NICE DCV Connection Gateway

Administrator Guide

NICE DCV Connection Gateway: Administrator Guide

Table of Contents

What is NICE DCV Connection Gateway?

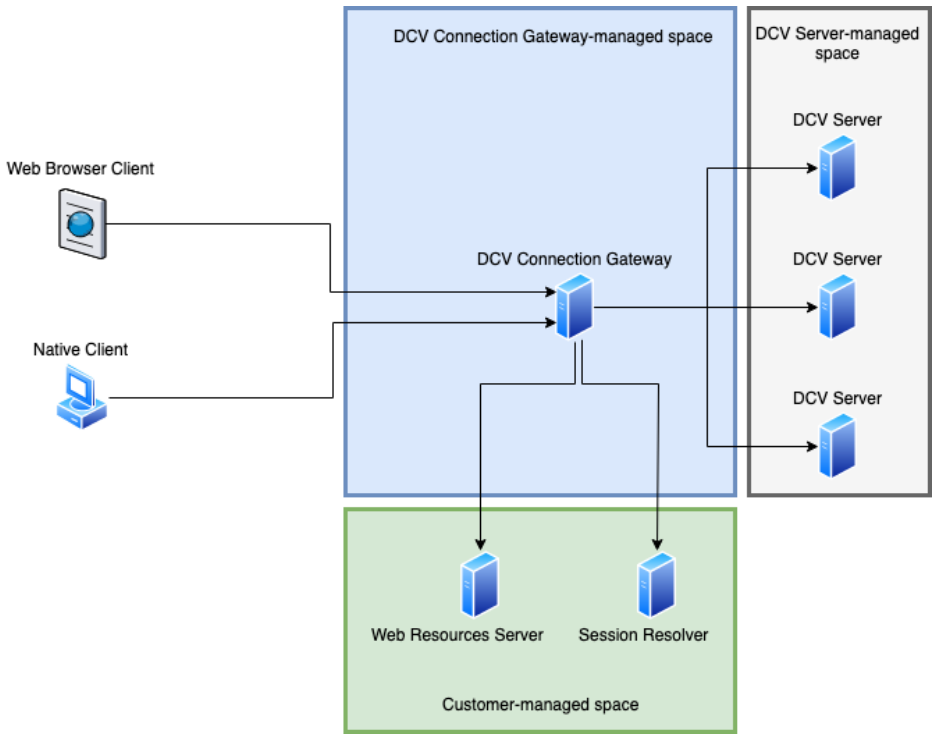
NICE DCV Connection Gateway is an installable software package that enables users to access a fleet of NICE DCV servers through a single access point to a LAN or VPC.

This guide explains how to install and configure the NICE DCV Connection Gateway.

Topics

How the NICE DCV Connection Gateway works

The following diagram shows the high-level view of how the NICE DCV Connection Gateway routes traffic to a fleet of NICE DCV servers.



When using the NICE DCV Connection Gateway, clients connect to the gateway rather than connecting directly to a NICE DCV server. Clients specify a *session ID*, which uniquely identifies the server they want to connect to. The Connection Gateway in turn consults a *Session Resolver* to map the session ID received by the client to a specific server and then forwards the connection to the correct destination.

Customers can define how session IDs map to their resources by implementing their Session Resolver (p. 7) API end-point. Customers using the NICE DCV Session Manager can leverage (p. 18) its built-in session resolver.

The NICE DCV Connection Gateway can also forward HTTP requests to a web server. This feature allows the customer to host the NICE DCV Web Client or a custom Web application based on the NICE DCV Web Client SDK on a dedicated web server. When a browser connects to the Connection Gateway, its request to retrieve the web page of the NICE DCV Web Client is forwarded to the *Web Resources Server* configured in the Connection Gateway; once the browser has retrieved and displayed that page, the Web Client will connect again to the Connection Gateway to connect to the NICE DCV session and the Connection Gateway will forward that connection to the corresponding NICE DCV server.

Limitations

The NICE DCV Connection Gateway requires a NICE DCV version greater than or equal to 2021.2 if you want to enable support for QUIC.

The NICE DCV Connection Gateway requires that NICE DCV is configured to use the External Authentication.

Pricing

The NICE DCV Gateway is available at no cost for customers who are using NICE DCV.

NICE DCV Connection Gateway system requirements

The NICE DCV Connection Gateway has the following system requirements.

Operating system	• Amazon Linux 2 • RHEL/CentOS 8 • RHEL/CentOS 7 • Ubuntu 18.04 • Ubuntu 20.04	
Architecture	• 64-bit x86 • 64-bit ARM	

NICE DCV Connection Gateway network requirements

NICE DCV Connection Gateway is usually installed on dedicated hosts, separate from NICE DCV server machines. As depicted in the high-level overview (p. 1), the Connection Gateway must have network connectivity with the other components: the Clients, the NICE DCV server hosts, the Session Resolver, and the Web Resources Server.

Note
Depending on how the machines and network are configured, the network traffic that flows to and from the different components may be bound to separate network interfaces.

Please make sure your firewall rules and security groups allow the following:

- The Connection Gateway listens for incoming connection on a TCP port specified in the configuration (p. 5). This port must be reachable from the clients connecting to the gateway.
- If QUIC support is enabled, Connection Gateway listens for incoming QUIC traffic on a UDP port specified in the configuration (p. 5). This port must be reachable from the clients connecting to the gateway.
- The Connection Gateway must be able to connect to NICE DCV server hosts on the TCP port used for DCV connections, 8443 by default.
- If QUIC support is enabled, Connection Gateway must be able to connect to NICE DCV server hosts on the UDP port used for DCV QUIC connections, 8443 by default.
- The Connection Gateway must be able to connect to the TCP port of the HTTPS end-point exposed by the Session Resolver.
- If a Web Resources Server is present, Connection Gateway must be able to connect to the TCP port of the HTTPS end-point exposed by the Web Resources Server.

If you choose to have multiple NICE DCV Connection Gateway hosts to improve availability, then a network load balancer will be present between the clients and the Connection Gateway hosts. In this case the gateway must be reachable from the load balancer nodes. When using a load balancer you may also want to use a health-check connection; in this case the load balancer need to be able to reach the TCP port of the health-check service exposed by the NICE DCV Connection Gateway.

If using a Network Load Balander, refer to its documentation for more details.

Setting up the NICE DCV Connection Gateway

The following topics describe how to install and set up the NICE DCV Connection Gateway.

Topics

Installing the NICE DCV Connection Gateway

This section describes how to install the latest version of the NICE DCV Connection Gateway on a Linux host. You can use multiple hosts to improve scalability and performance. For more information, see Scaling the NICE DCV Connection Gateway (p. 19).

Note
The NICE DCV Connection Gateway is available for the following Linux distributions and architectures:

- Amazon Linux 2 (64-bit x86 and 64-bit ARM)
- RHEL 7.x and CentOS 7.x (64-bit x86 and 64-bit ARM)
- RHEL 8.x and CentOS 8.x (64-bit x86 and 64-bit ARM)
- Ubuntu 18.04 and Ubuntu 20.04 (64-bit x86 and 64-bit ARM)

The following instructions are for installing the Connection Gateway on 64-bit x86 hosts. To install the Connection Gateway on 64-bit ARM hosts, for Amazon Linux, RHEL, and CentOS, replace *x86_64* with `aarch64`, and for Ubuntu, replace *amd64* with `arm64`.

To install the Connection Gateway on a Linux host

1. The NICE DCV Connection Gateway 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. Run the following command to import the NICE GPG key.

   - Amazon Linux 2, RHEL, CentOS, and SUSE Linux Enterprise

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

   - Ubuntu

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

     ```
     $ gpg --import NICE-GPG-KEY
     ```

2. Download the NICE DCV Connection Gateway installation package for your distribution from the NICE DCV download website.

3. Install the package.

   - Amazon Linux 2, RHEL 7.x, and CentOS 7.x

     ```
     $  sudo yum install -y nice-dcv-connection-gateway-2022.1.377.el7.x86_64.rpm
     ```

   - RHEL 8.x and CentOS 8.x

     ```
     $  sudo yum install -y nice-dcv-connection-gateway-2022.1.377.el8.x86_64.rpm
     ```

   - Ubuntu 18.04

     ```
     $  sudo apt install ./nice-dcv-connection-gateway_2022.1.377_amd64.ubuntu1804.deb
     ```

   - Ubuntu 20.04

     ```
     $  sudo apt install ./nice-dcv-connection-gateway_2022.1.377_amd64.ubuntu2004.deb
     ```

   - Ubuntu 22.04

     ```
     $  sudo apt install ./nice-dcv-connection-gateway_2022.1.377_amd64.ubuntu2204.deb
     ```

Configuring the NICE DCV Connection Gateway

This section describes how to configure the NICE DCV Connection Gateway. It introduces the *configuration file* used by the Connection Gateway and describes the basic configuration required to run the Connection Gateway service. For more information about all the available configuration options, see the Configuration File Reference (p. 21) section.

The NICE DCV Connection Gateway configuration file is located at `/etc/dcv-connection-gateway/dcv-connection-gateway.conf`. The file uses the TOML format and is organized in sections which control different aspects of the Connection Gateway.

You can edit the configuration file using your preferred text editor.

A basic configuration file will have the following content.

```
[gateway]
web-listen-endpoints = ["0.0.0.0:8443", "[::]:8445"]
quic-listen-endpoints = ["0.0.0.0:8443"]

[resolver]
url = "https://localhost:8081"

[web-resources]
url = "https://localhost:8080"
```

Configuring the Connection Gateway Listener

The `[gateway]` section controls how the NICE DCV Connection Gateway accepts incomig connections from the clients.

```
[gateway]
web-listen-endpoints = ["0.0.0.0:8443", "[::]:8445"]
quic-listen-endpoints = ["0.0.0.0:8443"]
```

```
...
```

This section includes two parameters: `web-listen-endpoints` and `quic-listen-endpoints` which define the list of TCP and UDP endpoints (respectively) that the Connection Gateway service will bind to and listen on. In the above example, the Connection Gateway is configured to listen for incoming TCP connections on all available IPv4 addresses on TCP port `8443`, and on all available IPv6 addresses on port `8445`. Also, the Connection Gateway is configured to listen for incoming UDP connections on all available IPv4 addresses on UDP port `8443`. The `web-listen-endpoints` parameter is required to be set and non-empty. If the `quic-listen-endpoint` parameter is not set or empty, QUIC support is disabled.

This section also allows you to configure the certificates that NICE DCV Connection Gateway presents to the clients:

```
[gateway]
cert-file = "/path/to/cert.pem"
cert-key-file = "/path/to/key.pem"
...
```

`cert-file` and `cert-key-file` respectively specify the path of the x.509 public certificate in PEM format and the path of the file containing the private SSL key in PKCS8 representation. If these parameters are not specified, the Connection Gateway will generate and use a *self-signed* certificate.

Configuring the Session Resolver

The `[resolver]` section controls how the NICE DCV Connection Gateway interacts with a *Session Resolver* responsible for mapping *Session IDs* to a destination host running the NICE DCV server

```
...
[resolver]
url = "https://localhost:8081"
...
```

This section includes a *mandatory* `url` parameter which specifies the HTTP end-point of the resolver. See Implementing a Session Resolver (p. 8) for more information about the implementation of this end-point.

Depending on where your session resolver end-point is located and how it authenticates connections, you may need to specify additional configuration parameters: in particular if the end point has a certificate signed by a private Certification Authority, you may provide the corresponding `ca-file` with the path of the x.509 CA certificate in PEM format:

```
...
[resolver]
ca-file = "/path/to/resolver_ca.pem"
...
```

Or if it fits your security requirements, you can accept untrusted certificates:

```
...
[resolver]
tls-strict = false
...
```

If the session resolver HTTP end-point is configured to require mutual TLS authentication, you will also need to specify the certificate and key that the Connection Gateway uses to prove its identity to the resolver. These files can be the same as the ones specified in the `[gateway]` section.

```
...
[resolver]
cert-file = "/path/to/cert.pem"
cert-key-file = "/path/to/key.pem"
...
```

Configuring the DCV target servers

The `[dcv]` section allows to specify options used by the NICE DCV Connection Gateway to connect to the NICE DCV server hosts.

If you are using the NICE DCV server with the automatically generated self-signed certificates, you can use the `tls-strict` setting to allow the Connection Gateway to connect:

```
...
[dcv]
tls-strict = false
...
```

Similarly to the `[resolver]` section, you can also use the `ca-file` setting if your fleet of DCV servers use certificates signed by a private Certificate Authority.

Configuring Web Resources

The `[web-resources]` section controls how the NICE DCV Connection Gateway forwards HTTP requests to an external Web Server. In particular, the Web Server is used to host the files of a DCV Web Client, so that when a browser connects to the Connection Gateway it can retrieve the `html`, `css` and `javascript` files of the DCV Web Client.

```
...
[web-resources]
url = "https://localhost:8080"
...
```

This section is optional and can be omitted if you are not interested in using the DCV Web Client or if client machines retrieve the DCV Web Client from a separate server. If the `url` parameter is specified, it points to the HTTP end-point of a Web Server which can serve static files, in particular the `html`, `css` and `javascript` files of the DCV Web Client.

Similarly to the `[resolver]` section, you can also use the `ca-file` or the `tls-strict` settings to be able to connect to a Web server that has a certificate signed by a private Certificate Authrority or a self-signed certificate.

```
...
[web-resources]
ca-file = "/path/to/resolver_ca.pem"
...
```

Setting up a Session Resolver

The *Session Resolver* is the component responsible for mapping *Session IDs* to a destination host running the NICE DCV server. The logic of this mapping is specific to how each customer designs and plans to use its infrastructure.

The following topics describe how customers can implement a *Session Resolver* that matches their requirements and configure it in the NICE DCV Connection Gateway. Customers using the NICE DCV Session Manager can refer to Integration with NICE DCV Session Manager (p. 18) to learn how to use the Session Resolver end-point included in the NICE DCV Session Manager.

Topics

Implementing a Session Resolver

Your session resolver service can run on the same host as the NICE DCV Connection Gateway or it can run on a separate host. The authentication service must listen for HTTP(S) POST requests from the Connection Gateway.

The following shows the POST request format used by the Connection Gateway.

```
POST /resolveSession?
sessionId=session_id&transport=transport&clientIpAddress=clientIpAddress HTTP/1.1
accept: application/json
```

The `sessionId` parameter contains a string which uniquely identifies a DCV session, the `transport` parameter will either be `HTTP` or `QUIC`, the `clientIpAddress` will be the ip address of the client, or the load balancer ip address if the gateway is fronted by a load balancer, the `clientIpAddress` can either be an IPv4 or IPv6 address. In case the gateway cannot get the client ip, it will not be present in the request.

Your session resolver service is responsible for determining the destination host, if any, where to forward the connection and returns its response to the Connection Gateway.

- If a destination is not found, the session resolver service returns an HTTP status `404`
- If a destination is successfully identified, the session resolver service returns an HTTP status `200` and the response body must contain the following JSON:

```
{
    "SessionId": session_id,
    "TransportProtocol": transport_protocol,
    "DcvServerEndpoint": dns_name,
    "Port": port,
    "WebUrlPath": web_url_path
}
```

The `SessionId` field normally would just return the same ID that was provided as input, however, if it is useful for your use case, you can also use this field to map a client-facing session ID to a different session ID used internally by your infrastructure. The `TransportProtocol` field must be either `HTTP` or `QUIC` (uppercase).

Example session resolver python implementation

```
from flask import Flask, request
import json

app = Flask(__name__)

dcv_sessions = {
```

```
  "session-123": {
    "SessionId": "session-123",
    "Host": "dcv123.mycompany.com",
    "HttpPort": 8443,
    "QuicPort": 8443,
    "WebUrlPath": "/"
  },
  "session-456": {
    "SessionId": "session-456",
    "Host": "dcv456.mycompany.com",
    "HttpPort": 8443,
    "QuicPort": 8443,
    "WebUrlPath": "/"
  }
}

@app.route('/resolveSession', methods=['POST'])
def resolve_session():
    session_id = request.args.get('sessionId')
    transport = request.args.get('transport')
    client_ip_address = request.args.get('clientIpAddress')

    if session_id is None:
        return "Missing sessionId parameter", 400

    if transport != "HTTP" and transport != "QUIC":
        return "Invalid transport parameter: " + transport, 400

    print("Requested sessionId: " + session_id + ", transport: " + transport + ",
 clientIpAddress: " + client_ip_address)
    dcv_session = dcv_sessions.get(session_id);
    if dcv_session is None:
        return "Session id not found", 404

    response = {
        "SessionId": dcv_session['SessionId'],
        "TransportProtocol": transport,
        "DcvServerEndpoint": dcv_session['Host'],
        "Port": dcv_session["HttpPort"] if transport == "HTTP" else
 dcv_session['QuicPort'],
        "WebUrlPath": dcv_session['WebUrlPath']
    }
    return json.dumps(response)


if __name__ == '__main__':
    app.run(port=9000, host='0.0.0.0')
```

Configuration

You must configure the NICE DCV Connection Gateway to use the Session Resolver service.

To specify a session resolver

1. Navigate to the `/etc/dcv-connection-gateway/` folder and open the `dcv-connection-gateway.conf` with your preferred text editor.
2. Locate the `[resolver]` and set the `url` parameter to the URL of your session resolver.

   ```
   [resolver]
   url=localhost:9000
   ```

3. Save and close the file.

Managing the Connection Gateway

The following topics describe how to start, stop, and operate the NICE DCV Connection Gateway service.

Topics

Starting the Connection Gateway

Manually start the Connection Gateway service using the command line.

To start the Connection Gateway service

Use the following command:

```
$ sudo systemctl start dcv-connection-gateway
```

Configure the Connection Gateway service to start automatically.

To configure the Connection Gateway service to start automatically

Use the following command:

```
$ sudo systemctl enable dcv-connection-gateway
```

Stopping the Connection Gateway

Manually stop the Connection Gateway service using the command line.

To stop the Connection Gateway service

Use the following command:

```
$ sudo systemctl stop dcv-connection-gateway
```

Checking the status of the Connection Gateway

To Check the status of the Connection Gateway service using the command line.

To check the status of the Connection Gateway

Use the following command:

```
$ sudo systemctl status dcv-connection-gateway
```

Reload the configuration of the Connection Gateway

To reload the configuration of the Connection Gateway using the command line.

To reload the configuration of the Connection Gateway

Use the following command:

```
$ sudo systemctl reload dcv-connection-gateway
```

Verify the connectivity of the Connection Gateway

Let's assume that the Connection Gateway host is associated with a DNS name, for instance `dcv.gateway.domain`, and it is listening on TCP port `8443` and UDP port `8443`. We can use the `nc` command to test the connectivity of our gateway.

To check if the Connection Gateway is reacheable with TCP

Use the following command:

```
$ nc -vz dcv.gateway.domain 8443
```

To check if the Connection Gateway is reacheable with UDP

Use the following command:

```
$ nc -uvz dcv.gateway.domain 8443
```

Logs

The NICE DCV Connection Gateway logs its activities to a log file. Log files are useful for monitoring the state of the Connection Gateway and can be used to troubleshoot problems. This section introduces the log file used by the NICE DCV Connection Gateway and describes how to configure all the aspects related to logging, such as location, verbosity, size, and rotation.

By default, log files produced by the NICE DCV Connection Gateway are located in `/var/log/dcv-connection-gateway/` folder. Logs are rotated by default. The most recent log is named `gateway.log`, while older logs are named `gateway.log.N`, where `N` is a number. A bigger number indicates an older file log.

Every line in the log files uses the following format.

```
[Timestamp] [Level] [Context]: [Message]
```

Timestamps refer to the UTC time. Log level is one of `error`, `warn`, `info`, `debug`, `trace` and it is an indication of the importance of the message. By default, `debug` and `trace` messages are not included in the logs to reduce the verbosity, but while troubleshooting it is recommended to turn them on by

changing the `level` parameter in the configuration. Consult the configuration file reference (p. 23) for a list of parameters that affect the logging behavior.

Metrics

The NICE DCV Connection Gateway is able to record and emit metrics which allow customers to monitor the performance of the Connection Gateway.

The emission of metrics is disabled by default. The NICE DCV Connection Gateway supports emitting its metrics in a format compatible with StatsD. To enable the emission of the metrics, edit the `/etc/dcv-connection-gateway/dcv-connection-gateway.conf` and add the following:

```
[metrics-reporter-statsd]
host = "localhost"
port = 8125
```

Note
It is up to the customer to install a StatsD service. See Sending Metrics to Amazon CloudWatch (p. 16) to use Amazon CloudWatch Agent as a StatsD service.
The values of `host` and `port` must match the ones used by your installation of StatsD.

List of metrics

The following table lists the metrics emitted by the NICE DCV Connection Gateway.

Name	Unit	Description
`ClientConnectionRequestCount`	Count	The number of connection requests processed by the Connection Gateway. Each DCV connection, during the connection phase, generates a single connection request
`ClientConnectionRequestTime`	Milliseconds	The time elapsed between the establishment of a connection from the DCV client to the Connection Gateway and the reception of the first message from the DCV client by the Connection Gateway
`ClientConnectionRequestTimeoutCount`	Count	The number of times a connection request has been rejected because of timeout. In other words, if a DCV client takes too long to send the first message, the connection will be actively closed by the Connection Gateway, in order to prevent malicious slow send attacks
`ClientConnectionTimeoutCount`	Count	The number of times a DCV connection has been closed

Name	Unit	Description
		because of a timeout between the DCV client and the Connection Gateway
ClientFailureLoginAuthenticationFailedCount	Count	The number of times a DCV connection has been rejected by the DCV server because of the authentication
ClientFailureLoginConnectionLimitReachedCount	Count	The number of times a DCV connection has been rejected by the DCV server because the maximum number of connections has been reached
ClientFailureLoginCount	Count	The number of times a DCV connection has been rejected by the DCV server
ClientFailureLoginGenericErrorCount	Count	The number of times a DCV connection has been rejected by the DCV server because of a generic error
ClientFailureLoginInternalServerErrorCount	Count	The number of times a DCV connection has been rejected by the DCV server because of an internal error
ClientFailureLoginInvalidConnectionIdCount	Count	The number of times a DCV connection has been rejected by the DCV server because request contains an invalid connection identifier
ClientFailureLoginInvalidSessionIdCount	Count	The number of times a DCV connection has been rejected by the DCV server because the request contains an invalid session identifier
ClientFailureLoginProtocolErrorCount	Count	The number of times a DCV connection has been rejected by the DCV server because of a protocol error
ClientFailureLoginUnknownErrorCount	Count	The number of times a DCV connection has been rejected by the DCV server because of an unknown error
ClientNetworkIn	Bytes	The number of bytes received from the clients and forwarded to the corresponding target by the Connection Gateway

Name	Unit	Description
ClientNetworkOut	Bytes	The number of bytes received from the targets and forwarded to a specific client by the Connection Gateway
ClientRequestReceptionTime	Milliseconds	The time elapsed between the establishment of a TLS connection from a client to the Connection Gateway and the reception of the HTTP request by the Connection Gateway
ClientRequestReceptionTimeoutCount	Count	The number of TLS connections dropped due to a timeout on the reception of the HTTP request. In other words, if a client takes too long to send an HTTP request after establishing the TLS connection, the TLS connection will be actively closed by the Connection Gateway, in order to prevent malicious slow send attacks
ClientSuccessfulLoginCount	Count	The number of times a DCV connection has been successfully accepted by the DCV server
ConnectionThrottledCount	Count	The number of times a DCV connection has been rejected by the Connection Gateway because of throttling
CurrentConnectedClients	Count	The number of DCV clients currently connected to the Connection Gateway
CurrentNetworkConnections	Count	The number of concurrent TCP/QUIC connections active from clients to the Connection Gateway and from the Connection Gateway to targets
GatewayHttpCode4XXCount	Count	The number of HTTP responses with error codes 4XX generated by the Connection Gateway
GatewayHttpCode5XXCount	Count	The number of HTTP responses with error codes 5XX generated by the Connection Gateway
GatewayInternalErrorCount	Count	The number of errors originating from the Connection Gateway itself that prevented a request from being processed successfully

Name	Unit	Description
`LatencyOverhead`	Milliseconds	Overhead introduced by the Gateway in forwarding the DCV messages
`NetworkConnectionRequestCount`	Count	The number of client connection requests processed by the gateway since startup
`SessionResolverSuccessCount`	Count	The number of HTTP requests to the Session Resolver which returned successfully (status code `200`)
`SessionResolverNotFoundCount`	Count	The number of HTTP requests to the Session Resolver which returned an error because the destination host could not be found (status code `404`)
`SessionResolverInvalidResponseCount`	Count	The number of HTTP requests to the Session Resolver which returned an error because it failed to handle the request (any status code different from `200` or `404`)
`SessionResolverConnectionErrorCount`	Count	The number of HTTP requests to the Session Resolver which failed because the Session Resolver could not be reached
`SessionResolverResponseTime`	Milliseconds	The time between when an HTTP request is sent to the Session Resolver and when the corresponding response is received
`TargetConnectionTimeoutCount`	Count	The number of times a DCV connection has been closed because of a timeout between the Connection Gateway and the target (e.g., DCV server)
`TargetHttpCode2xxCount`	Count	The number of HTTP responses with codes 2XX generated by targets
`TargetHttpCode3xxCount`	Count	The number of HTTP responses with error codes 3XX generated by targets
`TargetHttpCode4xxCount`	Count	The number of HTTP responses with error codes 4XX generated by targets

Name	Unit	Description
`TargetHttpCode5xxCount`	Count	The number of HTTP responses with error codes 5XX generated by targets
`TargetHttpResponseTime`	Milliseconds	The elapsed time between the forwarding of a HTTP request to a target and the reception of the response from the target
`TargetNetworkConnectionErrorCount`	Count	The number of errors while enstablishing a TCP/QUIC connection to the target from the Connection Gateway
`TargetTlsNegotiationErrorCount`	Count	The number of TLS connection attempts initiated by the Connection Gateway that did not establish a connection with the target. Possible causes include a mismatch of ciphers or protocols
`TargetUnreachableErrorCount`	Count	The number of connection attempts initiated by the Connection Gateway that did not establish a connection with the target because the target is not reachable

Each metric specifies additional *dimensions*, which allow to filter and aggreagate the values. In particular, the NICE DCV Connection Gateway adds a `protocol` dimension which can be set to `HTTP`, `WebSocket`, or `QUIC`, which respectively identify whether the value is related to a HTTP request, to a DCV connection using WebSockets, or to a DCV connection using QUIC.

Sending Metrics to Amazon CloudWatch

The Amazon CloudWatch agent can be installed on the host running the NICE DCV Connection Gateway and can be configured to collect the metrics and send them to the CloudWatch service of your Amazon Web Services account.

To send the NICE DCV Connection Gateway metrics to Amazon CloudWatch

1. Install the Amazon CloudWatch agent on your host.

   Refer to the CloudWatch documentation for detailed instructions on how to install the agent and ensure that the required IAM roles are present.

2. Enable the stasd plugin of the Amazon CloudWatch Agent.

   Refer to the CloudWatch documentation for detailed instructions on how to enable the StatsD plugin.

3. Configure the Amazon CloudWatch Agent to collect the NICE DCV Connection Gateway metrics.

   Create or edit the `/opt/aws/amazon-cloudwatch-agent/etc/amazon-cloudwatch-agent.json` with your preferred editor and add the following content:

```
{
    "metrics": {
        "namespace": "DCV-Connection-Gateway",
        "metrics_collected": {
            "statsd": {
                "service_address": ":8125",
                "metrics_collection_interval": 5,
                "metrics_aggregation_interval": 60
            }
        },
        "append_dimensions": {
            "InstanceId": "${aws:InstanceId}"
        }
    }
}
```

4. Restart the Amazon CloudWatch Agent.

```
sudo systemctl start amazon-cloudwatch-agent
```

5. Enable the metrics in the NICE DCV Connection Gateway.

   Edit the `/etc/dcv-connection-gateway/dcv-connection-gateway.conf` and add the following:

```
[metrics-reporter-statsd]
host = "localhost"
port = 8125
```

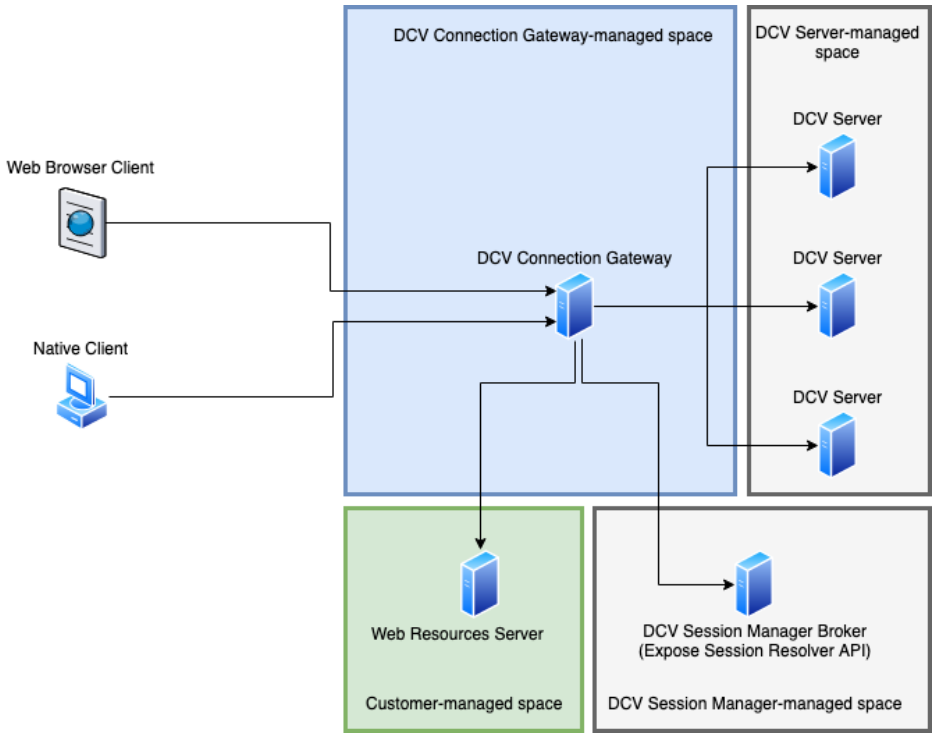
   Note
   The values specified for `host` and `port` must match the ones used in the `service_address` parameter of the Amazon CloudWatch Agent statsd configuration file.

6. Restart the NICE DCV Connection Gateway service.

```
sudo systemctl restart dcv-connection-gateway
```

Integration with NICE DCV Session Manager

NICE DCV Connection Gateway can be used in conjunction with NICE DCV Session Manager, which manages NICE DCV server hosts and provides a Session Resolver end-point. The simplified high-level overview (p. 1) becomes:



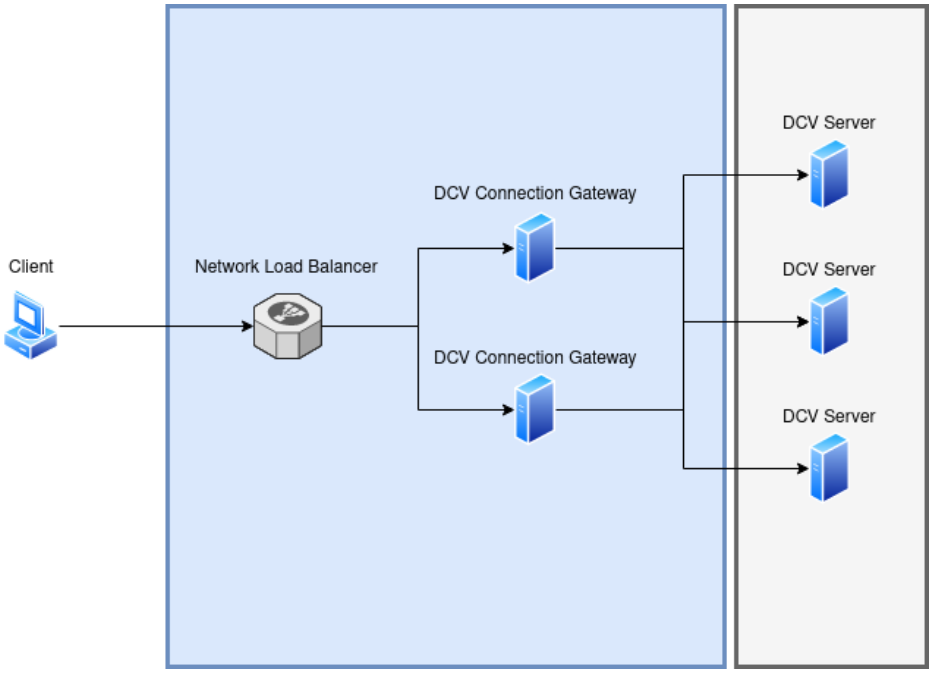
Refer to the NICE DCV Session Manager documentation for more information about configuring the Session Resolver in NICE DCV Session Manager.

Scaling the NICE DCV Connection Gateway

The following topics describe how to scale NICE DCV Connection Gateway using a fleet of gateway hosts and a Network Load Balancer.

Topics

The simplified high-level overview (p. 1) includes a single Connection Gateway which forwards connections to a fleet of NICE DCV server hosts. In this architecture the Connection Gateway is a single point of failure. To increase robustness and scalability, we can use a fleet of Connection Gateway hosts and front them with a Network Load Balancer, in order to preserve the ability for clients to target a single entry point to the server-side infrastructure.



With this architecture, gateway nodes can be added or removed according to the system load without any disruption for the clients.

The Network Load Balancer can *check the health* of each instance of the Connection Gateway and uses this information to select whether one of the Connection Gateway should or should not be used to handle incoming connections.

Reporting the Health of the Connection Gateway

The NICE DCV Connection Gateway can be configured to listen on an additional TCP port that will be used to check the health of the Connection Gateway service.

To enable the health check service in the NICE DCV Connection Gateway, edit the `/etc/dcv-connection-gateway/dcv-connection-gateway.conf` and add the following:

```
[health-check]
bind-addr = "::"
port = 8989
```

The `bind-addr` and `port` are the IP address and TCP port used by the health check service. They need to be reachable from the Network Load Balancer. `bind-addr` can use IPv4 or IPv6 addresses.

Configuring a Network Load Balancer

The following steps summarize how to create a Network Load Balancer and highlight the settings which are needed to use a Network Load Balancer with NICE DCV Connection Gateway. See the Network Load Balancer documentation for more detailed information.

To create a Network Load Balancer for a fleet of NICE DCV Connection Gateway hosts

1. Navigate to the EC2 Console, select **Load Balancer** from the navigation pane and then then choose **Create Load Balancer**. For load balancer type, choose **Network Load Balancer**.
2. For **Basic Configuration** assign a **Name**, set **Scheme** to **internet-facing**, and set **Ip address type** to **IPv4**.
3. For **Network mapping** select your **VPC** and then select all the availability zones and subnets in that VPC. Make sure that your DCV Connection Gateway instances security groups allow traffic from the selected subnets.
4. For **Listeners and routing** create a TCP target group, specifying the `web-port` of the NICE DCV Connection Gateway configuration as the port.

   For the *health check*, make sure TCP is used and override the TCP port with the one specified in the `[health-check]` section of the NICE DCV Connection Gateway configuration.

   If you also want QUIC support, create a UDP target group, specifying the `quic-port` of the NICE DCV Connection Gateway configuration as the port.

   For the *health check* use the same values as before: make sure TCP is used and override the TCP port with the one specified in the `[health-check]` section of the NICE DCV Connection Gateway configuration.

If you have enabled QUIC, once the Network Load Balancer is created, select it from the list, select the *UDP listener* and make sure the **Stickiness** check box is active.

Configuration File Reference

This section provides a reference for all the parameters that can be specified in the Connection Gateway configuration file. For an introduction to the configuration of NICE DCV Connection Gateway, see Configuring the NICE DCV Connection Gateway (p. 5).

The NICE DCV Connection Gateway configuration file is located at `/etc/dcv-connection-gateway/dcv-connection-gateway.conf`. The file uses the TOML format and is organized in sections which control different aspects of the Connection Gateway

You can edit the configuration file using your preferred text editor.

> **Note**
> Some of the configuration parameters can be reloaded (p. 18) while the gateway is running without causing disruptions for the existing connections. Others parameters instead require a restart of the service. This is denoted by the `Requires Restart` column in the table below.

Topics

[gateway] section

Parameter na	Required	Default value	Requires Restart	Description
`bind-addr`	Yes		Yes	This setting is **deprecated**, use `web-listen-endpoints` and `quic-listen-endpoints` instead. The socket address the gateway will be listening on for incoming DCV client connections. The value must be a valid IP address syntax.
`cert-file`	No		No	The path to a PEM file containing the certificate to be used by the gateway. If not specified, the Connection Gateway will use generate self-signed certificates. When this parameter is specified, `cert-key-file` must be used as well.
`cert-key-file`	No		No	The path to the private key file of the certificate. When this parameter is specified, `cert-file` must be used as well.

Parameter na	Required	Default value	Requires Restart	Description
ciphers-tls	No	["TLS_ECDHE_RSA_WITH_AES_256_GCM_SHA384", "TLS_ECDHE_RSA_WITH_AES_128_GCM_SHA256", "TLS13_CHACHA20_POLY1305_SHA256", "TLS13_AES_256_GCM_SHA384", "TLS13_AES_128_GCM_SHA256"]	No	The TLS ciphers used for the TLS communication with the clients.
graceful-shutdown-timeout	No	10	Yes	When receiving a shutdown signal, the Connection Gateway waits for the specified number of seconds before closing all connections and exiting.
minimum-tls-version	No	"tls12"	No	The minimum TLS version used for the TLS communication with the clients. The value can be "tls12" or "tls13".
quic-idle-timeout	No	10	Yes	The timeout in seconds after which an inactive QUIC connection with a client is closed by the Connection Gateway.
quic-listen-endpoints	No	[]	Yes	The list of endpoints the gateway will be listening on for incoming UDP connections from DCV clients. An endpoint is defined as a *ip-address*[:*port*] pair, where *ip-address* is a valid IPv4 or IPv6 address and *port* is a UDP port. The *port* field in the endpoint is optional, and if not specified the quic-port parameter will be assumed as port. If this parameter is not set or set to an empty list, QUIC support will be disabled.
quic-max-connections	No	1000	Yes	The maximum number of concurrent QUIC connections the Connection Gateway is going to accept. After that limit, a new incoming connection will be rejected.
quic-port	No	8443	Yes	The default UDP port that will be associated to an endpoint without the port field in quic-listen-endpoints.
tcp-idle-timeout	No	10	Yes	The timeout in seconds after which an inactive TCP connection with a client is closed by the Connection Gateway.
tcp-max-connections	No	1000	Yes	The maximum number of concurrent TCP connections the Connection Gateway is going to accept. After that limit, a new incoming connection will be rejected.

Parameter na	Required	Default value	Requires Restart	Description
web-listen-endpoints	Yes		Yes	The list of endpoints the gateway will be listening on for incoming WebSocket and HTTP connections from DCV clients. An endpoint is defined as a *ip-address*[:*port*] pair, where *ip-address* is a valid IPv4 or IPv6 address and *port* is a TCP port. The *port* field in the endpoint is optional, and if not specified the web-port parameter will be assumed as port.
web-port	No	8443	Yes	The default TCP port that will be associated to an endpoint without the port field in web-listen-endpoints.

[log] section

Parameter na	Required	Default value	Requires Restart	Description
directory	No	/var/log/dcv-connection-gateway	Yes	The directory where gateway log files are going to be written.
level	No	info	No	The log level verbosity. Possible values are sorted by increasing verbosity: error, warning, info, debug, trace.
max-file-size	No	10485760	Yes	When a log file size reaches the specfied size in bytes, it will be rotated. A new log file will be created and further log events will be placed in the new file.
rolling-frequency	No	every-day	Yes	The temporal frequency with which log files will be rotated. Valid values are: every-day, every-hour, every-minute.
rotate	No	9	Yes	The maximum number of log files preserved in the rotation. Each time a rotation happens and this number is reached, the oldest log file will be deleted.

[health-check] section

Parameter na	Required	Default value	Requires Restart	Description
bind-addr	No		Yes	The socket address the gateway will be listening on for incoming health check requests. The value must be a valid IP address syntax. If this parameter is not specified, the health check service will be disabled.
port	No	8888	Yes	The TCP port the gateway will be listening on for incoming health check requests. The value must be a valid port number.

[dcv] section

Parameter na	Required	Default value	Requires Restart	Description
ca-file	No		No	If this setting is active, the certificates presented by the DCV servers will be validated only against the Certificate-Authority's certificate specified in this file.
ciphers-tls	No	["TLS_ECDHE_RSA_WITH_AES_256_GCM_SHA384", "TLS_ECDHE_RSA_WITH_AES_128_GCM_SHA256", "TLS13_CHACHA20_POLY1305_SHA256", "TLS13_AES_256_GCM_SHA384", "TLS13_AES_128_GCM_SHA256"]	No	The TLS ciphers used for the TLS communication with the NICE DCV server hosts.
minimum-tls-version	No	"tls12"	No	The minimum TLS version used for the TLS communication with the NICE DCV server hosts. The value can be "tls12" or "tls13".
tls-strict	No	true	No	Whether to enable or not the verification against a trusted Certificate-Authority for the certificate presented by the NICE DCV server. The value can be true or false.

[resolver] section

Parameter na	Required	Default value	Requires Restart	Description
ca-file	No		No	If this setting is active, the certificates presented by the resolver will be validated only against the Certificate-Authority's certificate specified in this file.

Parameter na	Required	Default value	Requires Restart	Description
cert-file	No		No	The path to a PEM file containing the certificate the gateway will present to the Session Resolver end-point. This setting is required if the Session Manager requires mutual TLS authentication. When this parameter is specified, cert-key-file must be used as well.
cert-key-file	No		No	The path to the private key file of the certificate. When this parameter is specified, cert-file must be used as well.
ciphers-tls	No	["TLS_ECDHE_RSA_WITH_AES_256_GCM_SHA384", "TLS_ECDHE_RSA_WITH_AES_128_GCM_SHA256", "TLS13_CHACHA20_POLY1305_SHA256", "TLS13_AES_256_GCM_SHA384", "TLS13_AES_128_GCM_SHA256"]	No	The TLS ciphersuites for the TLS communication with the Session Resolver.
minimum-tls-version	No	"tls12"	No	The minimum TLS version used for the TLS communication with the resolver. The value can be "tls12" or "tls13".
http-establish-timeout	No	10	No	The timeout in seconds used when establishing connections with the resolver.
tls-strict	No	true	No	Whether to enable or not the verification against a trusted Certificate-Authority for the certificate presented by the Session Resolver. The value can be true or false.
url	Yes		No	The url of the Session Resolver. The url host must be a domain name, ip addresses are not supported.

[web-resources] section

Parameter na	Required	Default value	Requires Restart	Description
ca-file	No		No	If this setting is active, the certificates presented by the web resources server will be validated only against the Certificate-Authority's certificate specified in this file.
ciphers-tls	No	["TLS_ECDHE_RSA_WITH_AES_256_GCM_SHA384", "TLS_ECDHE_RSA_WITH_AES_128_GCM_SHA256", "TLS13_CHACHA20_POLY1305_SHA256", "TLS13_AES_256_GCM_SHA384", "TLS13_AES_128_GCM_SHA256"]	No	The TLS ciphersuites for the TLS communication with the Web Resources server.

Parameter na	Required	Default value	Requires Restart	Description
minimum-tls-version	No	"tls12"	No	The minimum TLS version used for the TLS communication with the Web Resources Server. The value can be "tls12" or "tls13".
http-establish-timeout	No	10	No	The timeout in seconds used when establishing HTTP connections with the Web Resources server.
tls-strict	No	true	No	Whether to enable or not the verification against a trusted Certificate-Authority for the certificate presented by the Web Resources server. The value can be true or false.
url	No		No	The url of the Web Resources Server. The url host must be a domain name, ip addresses are not supported. If not specified, the gateway will not forward requests for static web resources.

[metrics-reporter-statsd] section

Parameter na	Required	Default value	Requires Restart	Description
host	No		Yes	The IP where the statsd service is located and metrics can be pushed to. If this parameter is not specified, the StatsD metric reporter will be disabled.
port	No	8125	Yes	The UDP port of the statsd service.

Release notes and document history for NICE DCV Connection Gateway

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

Topics

NICE DCV Connection Gateway release notes

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

Topics

2022.1-377— June 29, 2022

Build numbers	New features	Changes and bug fixes
377	• Added support for Ubuntu 22.04 and Rocky Linux 8.5 and higher.	• Fixed a problem preventing QUIC connections to be closed when an error occurs in the server.

2022.0-351— May 19, 2022

Build numbers	Changes
351	• Fixed WebSocket performance problem that could occur in case of latency between the gateway and the server.

2022.0-322— March 23, 2022

Build numbers	Changes
322	• Handle HTTP DELETE method for DCV resources.

2022.0-310— February 23, 2022

Build numbers	Changes
310	• It is now possible to configure the NICE DCV Connection Gateway to listen on a specific network interface or on specific IPv4 or IPv6 addresses. • Leverage systemd sandboxing features when they are available. • Support session resolver URLs with a path.

2021.3-251— December 20, 2021

Build numbers	New features
251	• The initial release of NICE DCV Connection Gateway.

Document history

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

Change	Description	Date
Release of NICE DCV Connection Gateway 2022.1;	NICE DCV Connection Gateway 2022.1 is now available. For more information, see 2022.1-377— June 29, 2022 (p. 27).	June 29, 2022
Release of NICE DCV Connection Gateway 2022.0;	NICE DCV Connection Gateway 2022.0 is now available. For more information, see 2022.0-310— February 23, 2022 (p. 28).	February 23, 2022
Initial release of NICE DCV Connection Gateway	The first publication of this content.	December 20, 2021