launch the application (step 4).

4. (Linux NICE DCV server only) Launch the required application with smart card support. In the session, open a terminal window, and launch the application using the `dcvscrunch` command. For example, to launch `firefox` with smart card support, use the following command:

```
$ dcvscrunch firefox
```

**Important**

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

## Using Multiple Screens

The NICE DCV clients enable you to extend the session's display across multiple screens.

**Note**

Multiple-screens are only supported with the Windows, Linux, and web browser client. It is not supported with the macOS client.

With the Windows, and Linux clients, the extended display matches your physical display layout and screen resolutions. For example, if you have three screens connected to your local computer, the server extends the session's display across three screens and matches your 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.

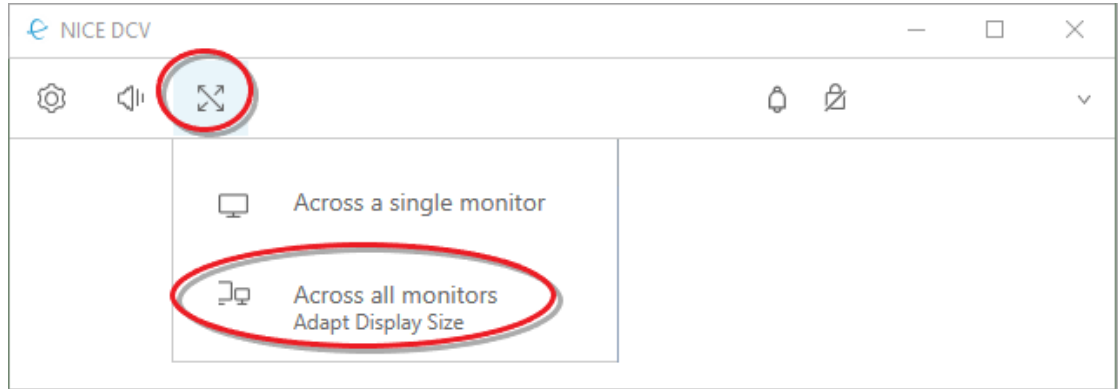
You can also manually specify custom display layouts. For more information, see [Managing the NICE DCV Session Display Layout](#) in the *NICE DCV Administrator Guide*.

**Note**

If the requested layout is not supported by the server, the layout might be adjusted to match the server's display limitations. If the layout can't be adjusted to match the server's display limitations, the request fails and the changes are not applied.

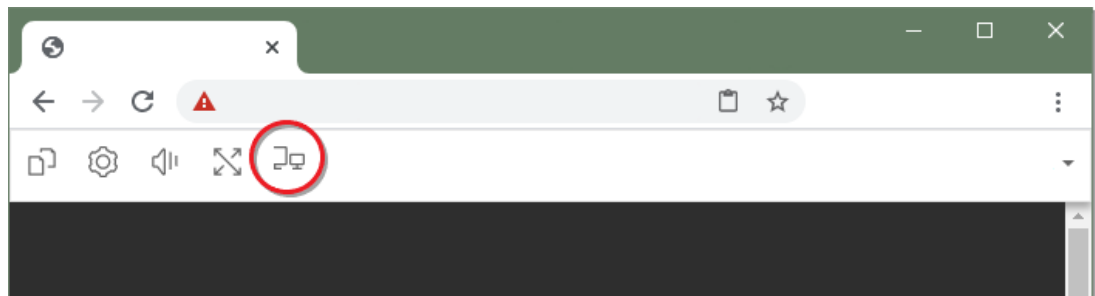
### To extend the displays using the Windows, and Linux clients

- In the client, choose **Enter fullscreen, Across all monitors**.



### To extend the displays using the web browser client

- In the client, choose **Multiscreen**.



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

## Using USB Remotization

NICE DCV enables you to use specialized USB devices, such as 3D pointing devices and graphic tablets, which are physically connected to your computer to interact with an application running on a NICE DCV server.

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*.

### Note

USB remotization is only supported with the installable Windows client. It is not supported with the portable Windows client, web browser client, Linux client, or macOS client. Additional configuration might be required on the NICE DCV server. For more information, see [Enabling USB Remotization](#) in the *NICE DCV Administrator Guide*.

Most commonly used USB devices are supported by default. This enables you to connect a USB device to your computer and use it on the server without any additional configuration. To use a USB device, connect it to your computer. In the client, choose **Settings**, and then move the slider next to the USB device in the list.

However, some specialized USB devices are not supported by default. Unsupported devices do not appear in the **Settings** menu after they are connected. These devices must be added to the USB device

*allow list* on the NICE DCV server before they can be used. After they have been added to the allow list, they appear in the **Settings** menu in the client.

#### To use a device that must be added to the allow list on the NICE DCV server

1. Ensure that you have installed the latest version of the Windows client and that you opted to install the USB remotization drivers. For more information, see [Installable Windows Client \(p. 4\)](#).
2. Ensure that the USB device is connected to your computer and that you have installed the required hardware drivers.
3. Navigate to `C:\Program Files (x86)\NICE\DCV\Client\bin\` and run `dcvusblis.exe`.
4. Open the context (right-click) menu for the USB device in the list, choose **Copy filter string**, and then send the filter string to your NICE DCV server administrator.

#### Note

The NICE DCV server administrator adds each USB device's filter string to the allow list. For more information, see [Enabling USB Remotization](#) in the *NICE DCV Administrator Guide*.

5. After the device has been added to the allow list on the NICE DCV server, choose **Settings** and move the slider next to the USB device to use it.

## Using a Connection File

The Windows, Linux, and macOS native clients enable you to create a connection file that you can use to instantly connect to a NICE DCV session.

#### Contents

- [Creating the Connection File \(p. 20\)](#)
- [Supported Parameters \(p. 21\)](#)
- [Executing the Connection File \(p. 25\)](#)

## 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, where 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
```

For the Windows client, you can create a connection file for a specific NICE DCV session directly from the client, or you can create a connection file from scratch using a text editor. For the Linux and macOS clients, you can only 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 Windows client

1. Open the Windows client and connect to the server and session for which to create the file.
2. Select the NICE DCV server's hostname in the top-right corner and choose **Save Connection As**.
3. In the **Save As** window, enter a file name and destination folder, and choose **Save**.

By default, when you create a connection file using the Windows client, the file includes the `format`, `host`, `port`, `user`, and `proxytype` parameters. These parameters are required to connect to the session from which the file was created. 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 does not 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 \(p. 21\)](#).

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

```
parameter_name=parameter_value
```

#### Note

- Parameter names are case sensitive.
- Do not enclose string parameter values in quotation marks.

For more information about the parameters and parameter values, see [Supported Parameters \(p. 21\)](#).

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 \(p. 22\)](#)
- [\[connect\] Parameters \(p. 22\)](#)

- [\[options\] Parameters \(p. 24\)](#)

## [version] Parameters

### Important

This is a required group. If your `.dcv` file does not 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		<p><b>Important</b> This is a required parameter. The parameter value must be <code>1.0</code>. If your <code>.dcv</code> file does not include this parameter, parsing fails.</p>

## [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.
weburlpath	String		A custom path on the NICE DCV server to which to connect. 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 which to connect.

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

## [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 should start in full screen mode.
useallmonitors	Boolean	false	Indicates whether the client should use all monitors when starting full screen mode.
promptreconnect	Boolean	true	Indicates whether the client should prompt you to reconnect after you

Parameter	Type	Default value	Description	
			disconnect from a session. If the parameter is set to <code>true</code> , you are redirected to the sign-in screen when you disconnect. If the parameter is set to <code>false</code> , the client closes when you disconnect.	

## Executing the Connection File

To execute a `.dcv` connection file, navigate to the file and double-click it.

Or, specify the file path as an argument for the `dcvviewer` command. For example:

- Windows client

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

- Linux and macOS client

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

# 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 \(p. 26\)](#)
- [Document History \(p. 37\)](#)

## NICE DCV Release Notes

This section describes NICE DCV features, improvements, and bug fixes by release date.

## Topics

- [DCV 2020.2-9662— December 04, 2020 \(p. 26\)](#)
- [DCV 2020.2-9508— November 11, 2020 \(p. 27\)](#)
- [DCV 2020.1-9012— September 30, 2020 \(p. 27\)](#)
- [DCV 2020.1-9012— August 24, 2020 \(p. 28\)](#)
- [DCV 2020.1-8942— August 03, 2020 \(p. 28\)](#)
- [DCV 2020.0-8428 — April 16, 2020 \(p. 29\)](#)
- [DCV 2019.1-7644 — October 24, 2019 \(p. 30\)](#)
- [DCV 2019.1-7423 — September 10, 2019 \(p. 30\)](#)
- [DCV 2019.0-7318 — August 5, 2019 \(p. 30\)](#)
- [DCV 2017.4-6898 — April 16, 2019 \(p. 31\)](#)
- [DCV 2017.3-6698 — February 24, 2019 \(p. 32\)](#)
- [DCV 2017.2-6182 — October 8, 2018 \(p. 33\)](#)
- [DCV 2017.1-5870 — August 6, 2018 \(p. 35\)](#)
- [DCV 2017.1-5777 — June 29, 2018 \(p. 35\)](#)
- [DCV 2017.0-5600 — June 4, 2018 \(p. 35\)](#)
- [DCV 2017.0-5121 — March 18, 2018 \(p. 36\)](#)
- [DCV 2017.0-4334 — January 24, 2018 \(p. 36\)](#)
- [DCV 2017.0-4100 — December 18, 2017 \(p. 36\)](#)

## DCV 2020.2-9662— December 04, 2020

Build numbers	Changes and bug fixes
<ul style="list-style-type: none"><li>• nice-dcv-server: 9662</li><li>• nice-dcv-client (Windows): 7490</li></ul>	<ul style="list-style-type: none"><li>• Security improvements in the web browser client.</li></ul>

Build numbers	Changes and bug fixes
<ul style="list-style-type: none"> <li>nice-dcv-viewer (MacOS): 2117</li> <li>nice-dcv-viewer (Linux): 3007</li> <li>nice-xdcv: 359</li> <li>nice-dcv-gl: 881</li> <li>nice-dcv-gltest: 259</li> <li>nice-dcv-ext-authenticator: 125</li> </ul>	<ul style="list-style-type: none"> <li>Increased performance and robustness when using Amazon EC2 G4ad instances with Windows.</li> <li>Fixed a problem with port selection in the connection settings dialog of the Windows client.</li> </ul>

## DCV 2020.2-9508— November 11, 2020

Build numbers	New features	Changes and bug fixes
<ul style="list-style-type: none"> <li>nice-dcv-server: 9508</li> <li>nice-dcv-client (Windows): 7459</li> <li>nice-dcv-viewer (MacOS): 2078</li> <li>nice-dcv-viewer (Linux): 1737</li> <li>nice-xdcv: 359</li> <li>nice-dcv-gl: 881</li> <li>nice-dcv-gltest: 259</li> <li>nice-dcv-ext-authenticator: 125</li> </ul>	<ul style="list-style-type: none"> <li>Added support for the QUIC (UDP-based) transport protocol.</li> <li>Added support for SLES 15 and Ubuntu 20.4.</li> <li>Added smart card support for Windows NICE DCV servers.</li> </ul>	<ul style="list-style-type: none"> <li>The NICE DCV frame rate limiter is now set to 60 FPS by default for console sessions hosted on servers and EC2 instances with an NVIDIA GPU.</li> <li>Optimized usage of GPU and CPU resources on Windows NICE DCV servers hosted on EC2 instances with an NVIDIA GPU.</li> <li>Added the <code>list-endpoints</code> NICE DCV CLI command, which lists the current active endpoints.</li> <li>The <code>version</code> NICE DCV CLI command supports the <code>--json</code> option.</li> <li>On Linux servers, the <code>create-session</code> NICE DCV CLI command supports the <code>--disable-login-monitor</code> option.</li> <li>Improved compatibility with different display managers on Linux NICE DCV servers.</li> <li>Addressed various limitations in the handling of keyboard input.</li> <li>The USB devices allow list file is now dynamically reloaded.</li> </ul>

## DCV 2020.1-9012— September 30, 2020

Build numbers	Changes and bug fixes
<ul style="list-style-type: none"> <li>nice-dcv-server: 9012</li> </ul>	<ul style="list-style-type: none"> <li>Added missing macOS client icons.</li> </ul>

Build numbers	Changes and bug fixes
<ul style="list-style-type: none"> <li>nice-dcv-client (Windows): 7342</li> <li>nice-dcv-viewer (MacOS): 1986</li> <li>nice-dcv-viewer (Linux): 1545</li> <li>nice-xdcv: 338</li> <li>nice-dcv-gl: 840</li> <li>nice-dcv-gltest: 246</li> <li>nice-dcv-ext-authenticator: 111</li> </ul>	

## DCV 2020.1-9012— August 24, 2020

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

## DCV 2020.1-8942— August 03, 2020

Build numbers	New features	Changes and bug fixes
<ul style="list-style-type: none"> <li>nice-dcv-server: 8942</li> <li>nice-dcv-client (Windows): 7342</li> <li>nice-dcv-viewer (MacOS): 1910</li> <li>nice-dcv-viewer (Linux): 1545</li> <li>nice-xdcv: 338</li> <li>nice-dcv-gl: 840</li> <li>nice-dcv-gltest: 246</li> <li>nice-dcv-ext-authenticator: 111</li> </ul>	<ul style="list-style-type: none"> <li>The Linux NICE DCV server now supports AWS Graviton2-based Arm instances, such as M6g, C6g, and R6g. For more information, see <a href="#">AWS Graviton Processor</a>.</li> <li>Support for RHEL 8.x and CentOS 8.x on Linux NICE DCV server.</li> <li>Added support for printer redirection when using a Windows NICE DCV server and the Windows NICE DCV client.</li> <li>Added stylus support with pressure sensitivity on macOS and Linux native NICE DCV client.</li> <li>Added surround sound 5.1 support for Linux NICE DCV server and Linux NICE DCV client.</li> </ul>	<ul style="list-style-type: none"> <li>Added support for the new NICE DCV Virtual Display driver on Amazon EC2 instances that don't have a GPU.</li> <li>Resolved the issue that caused visual artifacts as a result of colorspace conversion when using the NVENC encoder.</li> <li>The <code>dcv list-sessions</code> command now always includes the console session, if one is present</li> <li>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.</li> <li>Native clients now automatically open when</li> </ul>



Build numbers	New features	Changes and bug fixes
	<ul style="list-style-type: none"> <li>Added touch screen support for Linux NICE DCV native client.</li> <li>You can now associate a custom name to a NICE DCV session.</li> <li>Support for hardware accelerated decoding and rendering on the macOS native NICE DCV client.</li> </ul>	<ul style="list-style-type: none"> <li>activating a URL with the <code>dcv://</code> scheme.</li> <li>Improved how the macOS native client and web client handle keyboard modifiers.</li> <li>Improved visual and fbconfig selection in DCV-GL to improve support for some applications.</li> <li>Reduced CPU usage during file transfer</li> <li>Improved WebGL rendering in the web browser client to reduce resource usage.</li> </ul>

## DCV 2020.0-8428 — April 16, 2020

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

Build numbers	New features	Changes and bug fixes
		<ul style="list-style-type: none"> <li>DCV-GL now uses the GL Vendor-Neutral Dispatch library (GLvnd) on systems that support it.</li> </ul>

## DCV 2019.1-7644 — October 24, 2019

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

## DCV 2019.1-7423 — September 10, 2019

Build numbers	Changes and bug fixes
<ul style="list-style-type: none"> <li>nice-dcv-server: 7423</li> <li>nice-dcv-client (Windows): 7087</li> <li>nice-dcv-viewer (MacOS): 1535</li> <li>nice-dcv-viewer (Linux): 1124</li> <li>nice-xdcv: 226</li> <li>nice-dcv-gl: 544</li> <li>nice-dcv-gltest: 220</li> <li>nice-dcv-ext-authenticator: 77</li> </ul>	<ul style="list-style-type: none"> <li>Improved security for DCV server on Windows.</li> <li>Fixed a rendering problem with Autodesk Maya on Linux.</li> <li>Added improvements and bug fixes related to keyboard handling.</li> </ul>

## DCV 2019.0-7318 — August 5, 2019

Build numbers	New features	Changes and bug fixes
<ul style="list-style-type: none"> <li>nice-dcv-server: 7318</li> <li>nice-dcv-client (Windows): 7059</li> <li>nice-dcv-viewer (MacOS): 1530</li> <li>nice-dcv-viewer (Linux): 968</li> <li>nice-xdcv: 224</li> <li>nice-dcv-gl: 529</li> </ul>	<ul style="list-style-type: none"> <li>Multiple monitor support on Web client.</li> <li>Stylus input support on Windows Server 2019.</li> <li>Audio in/out on macOS and Linux native clients.</li> </ul>	<ul style="list-style-type: none"> <li>Touch input on Windows now respects the pressure value when available.</li> <li>Improved behavior on systems that have heterogeneous graphic adapters on Windows.</li> <li>Reduced time required to detect inactive connections</li> </ul>

Build numbers	New features	Changes and bug fixes
<ul style="list-style-type: none"> <li>nice-dcv-gltest: 218</li> <li>nice-dcv-ext-authenticator: 72</li> </ul>	<ul style="list-style-type: none"> <li>Enhanced clipboard capability on Linux server (middle-click paste).</li> </ul>	<p>(for example, in response to changes from wired to Wi-Fi networks on the client).</p> <ul style="list-style-type: none"> <li>Reduced logging when the cursor icon cannot be captured on Linux.</li> <li>Support for disabling the Composite extension in the virtual sessions Xdcv component.</li> <li>Ability to set a limit on the number of concurrent virtual sessions.</li> <li>Improved compatibility of scripts with systems that have Bash 5 installed.</li> <li>Autodetect and use OpenGL and GLES for rendering on the Linux client.</li> <li>Updated DCV-GL on-screen buffer when the visibility of a GL window changes.</li> <li>Fixed mouse wheel detection in the Windows client on Windows 7.</li> <li>Fixed a problem that caused the Windows client to fail when loading libraries on some Windows 7 systems.</li> <li>Improved printing on the Windows client when printing documents with landscape orientation.</li> </ul>

## DCV 2017.4-6898 — April 16, 2019

Build numbers	New features	Changes and bug fixes
<ul style="list-style-type: none"> <li>nice-dcv-server: 6898</li> <li>nice-dcv-client (Windows): 6969</li> <li>nice-dcv-viewer (MacOS): 1376</li> <li>nice-dcv-viewer (Linux): 804</li> <li>nice-xdcv: 210</li> <li>nice-dcv-gl: 490</li> <li>nice-dcv-gltest: 216</li> <li>nice-dcv-ext-authenticator: 70</li> </ul>	<ul style="list-style-type: none"> <li>New native client for macOS.</li> </ul>	<ul style="list-style-type: none"> <li>The Windows native client now uses hardware acceleration for decoding and rendering, if it is available in the system.</li> <li>The <code>dcv</code> command line tool now uses the same options and output format on both Windows and Linux.</li> <li>The <code>dcv</code> command line tool now reports information about licenses.</li> </ul>

Build numbers	New features	Changes and bug fixes
		<ul style="list-style-type: none"> <li>• Clients now show a warning to the user before disconnection due to inactivity.</li> <li>• Improved support for keyboard combinations that use multiple modifiers.</li> <li>• Improved robustness of the interaction with the Reprise License Manager for communication failures.</li> <li>• The <code>dcvusers</code> command line tool now defaults to saving data to the <code>dcv</code> user home directory on Linux.</li> <li>• Followed the same ordering used by the <code>nvidia-smi</code> tool when using the NVENC hardware encoder with multiple GPUs on Linux.</li> <li>• The Linux client now receives and handles printed files from the Windows DCV printer.</li> </ul>

## DCV 2017.3-6698 — February 24, 2019

Build numbers	New features	Changes and bug fixes
<ul style="list-style-type: none"> <li>• nice-dcv-server: 6698</li> <li>• nice-dcv-client: 5946</li> <li>• nice-dcv-viewer (Linux): 683</li> <li>• nice-xdcv: 207</li> <li>• nice-dcv-gl: 471</li> <li>• nice-dcv-gltest: 210</li> <li>• nice-dcv-ext-authenticator: 66</li> </ul>	<ul style="list-style-type: none"> <li>• Added support for Kerberos (GSSAPI) authentication.</li> <li>• Added support for touch events on Windows versions that support it.</li> <li>• Automatically unlock Windows sessions when using system authentication (Windows Credential Provider).</li> </ul>	<ul style="list-style-type: none"> <li>• Added an option to opt in to Y'UV444 encoding.</li> <li>• The EL6 RPM now includes the NVENC encoder module.</li> <li>• Windows system authentication now accepts the <code>name@domain</code> format.</li> <li>• Yubikey USB devices are now added to the allow list.</li> <li>• Improved Japanese keyboard support.</li> <li>• 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 pointer (for motion feedback). Added <code>keyboard-sas</code> permission to handle SAS on Windows ( Control+Alt+ Del).</li> </ul>

Build numbers	New features	Changes and bug fixes
		<p>keyboard<code>sas</code> depends on keyboard permission.</p> <ul style="list-style-type: none"> <li>Fixed a problem with empty clipboard events in the Web client on browsers that support the async clipboard API.</li> <li>Fixed a race on the capture module that prevented clients from receiving the first frame.</li> <li>Improvements to handling of concurrent file storage transfers.</li> <li>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.</li> <li>Never stop retrying re-acquiring a RLM license token. This allows you to recover from a licensing error state even after extended time periods.</li> <li>In Windows client, added an option to set full screen keyboard shortcut.</li> <li>In Windows client, improved auto-fit logic when dragging window across multiple monitors.</li> <li>In Windows client, fixed the prompt-reconnect option when disconnection is not triggered by UI.</li> <li>Fixed DCV-GL incompatibility with NVIDIA driver 410.xx.</li> <li>Fixed regressions in DCV-GL with the Matlab and Blender applications.</li> </ul>

## DCV 2017.2-6182 — October 8, 2018

Build numbers	New features	Changes and bug fixes
<ul style="list-style-type: none"> <li>nice-dcv-server: 6182</li> <li>nice-dcv-client: 5890</li> <li>nice-dcv-viewer (Linux): 503</li> </ul>	<ul style="list-style-type: none"> <li>Added audio playback support on Linux virtual sessions.</li> </ul>	<ul style="list-style-type: none"> <li>Improvements and bug fixes related to keyboard handling.</li> </ul>

Build numbers	New features	Changes and bug fixes
<ul style="list-style-type: none"> <li>• nice-xdcv: 180</li> <li>• nice-dcv-gl: 427</li> <li>• nice-dcv-gltest: 201</li> <li>• nice-dcv-ext-authenticator: 58</li> </ul>	<ul style="list-style-type: none"> <li>• Improved smart card performance.</li> <li>• Added file transfer support on the Linux client.</li> </ul>	<ul style="list-style-type: none"> <li>• Changing the log level in the configuration no longer requires a server restart.</li> <li>• The Windows server installer now skips installation of Microsoft C runtime redistributable if it is already installed.</li> <li>• When running on EC2, if accessing S3 for the license fails, a notification is displayed in the user interface.</li> <li>• The Linux dcv command line tool now supports <code>list-connections</code> and <code>describe-session</code> sub-commands and includes an option to emit JSON output.</li> <li>• Added a <code>cuda-devices</code> setting in the <code>display</code> section, which configures the server to distribute NVENC encoding over different CUDA devices.</li> <li>• Improved robustness of session creation code when handling multiple concurrent commands.</li> <li>• Increased the default clipboard limit to 20 MB.</li> <li>• The Windows client now detects legacy <code>.dcv</code> files and launches the DCV 2016 Endstation (if installed).</li> <li>• The DCV simple external authenticator now always uses the system Python interpreter instead of the one set in the environment.</li> <li>• Improved the read-back strategy of DCV-GL for improved performance and robustness.</li> <li>• DCV-GL now checks if a window changed size after a front buffer readback. This fixes a rendering problem with the Coot application.</li> </ul>

## DCV 2017.1-5870 — August 6, 2018

Build numbers	New features	Changes and bug fixes
<ul style="list-style-type: none"><li>nice-dcv-server: 5870</li><li>nice-dcv-client: 5813</li><li>nice-dcv-viewer (Linux): 450</li><li>nice-xdcv: 170</li><li>nice-dcv-gl: 366</li><li>nice-dcv-gltest: 198</li><li>nice-dcv-ext-authenticator: 53</li></ul>	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.	<ul style="list-style-type: none"><li>The license setting is now read at session creation, which allows the administrator to change this setting without restarting the server.</li><li>Resolved stability problem in the Windows client that caused the program to exit unexpectedly on some systems.</li><li>Reduced logging in a possible error condition.</li></ul>

## DCV 2017.1-5777 — June 29, 2018

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

## DCV 2017.0-5600 — June 4, 2018

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

Build numbers	New features	Changes and bug fixes
		<ul style="list-style-type: none"> <li>Fixed possible errors in smart card connection.</li> </ul>

## DCV 2017.0-5121 — March 18, 2018

Build numbers	New features	Changes and bug fixes
<ul style="list-style-type: none"> <li>nice-dcv-server: 5121</li> <li>nice-dcv-client: 5121</li> <li>nice-xdcv: 146</li> <li>nice-dcv-gl: 270</li> <li>nice-dcv-gltest: 184</li> <li>nice-dcv-ext-authenticator: 46</li> </ul>	<ul style="list-style-type: none"> <li>Windows native client is now DPI aware.</li> <li>Added support for relative mouse movement mode.</li> </ul>	<ul style="list-style-type: none"> <li>Prevent hang on Ansys cfx5solve on Linux.</li> <li>Fixed possible agent hang on Windows 10.</li> <li>Improvements for the Web Client user interface.</li> <li>Normalized Windows user name when a domain is specified.</li> <li>Fixed the external authenticator on RHEL6.</li> </ul>

## DCV 2017.0-4334 — January 24, 2018

Build numbers	Changes and bug fixes
<ul style="list-style-type: none"> <li>nice-dcv-server: 4334</li> <li>nice-dcv-client: 4334</li> <li>nice-xdcv: 137</li> <li>nice-dcv-gl: 254</li> <li>nice-dcv-gltest: 184</li> <li>nice-dcv-ext-authenticator: 45</li> </ul>	<ul style="list-style-type: none"> <li>Improved keyboard handling.</li> <li>Fixed Dbus problem on RHEL6 in which closing of a session does not allow the creation of a new one.</li> <li>Improved support for SOCKS5 proxy on the native client.</li> <li>Prevent crash on Headwave when running on virtual sessions.</li> <li>Prevent crash on Chimera when running on virtual sessions.</li> <li>Improved font support on virtual sessions.</li> </ul>

## DCV 2017.0-4100 — December 18, 2017

Build numbers
<ul style="list-style-type: none"> <li>nice-dcv-server: 4100</li> <li>nice-dcv-client: 4100</li> <li>nice-xdcv: 118</li> <li>nice-dcv-gl: 229</li> <li>nice-dcv-gltest: 158</li> </ul>



**Build numbers**

- nice-dcv-ext-authenticator: 35

## Document History

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

Change	Description	Date
NICE DCV Version 2020.2	NICE DCV 2020.2 is now available. For more information, see <a href="#">DCV 2020.2-9508—November 11, 2020 (p. 27)</a> .	November 11, 2020
NICE DCV Version 2020.1	NICE DCV 2020.1 is now available. For more information, see <a href="#">DCV 2020.1-8942—August 03, 2020 (p. 28)</a> .	August 03, 2020
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 <a href="#">Installing the NICE DCV Server</a> 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 <a href="#">macOS Client</a> 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 <a href="#">Configuring Smart Card Caching</a> 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 <a href="#">Linux Client</a> in the <i>NICE DCV User Guide</i> .	August 29, 2018
Updated Parameter Reference	The Parameter Reference has been updated. For more information, see <a href="#">NICE DCV Server Parameter Reference</a>	August 07, 2018

Change	Description	Date
	in the <i>NICE DCV Administrator Guide</i> .	
USB remotization	NICE DCV enables clients to use specialized USB devices, such as 3D pointing devices or graphic tablets. For more information, see <a href="#">Enabling USB Remotization</a> in the <i>NICE DCV Administrator Guide</i> .	August 07, 2018
Initial release of NICE DCV	First publication of this content.	June 05, 2018