NoMachine Cloud Server - Installation and Configuration Guide

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Introduction

1. NoMachine Cloud Server Installation and Configuration Guide

Welcome to the NoMachine Cloud Server - Installation and Configuration Guide v. 6.

What is NoMachine Cloud Server for?
NoMachine Cloud Server works as a single point of access to multiple subsystems globally distributed and running NoMachine server installations or Unix-like unsupported operating systems ('foreign servers'). It can create a hierarchical federation of servers with multi-level hosts.

Available for Linux, Mac and Windows, the Cloud Server connects to its federated subsystems via a browser (thanks to its built-in web server) or via NoMachine client.

TIP

The Cloud Server is not intended for providing access to desktops on his host machine. Only specific users are allowed to connect to the physical desktop of the Cloud Server, mainly for maintenance or administrative operations on this host.

Building your centralized NoMachine architecture
NoMachine Cloud Server is fully operative once installation is completed.

Then add your subsystem(s) to the Cloud Server. These subsystems can be:

- Any of the standalone NoMachine servers like Enterprise Desktop, Workstation and Terminal Server.

- A NoMachine Enterprise Terminal Server which in turn manages a multi-host environment made of NoMachine Terminal Server Nodes.

- Another NoMachine Cloud Server which in turns rules its own subsystems.

- A foreign server, i.e. a Unix-like host running an unsupported O.S. for which we don't build native packages.

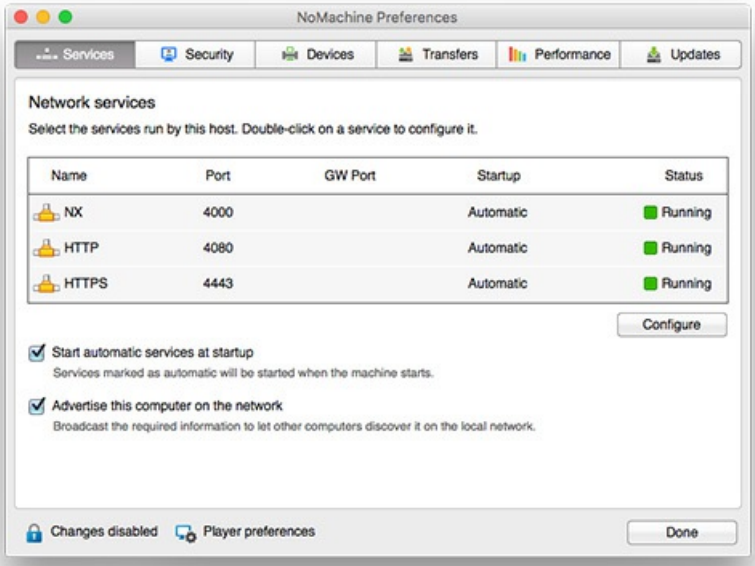
NoMachine servers added to the main Cloud Server are **first-level child servers**.

High-Availability
Two NoMachine Cloud Servers can be federated in a high-availability failover cluster to grant continuous system availability.

A Graphical Interface

The Cloud Server package includes the NoMachine User Interface which provides the graphical interface (Server preferences) for administering the server and its services. This GUI acts also as client for running sessions and connecting to remote desktops.

Most common operations detailed in this guide can be performed by the NoMachine UI and the Server preferences panel running on the local installation of the server:



How to manage the server from the graphical tools is however part of a different manual: https://www.nomachine.com/DT10O00155

1.1. About This Guide

Document Conventions and Important Notices
The following conventions are used in this guide:

BaseDirectory
is the base directory where the NoMachine binaries and libraries are installed.
By default, BaseDirectory is: /usr on Linux, C:\Program Files\ on Windows and /Applications on Mac.

InstallationDirectory
is: *BaseDirectory*/NX on Linux, *BaseDirectory*/NoMachine on Windows and *BaseDirectory*/NoMachine.app on Mac.

The command line interface
NoMachine server and node programs have a command line interface to execute operations.

You need to be a privileged system user to access all these functionalities. These commands can be run from an xterm or similar on Linux and Mac using the sudo utility or as root. On Windows they can be run from a command prompt (cmd.exe) executed as administrator.

On Linux and Mac, invoke the 'nxserver' and 'nxnode' programs from /etc/NX, for example:

```
$ /etc/NX/nxserver --help
$ /etc/NX/nxnode --help
```

on Windows:

move to the 'NoMachine' installation directory, by default it's under C:\'Program files (x86)' on 64bit systems and 'C:\Program file' on 32bits machines and go to the 'bin' subdirectory.

```
> cd C:\PROGRA~1
> cd NoMachine\bin
> nxserver --help
> nxnode --help
```

E.g.:

```
> cd C:\PROGRA~1
C:\Program Files (x86)> cd NoMachine\bin
C:\Program Files (x86)\NoMachine\bin>nxserver --help
C:\Program Files (x86)\NoMachine\bin>nxnode --help
```

The 'nxserver --help' and 'nxnode --help' display the list of all the available commands and options and their description.

Online Resources
Visit the NoMachine Support Area to access a variety of online resources included the NoMachine Forums, tutorials and FAQs: https://www.nomachine.com/support

Find a list of all documents and tutorials: https://www.nomachine.com/all-documents

Use the Knowledge Base search engine to access articles, FAQs and self-help information: https://www.nomachine.com/knowledge-base

Leave Feedback About This Guide
Our goal is to provide comprehensive and clear documentation for all NoMachine products. If you would like to send us your comments and suggestions, you can use the contact tool available at https://www.nomachine.com/contact-request, selecting Web Quality Feedback as your option.

2. How to Set-up an Operative Cloud Sever

2.1. Install the Cloud Server

Supported Operating Systems
Windows 32-bit/64-bit XP/Vista/7/8/8.1/10

Windows Server 2008/2012/2016

Mac OS X Intel 64-bit 10.7 to 10.14

Linux 32-bit and 64-bit

RHEL 4 to RHEL 8
SLED 10 to SLED 15
SLES 10 to SLES 15
openSUSE 10.x to openSUSE 15.x
Mandriva 2009 to Mandriva 2011
Fedora 10 to Fedora 30
Debian 4.0 to Debian 9
Ubuntu 8.04 to Ubuntu 19.04

Raspberry Pi 2/3 ARMv6/ARMv7/ARMv8

Hardware requirements
Intel Core2 Duo or AMD Athlon Dual-Core or equivalent
1 GB RAM
Network connection (either a LAN, or Internet link: broadband, cable, DSL, etc...)
Size required on disk:
Windows 210 MB
Linux 195 MB
Mac 180 MB

Software requirements
NoMachine client v. 6 or later is required to connect to Cloud Server v. 6 or later. Connections by browser are also supported.

In order to connect by NoMachine to the physical desktop of the Cloud Server host, a desktop environment must already be installed. This applies also to headless Linux machines.

2.2. Windows Installations

INSTALL
Download the package for Windows from the NoMachine web site and install it by double-clicking on the icon of the executable: a setup wizard will take you through the installation. Accept to reboot the machine, this is mandatory for completing the installation.

If you own a customer license we recommend to download the package from your **Customer Area**:

https://www.nomachine.com/support#login.

TIP

To install the package in **silent** or **very silent mode** from a CMD console, run respectively:

```
>nomachine-packageName_packageVersion.exe /silent

or:

>nomachine-packageName_packageVersion.exe /verysilent

Then reboot the machine:

>SHUTDOWN -r -t 10 -c " your comments here"
```

To specify a non-default installation directory, use:

```
>nomachine-packageName_packageVersion.exe /SILENT /DIR="X:Target_directory"

or:

>nomachine-packageName_packageVersion.exe /VERYSILENT /DIR="X:Target_directory"
```

Note for Windows XP: the NoMachine server will not start until the machine is rebooted.

UPDATE
The update procedure for server and node installations requires to stop all NoMachine services in order to correctly replace libraries and binaries. This implies that the Cloud Server is not accessible to users during the update procedure. Users can connect later to recover their sessions on any of the federated servers.

There are two ways to update your current installation:

I Automatic updates

You can update your installation from our repositories. Just run the NoMachine GUI from your Programs Menu and access the 'Settings' panel and click on 'Server preferences'. Go to the 'Updates' GUI and click on the 'Check now' button.

NoMachine has the automatic check for updates enabled: it will check by default our repositories every two days to verify if updates are available. In this case, the server will prompt a dialog informing that a new version is available but **it will never automatically update the current installation**.

Checking for updates can be disabled from that dialog by selecting the 'Don't ask again for this version' option or in the Updates panel by unchecking the 'Automatically check for updates' option.

Detailed instructions for configuring the Automatic Updates are available in this separate document: https://www.nomachine.com/DT10O00149 .

Note: Due to heavy changes between versions 5 and 6, the automatic updates are disabled: it's therefore necessary to upgrade NoMachine Cloud Server v. 5 by using packages.

II Update with NoMachine packages

Alternatively, download the latest available package from the NoMachine web site and click on the executable file to launch Setup. As for the installation, Setup will guide you through all steps necessary for updating your installation.

If you own a **customer license** we recommend to download the package from your Customer Area: https://www.nomachine.com/support#login.

UNINSTALL
You can uninstall NoMachine Cloud Server from the Windows Control Panel and the 'Add or Remove Programs' in Windows XP or 'Program and Features' in Windows Vista, 7, 8 or 10. Find the NoMachine program in the list of installed programs and choose to uninstall it.
On Windows 8 or later you can use the Search box from the Charms bar on the right side of the screen: type Control Panel to open it. Then access the Programs - 'Uninstall a program' panel.
On Windows 7, Vista and XP, click on the Start button and click to open the Control panel from the Start menu. Then access panel 'Programs and Features' or 'Add or Remove Programs', depending on your Windows version.

Reboot is requested to complete the uninstalling process.

TIP

To **uninstall from a CMD console**, move to C:/ProgramData/NoMachine/var/uninstall/ (if you are on Vista/7/8/10) or to C:/Documents and Settings/All Users/NoMachine/var/uninstall/ (if you are on XP). Then run:

```
> unins000.exe /silent

or:

> unins000.exe /verysilent
```

Uninstalling is completed when your command prompt is back. Then, your computer will restart automatically.

2.3. Mac Installations

INSTALL
Download the DMG package from the NoMachine web site. Double-click on the disk Image to open it and see the package icon. Then double-click on the package icon to install the program: the installer will take you through the installation.

If you own a customer license we recommend to download the package from your Customer Area: https://www.nomachine.com/support#login.

TIP

To install from the command line, run:

```
$ NXMOUNTDIR=$(echo `hdiutil mount nomachine-cloud-server_version.dmg | tail -1 | awk '{$1=$2=""; print $0}'` | xargs -0 echo)

$ sudo installer -pkg "${NXMOUNTDIR}/NoMachine.pkg" -target /
```

UPDATE
The update procedure for server and node installations requires to stop all NoMachine services in order to correctly replace libraries and binaries. This implies that the Cloud Server is not accessible to users during the update procedure. Users can connect later to recover their sessions on any of the federated servers.

There are two ways to update your current installation:

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Note: Due to heavy changes between versions 5 and 6, the automatic updates are disabled: it's therefore necessary to upgrade NoMachine Cloud Server v. 5 by using packages.

II Update with NoMachine packages

Alternatively, download the latest available package from the NoMachine web site and click on the executable file to launch Setup. As for the installation, Setup will guide you through all steps necessary for updating your installation.

If you own a **customer license** we recommend to download the package from your Customer Area: https://www.nomachine.com/support#login.

UNINSTALL
To uninstall the Cloud Server drag and drop NoMachine from Applications to trash or select 'Move to trash' from the mouse button menu. This will uninstall all the NoMachine software.

TIP

To **uninstall from command line**, it's enough you remove the NoMachine application directory:

```
$ sudo rm -rf /Applications/NoMachine.app
```

2.4. Linux Installations

Installing for the first time
You can install, update and uninstall using the graphical package manager of your Linux distribution or from command line by running commands from an xterm or similar with the sudo utility, or as root user if you don't have sudo installed. Instructions below refer to installation by command line.

If you own a customer license we recommend to download the package from your Customer Area: https://www.nomachine.com/support#login.

Successive updates
The update procedure for server and node installations requires to stop all NoMachine services in order to correctly replace libraries and binaries. This implies that all running sessions are terminated during the update procedure and cannot be recovered later. This applies to updates made by using NoMachine packages and to automatic updates from NoMachine repositories.

There are two ways to update your current installation:

I Automatic updates

You can update your installation from our repositories. Just run the NoMachine GUI from your Programs Menu and access the 'Settings' panel and click on 'Server preferences'. Go to the 'Updates' GUI and click on the 'Check now' button.

NoMachine has the automatic check for updates enabled: it will check by default our repositories every two days to verify if updates are available. In this case, the server will prompt a dialog informing that a new version is available but **it will never automatically update the current installation**.

Checking for updates can be disabled from that dialog by selecting the 'Don't ask again for this version' option or in the Updates panel by unchecking the 'Automatically check for updates' option.

Detailed instructions for configuring the Automatic Updates are available in this separate document: https://www.nomachine.com/DT10O00149 .

Note: Due to heavy changes between versions 5 and 6, the automatic updates are disabled: it's therefore necessary to upgrade NoMachine Cloud Server v. 5 by using packages.

II Update with NoMachine packages

Alternatively, download the latest available package from the NoMachine web site and click on

the executable file to launch Setup. As for the installation, Setup will guide you through all steps necessary for updating your installation.

If you own a **customer license** we recommend to download the package from your Customer Area: https://www.nomachine.com/support#login.

2.5. RPM Packages

If you want to **install to default location**, namely /usr/NX/:

INSTALL

```
# rpm -ivh <pkgName>_<pkgVersion>_<arch>.rpm

To find out which NoMachine package you have installed(you will get the full name of the package), run the following command:

# rpm -qa | grep nomachine
```

UPDATE

```
# rpm -Uvh <pkgName>_<pkgVersion>_<arch>.rpm
```

UNINSTALL

```
# rpm -e nomachine-cloud-server
```

TIP

For **non-default locations**, for example /opt/NX:

```
INSTALL

# rpm -ivh <pkgName>_<pkgVersion>_<arch>.rpm --prefix /opt

UPDATE

# rpm -Uvh <pkgName>_<pkgVersion>_<arch>.rpm --prefix /opt

UNINSTALL

# rpm -e nomachine-cloud-server
```

2.6. DEB Packages

If you want to **install to default location**, namely /usr/NX/:

INSTALL

```
$ sudo dpkg -i <pkgName>_<pkgVersion>_<arch>.deb

To find out which NoMachine package you have installed(you will get the full name of the package), run the following command:

$ dpkg -l | grep nomachine
```

UPDATE

```
$ sudo dpkg -i <pkgName>_<pkgVersion>_<arch>.deb
```

UNINSTALL

```
$ sudo dpkg -r nomachine-cloud-server
```

TIP

For **non-default locations**, for example /opt/NX:

INSTALL

```
$ sudo NX_INSTALL_PREFIX=/opt dpkg -i <pkgName>_<pkgVersion>_<arch>.deb
```

UPDATE

```
$ sudo NX_INSTALL_PREFIX=/opt dpkg -i <pkgName>_<pkgVersion>_<arch>.deb
```

UNINSTALL

```
$ sudo dpkg -r nomachine-cloud-server
```

2.7. TAR.GZ Packages

If you want to **install to default location**, namely /usr/NX/, ensure that package is placed there.

INSTALL

```
$ cd /usr

$ sudo tar xvzf <pkgName>_<pkgVersion>_<arch>.tar.gz

$ sudo /usr/NX/nxserver --install
```

UPDATE

```
$ cd /usr

$ sudo tar xvzf <pkgName>_<pkgVersion>_<arch>.tar.gz

$ sudo /usr/NX/nxserver --update
```

UNINSTALL

```
$ sudo /usr/NX/scripts/setup/nxserver --uninstall

$ sudo rm -rf /usr/NX
```

TIP

For **non-default locations**, for example /opt/NX:

INSTALL

```
$ sudo NX_INSTALL_PREFIX=/opt /usr/NX/nxserver --install
```

UPDATE

```
$ sudo NX_INSTALL_PREFIX=/opt /usr/NX/nxserver --update
```

UNINSTALL

```
$ sudo /opt/NX/scripts/setup/nxserver --uninstall
$ sudo rm -rf /opt/NX
```

2.8. Activating the License (for Customers)

Packages include a temporary (30-days) node.lic and server.lic files for evaluation which allows the software to be up-and-running once installed.

Such license files have to be replaced with the customer's license files acquired from NoMachine. This can be done via the NoMachine server GUI in the 'Updates' panel: click on the server.lic and node.lic links to open their license panel and replace the license.

See https://www.nomachine.com/DT10O00155 for more details on the GUI usage, or https://www.nomachine.com/AR11O00942 for more instructions, included commands from a terminal to activate licenses manually.

To verify from command line that server.lic and node.lic are correctly in place and check their validity, you may run the nxserver/nxnode --subscription and --version commands. For example on Linux:

```
$ sudo /etc/NX/nxserver --subscription

$ sudo /etc/NX/nxnode --subscription

$ sudo /etc/NX/nxserver --version

$ sudo /etc/NX/nxnode --version
```

3. Building a Scalable Multi-tier Infrastructure with Centralized Access to Remote Hosts

NoMachine Cloud Server allows to centralize the access to server subsystems, which are independent and globally located. These subsystems can be NoMachine servers or the so called 'foreign servers', i.e. Unix servers which offer SSH connectivity and a X-windows based environment but don't have the NoMachine software installed on.

3.1. Federating NoMachine Servers Under a Cloud Server

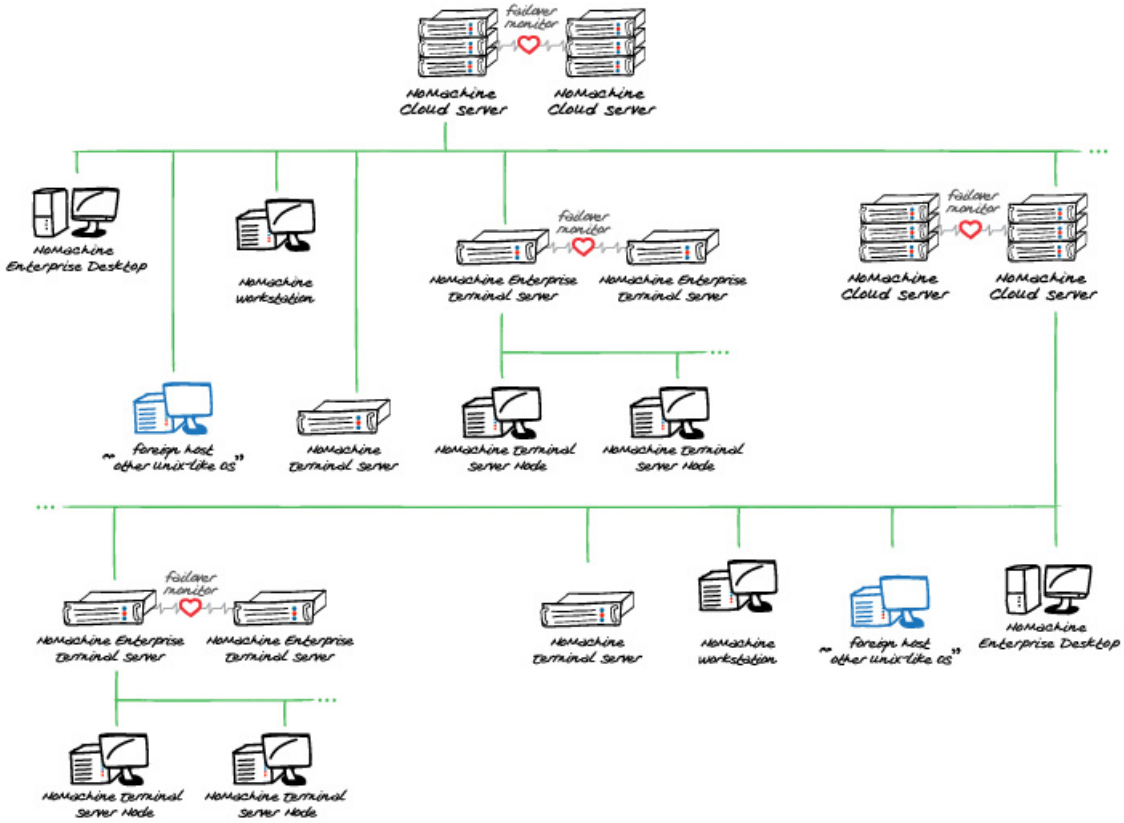
The Cloud Server, we can call it the **main server**, can add a new server (**child server**) to the multi-host infrastructure at any moment and without business discontinuity.

Multiple NoMachine Cloud Servers can be also added to the main server, building in this way a multi-level infrastructure (hierarchy). The main server is the top-level server which rules the whole hierarchy, the other Cloud Servers are multi-tier subsystems, which in turn can be parent servers of other children servers.

We call **first-level servers** those servers that are directly added to the main Cloud Server, second-

level servers are added to first-level servers and so on. All servers are structured in a parent-child hierarchy. Servers' hierarchies can be built from the main Cloud Server.

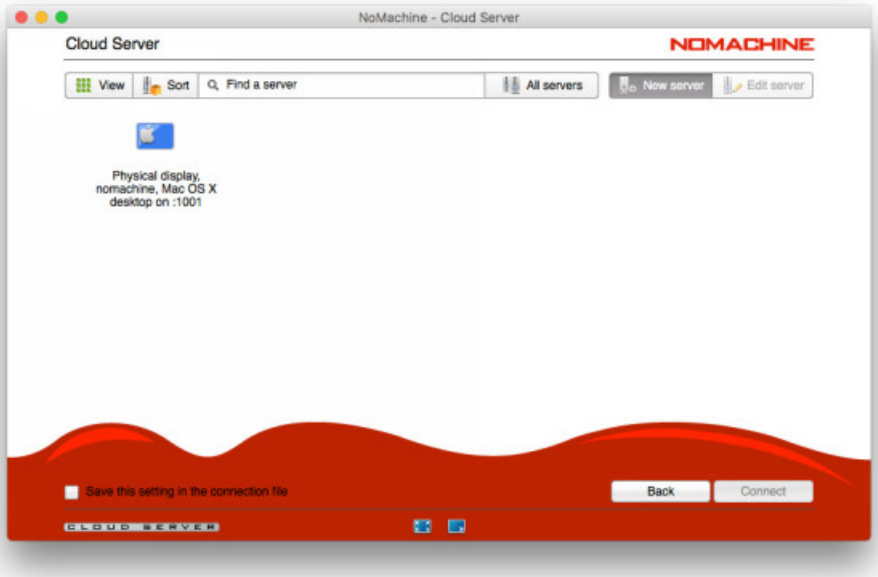
This is an example of **multi-level hierarchical infrastructure**, which includes also foreign servers. Note that the main Cloud Server is in failover cluster with a second Cloud Server to grant high available access to the system:



How to add a NoMachine server to the main Cloud Server
Servers can be federated under the Cloud Server in two ways: via **(i)** the NoMachine GUI or **(ii)** from command line in a console opened on the Cloud Server host.

To add servers via **NoMachine GUI:** log-in to the main Cloud Server by NoMachine client or via browser. Use an account with 'NoMachine administrator' privileges to log-in. On Windows, you can alternatively log-in as Windows administrator, on Mac and Linux as 'root' if this account is available.

Then click on 'New server' and complete all the requested field to federate the server:



Default settings will suffice for the majority of environments. It is possible to configure extra details on how client connections will be forwarded to the selected server by clicking 'Configure'.

Server's commands explained in the next sections correspond to the same configuration options available in the GUI.

TIP

A **NoMachine administrator** is a system account on the Cloud Server (CS) host having special rights to create NoMachine multi-host environments via the client User Interface. To assign such NoMachine privileges to a system user, execute on the CS host:

```
nxserver --useredit USERNAME --administrator yes
```

Once connected via GUI to the main Cloud Server, it's also possible to add a child server to a sub-level Cloud Server: right click on the sub-level Cloud Server to open the context menu and choose 'Show the servers'. This will show you the list of all servers federated under the selected Cloud Server and let you add a new server to it.
Please consult the step-by-tep guide about adding servers to the NoMachine Cloud Server via User Interface in the Tutorial section here: https://www.nomachine.com/all-documents

TIP

To permit users to connect to a sub-level server which is not a first-level child of the main Cloud Server, it's necessary that the client connection is routed via tunnel forwarding. If this method is not available, the client will return an error.

As an alternative to the GUI, it's possible to federate the server also from **command line**.

On the main Cloud Server host, execute the 'nxserver --serveradd' command to federate a NoMachine server, you need to be a system privileged user for doing that:

```
nxserver --serveradd SERVERIP --label "Server Name"

SERVERIP is the IP or hostname of the server to be federated under the Cloud Server. It will become a first-level server.

Specify --label to qualify the server. Such label will be displayed in the list of available servers shown to users in the client GUI. Otherwise 'Default server name' will be displayed.

For example:

nxserver --serveradd 109.155.20.16 --label "Sample Server"
```

Once the server is added, it is assigned with a unique string identifier (**UUID**). Use it to identify the child server and, when necessary, its parent when executing commands to manage it.

You can also federate a Cloud Server under the main Cloud Server and add a child server to it.

To add a child server to a sub-level Cloud Server, you need to know the UUID of this sub-level Cloud Server. The general format of the command, to be executed on the main Cloud Server is:

```
nxserver --serveradd IP_of_child_server --target uuid_of_sub_level_Cloud_server --label "This is a second-level child"
-
```

How to build servers' hierarchies is however dealt in detail in the paragraph dedicated to creating multiple levels of NoMachine servers.

TIP

Server commands to operate on first-level servers (edit, remove etc ...) can be run by specifying the server name in the SERVER:PORT format or its UUID.
When children are not first-level server, it's necessary to provide their UUID and also the UUID of their parent. In practice the command action would look like:*perform this operation on child server XXX which parent UUID is...* The uuid of the parent server is always specified by the --target option.

Default settings and configurations

By **default** the federated server is added with the following settings which are suitable for most cases.

1) Connection between this Cloud Server and the federated server uses the NX protocol on port 4000. Let's call it **server-to-server connection** or **communication**.

2) NoMachine clients' connections by NX protocol are forwarded to the federated server on port 4000. The client authenticates to the federated server with an OTP (One Time Password) **token** which uniquely identifies the client.
Fall back method to OTP token is **tunnel**, which means that the traffic is relayed through the parent server with the protocol specified for the server-to-server communication. This default setting corresponds to the 'serveradd' command option: --forward-nx-methods token,tunnel.

Forwarding method 'system' is also supported.

3) For clients' connections by SSH protocol, the default forward method is **system**, which means that the client will be authenticated to the federated server by using the same credentials already used for authenticating it on the Cloud Server.

Fall back method, as in the previous case, is tunnel. This default setting corresponds to the 'serveradd' command option: --forward-ssh-methods system,tunnel.

For client's SSH connections, OTP token is supported on Mac/Linux Cloud Server and child servers, but it requires to manually configure the system.

4) Users can connect directly to the IP of the child server, i.e. direct access to the federated server is enabled.

5) Once connected to the main Cloud Server, users can manually select to which child server connect. The GUI can list only first-level servers or all levels.

TIP

Default behaviours listed above can be modified by setting the necessary parameter(s). For sake of clarity they are treated separately but multiple custom configurations can be specified on the same command line while executing 'nxserver --serveradd'. Some of these parameters can be changed later via the 'nxserver --serveredit' command.

Setting protocol and port for server-to-server communication

```
nxserver --serveradd SERVERIP [--protocol NX|SSH] [--port PORT]
```

Some examples for Linux or Mac:

Connect this Cloud Server to the federated server by using NX protocol on port 4010. Since the default protocol is already NX, it's not necessary to specify the --protocol option:

```
$ sudo /etc/NX/nxserver --serveradd testdrive.nomachine.com --port 4010
```

Connect this Cloud Server to the federated server by using SSH protocol on port 2222. In this case instead it's necessary to specify also the --protocol option:

```
$ sudo /etc/NX/nxserver --serveradd testdrive2.nomachine.com --protocol SSH --port 2222
```

Qualifying the federated server with a label and/or a comment
Label is a short string (max 80 chars) that can be used to qualify the server for identifying it in a more userfriendly way. Label is shown to end-users. Comment is a longer text (max 1024 chars) that is not shown to end-users but it's visible to administrators in the output of the 'nxserver --serverlist' command. The general format of the command to add the server and specify label and comment is:

```
nxserver --serveradd SERVERIP --label "This is the server name" --comment "This is a longer description of the server."

E.g. on Linux or Mac:

$ sudo /etc/NX/nxserver --serveradd testdrive.nomachine.com --label "TestDrive server" --comment "This is a testdrive server for test purposes."
```

Listing the federated servers
To list all first-level servers federated under the Cloud Server:

```
nxserver --serverlist

The output of this command reports by default the list of first-level servers. The unique name of the federated server is in the SERVER:PORT format. To print extended information, such as the unique identifier (UUID) assigned to each of the first-level servers, its server type and version, use the --extended option:

nxserver --serverlist --extended

The output will provide the following additional information:
UUID, the unique ID of the federated server, e.g. 53532db3-0626-4074-ae50-a87ab1f84538
Parent-UUID, the unique identifier of its parent. In case of first-level servers, Parent-UUID is the ID of the main Cloud Server
Manual-S, the flag showing if the server is available for user's manual selection.
Product, the acronym of the server type e.g. ED stays for Enterprise Desktop, WS for Workstation etc ...
OS, the operating system of the NoMachine server host
Comment, the long description of the server if provided by the administrator

In order to display a multi-level list of servers (not only first-level servers) and map the NoMachine hierarchical infrastructure, use:

nxserver --serverlist --all

To see information about a specific server, provide its name or UUID:

nxserver --serverlist SERVER:PORT | UUID [--extended]

E.g. on Linux or Mac:

$ sudo /etc/NX/nxserver --serverlist testdrive.nomachine.com:4000 --extended
```

Changing settings

In order to change settings for any of the federated servers, use the following command:

```
nxserver --serveredit SERVER:PORT | UUID OPTION

where SERVER:PORT is the name of the federated server and UUID is the unique string identifier. OPTION is any of the parameters available for the --serveradd command except those for setting connection protocol,port and the 'foreign' qualifier. To change them, delete the federate server and add it again by specifying the new settings.

For non-first level servers, specify their parent UUID:

nxserver --serveredit UUID --target PARENT_UUID OPTION
```

Removing a child server

```
nxserver --serverdel SERVER:PORT | UUID

For non-first level servers, specify their parent UUID:

nxserver --serverdel UUID --target PARENT_UUID
```

Stopping/starting a child server

Stopping any of the federated servers means that it will no longer accept new connections. Current connections will stay running.

```
nxserver --serverstop SERVER:PORT | UUID

To enable accepting new connections, start the child server:

nxserver --serverstart SERVER:PORT | UUID

and to monitor its status:

nxserver --serverstatus SERVER:PORT | UUID

For non-first level servers, specify their parent UUID:

nxserver --serverstop UUID --target PARENT_UUID

nxserver --serverstart UUID --target PARENT_UUID

nxserver --serverstatus UUID --target PARENT_UUID
```

Further configurations

How to forbid direct connections to the child server
By default the federated server accepts connections to its IP. To force users connecting only through the main Cloud Server, you can disable direct access:

```
nxserver --serveradd SERVERIP --direct-access no

E.g. (for Linux or Mac), do not permit users to connect directly to the federated server host:

$ sudo /etc/NX/nxserver --serveradd testdrive4.nomachine.com --direct-access no

Direct access can be re-enabled at any moment by running:

$ sudo /etc/NX/nxserver --serveredit UUID --direct-access no

To disable direct access to a non-first level server, remember to specify it's parent uuid:

nxserver --serveredit UUID --target PARENT_UUID --direct-access no
```

How to remove a child server from the list of servers displayed to users
By default all federated servers are available for the manual selection and are listed in the client GUI once users are connected to the main Cloud Server. The All servers/Child servers switch in the GUI allows to show all servers or only the first-level ones. To hide a server from the list presented to users, disable the manual selection option for the given server:

```
nxserver --serveradd SERVERIP --manual-selection no

E.g. on Linux or Mac:

$ sudo /etc/NX/nxserver --serveradd testdrive5.nomachine.com --manual-selection no

To disable manual selection for a non-first level server, remember to specify it's parent uuid:

nxserver --serveradd SERVERIP --target PARENT_UUID --manual-selection no
```

The server with 'manual selection' disabled is not listed among the available servers in the client GUI. You then need to assign users to the federated server by means of 'nxserver --useradd' or 'nxserver --useredit' commands if you want to let users access it.

3.2. Creating Multiple Levels of NoMachine Servers

There are two ways for adding child servers to a sub-level Cloud Server:

I Connect to the sub-level Cloud Server (first method)

Given that the sub-level Cloud Server is already federated under the main Cloud Server, connect to it via GUI for adding a server to it or run the 'nxserver --serveradd' command on its host.

II Add the server via the main Cloud Server (second method)

Given that the sub-level Cloud Server is already federated under the main Cloud Server, to add a child: right click on the Cloud Server to open the context menu and choose 'Show the servers'. This will show you the list of all servers federated under the selected Cloud Server and let you add a new server to it.

The server can be added to the sub-level Cloud Server also via command line, in this case it's necessary to provide the '--target Parent-UUID' option.

A practical example for building a multi-level infrastructure from command line
Let's assume to have the following three NoMachine server installations:
Cloud Server 1, CS1
Cloud Server 2, CS2
Enterprise Desktop, ED
CS1 is the main server which will rule the whole infrastructure, we want to federate CS2 under CS1 and ED under CS2.

```
On CS1 execute:

nxserver --serveradd IP_of_CS2 --label "CS2 is a first-level child, its parent is CS1"

Let's retrieve now the UUID of CS2:

nxserver --serverlist --extended

Then we want to federate ED under CS2:

nxserver --serveradd IP_of_ED --target uuid_of_CS2 --label "ED second-level child" --comment "ED is a sub-level child, its parent is CS2"
```

The same server can be a child of more than one Cloud Servers. For example, let's say that we have a fourth NoMachine server, Workstation WS, and that we want to add it to both CS1 and CS2:

```
nxserver --serveradd IP_of_WS --label "WS is a first-level child, its parent is CS1"

nxserver --serveradd IP_of_WS --target uuid_of_CS2 --label "WS is also a sub-level child, its parent is CS2"
```

TIP

Server commands to operate on first-level servers (edit, remove etc ...) can be run by specifying the server name in the SERVER:PORT format or its UUID. When children are not first-level server, it's necessary to provide their UUID and also the UUID of their parent. In practice the command action

would look like:*perform this operation on child server XXX which parent UUID is...* The uuid of the parent server is always specified by the --target option.

3.3. Advanced Configurations for NoMachine Servers' Hierarchy

Default settings for server-to-server communication are suitable in most cases. In specific environments, howewer, it may be necessary to apply a different method for forwarding client connections to the child server, or forwarding the connection on a specific network interface and/or port.

Setting how client connections have to be routed to the child server
Unless there are strict policies which require to define a specific forward method, using the default settings is usually advisable.

The available forward methods are 'token','system' and 'tunnel'. There are different 'serveradd' options to define the forward methods for client connections by NX and SSH protocol.

```
For client connections using the NX protocol:

nxserver --serveradd SERVERIP --forward-nx-methods token | system | tunnel

and for client connections using SSH:

nxserver --serveradd SERVERIP --forward-ssh-methods token | system | tunnel
```

TIPS

I The --forward-nx-methods and --forward-ssh-methods options accept a single value or a comma-separated list of values. Values are positional, i.e. the first item in the list is also the first method attempted. Accepted values are:
token
system
tunnel

II A manual configuration is necessary to use the **token forwarding method** for client connections by SSH protocol.

Some examples for Linux or Mac

```
The following settings correspond to the default behaviour:

$ sudo /etc/NX/nxserver --serveradd testdrive1.nomachine.com --protocol NX --port 4000 --forward-nx-methods
token,tunnel --forward-ssh-methods system,tunnel

and are equivalent to run the command without the additional paramers, like this:
```

```
$ sudo /etc/NX/nxserver --serveradd testdrive1.nomachine.com

This is also equivalent to use:

$ sudo /etc/NX/nxserver --serveradd testdrive1.nomachine.com --protocol NX --port 4000

Tunnel both client connections by NX and SSH protocol through the existing server-to-server connection which uses
NX protocol on port 4010:

$ sudo /etc/NX/nxserver --serveradd testdrive2.nomachine.com --protocol NX --port 4010 --forward-nx-methods tunnel
--forward-ssh-methods tunnel

When users connect by NX protocol, forward client connections and try to use the OTP token for authenticating the
client to the child server:

$ sudo /etc/NX/nxserver --serveradd testdrive3.nomachine.com --forward-nx-methods token
```

Forwarding client connections to the child server on a specific network interface and port
When the client connection is not tunneled, it's possible to specify the network interface and port to be used for the client-child server connection. This can be useful when the server host has multiple NICs and you prefer to have a separate network for Cloud Server and client connections.

```
Specify a different NIC and port for client connections byNX protocol with the following options:

nxserver --serveradd SERVERIP --forward-nx-host SERVER_IP2 --forward-nx-port PORT2

For client connections using theSSH protocol, use instead:

nxserver --serveradd SERVERIP --forward-ssh-host SERVER_IP2 --forward-ssh-port PORT2
```

TIP

In case of non-first level servers and foreign servers, client connections are always tunneled.

3.4. Using the 'token' Forwarding Method for Client Connections by SSH (Advanced)

The token forwarding method for client connections by NX protocol is the default method and doesn't require any additional system configuration. NoMachine provides a built-in mechanism to generate the One Time Password and to use it for identifying the client.

In case of client connections by SSH protocol, instead, it relies on PAM-SSH for authenticating the token.

NoMachine provides a specific module, **pam_nxtoken.so** for this purpose and this module has to be added to the system PAM SSH configuration. The token forwarding method can be used only if the child server is Linux or Mac.

On Linux systems with SELinux enabled and not running in permissive mode, it's also necessary to add a policy to the SELinux configuration to permit the communication between SSHD and NoMachine in order to allow to authenticate the client with the OTP token.

Configuring Mac for using the pam_nxtoken.so module
Identify the sshd_config and sshd configuration files on your system:
Mac 10.11 and higher
/etc/ssh/sshd_config
/etc/pam.d/sshd
Mac versions up to 10.10
/etc/sshd_config
/etc/pam.d/sshd

Add the following entries to the **sshd_config** file:
PasswordAuthentication no
PermitEmptyPasswords no
ChallengeResponseAuthentication yes
UsePAM yes

Add the following entries to the beginning of the **sshd** file
auth sufficient /Applications/NoMachine.app/Contents/Frameworks/lib/pam_nxtoken.so

Finally, restart SSHD.

Configuring Linux for using the pam_nxtoken.so module
Identify the sshd_config and sshd configuration files on your system, namely:
/etc/ssh/sshd_config
/etc/pam.d/sshd

Add the following entries to the **sshd_config** file:
PasswordAuthentication no
PermitEmptyPasswords no
ChallengeResponseAuthentication yes
UsePAM yes

Add the following entry to the beginning of the **sshd** file:
auth sufficient /usr/NX/lib/pam_nxtoken.so

If it's a **Debian-based** system, add instead:
auth sufficient /usr/NX/lib/pam_nxtoken.so
auth [success=done default=ignore] pam_unix.so try_first_pass use_authtok

If the second entry is no added, users may be asked twice for password.

Finally, restart SSHD.

TIPS

I

In some cases, SSHD is not able to authorize the client to the federated server. This might be caused by permissions set for the user's ~/.ssh directory and files. Proper permissions are:
~/.ssh: 0700/drwx------
~/.ssh/authorized_keys: 0600/-rw-------
~/.ssh/authorized_keys2: 0600/-rw-------
~/.ssh/known_hosts: 0600/-rw-------

II

The 'nxserver --serveradd' command can hang on Linux when LDAP or Active Directory is used. To solve that, edit the sshd file and modify it as it follows.

For **LDAP** users
remove the common-auth entry and add these lines (the first entry should be already present if you have applied instructions above):
auth sufficient /usr/NX/lib/pam_nxtoken.so
auth [success=2 default=ignore] pam_unix.so nullok_secure try_first_pass use_authtok
auth [success=1 default=ignore] pam_ldap.so use_first_pass
auth [success=2 default=ignore] pam_unix.so nullok_secure try_first_pass use_authtok
auth [success=1 default=ignore] pam_ldap.so use_first_pass
auth [success=2 default=ignore] pam_unix.so nullok_secure try_first_pass use_authtok
auth [success=1 default=ignore] pam_ldap.so use_first_pass

For **Active Directory** users add instead these lines (the first entry should be already present if you have applied instructions above):

auth sufficient /usr/NX/lib/pam_nxtoken.so
auth sufficient pam_centrifydc.so try_first_pass use_authtok

Additional instructions for SELinux configuration

In order to add the necessary SELinux policy, NoMachine will use a script which is able to retrieve the port on which the 'nxserver --daemon' process is listening and opening it in the SELinux configuration. Other two scripts will be also necessary to clean-up possible left-over policies and remove the current policy once NoMachine is shutdown.

These scripts will be executed as 'nx' user and require that the nx user can use 'sudo' without password. To ensure that, add the following line to the /etc/sudoers file:
nx ALL=(ALL) NOPASSWD: ALL

Scripts to configure SELinux will be executed when the 'nxserver --daemon' process is started (e.g. at reboot or when the 'nxserver --restart' command is given) and stopped. They must be placed in a directory accessible by the nx user and have read,write and executable permissions (744 or 700).

To instruct NoMachine to execute such scripts, edit the /usr/NX/etc/server.cfg file, uncomment and provide path to the correspondent script into the following keys: ScriptBeforeServerDaemonStop
ScriptAfterServerDaemonStart
ScriptBeforeServerDaemonStart

Provide in ScriptBeforeServerDaemonStop the script to clean-up the SELinux policy if it already exists.
Configure ScriptAfterServerDaemonStart to execute the script for adding the SELinux policy.
In the ScriptBeforeServerDaemonStart key set instead the script to remove the policy when NoMachine

is shutdown.

We prepared the following scripts as an example, they were made for Fedora 26 but can be easily modified to fit different systems.

In particular since path to 'semanage' can be different, you may verify that by running:

```
which semanage
```

and change the path used in the following scripts accordingly.

clean_up_token_policy.sh

```
#!/bin/bash

if [ -e /tmp/selinux ]
then
while read nxport;
do
`/usr/bin/sudo /usr/sbin/semanage port -d -t ssh_port_t -p tcp $nxport`
done < /tmp/selinux;

rm /tmp/selinux;
fi
```

add_token_policy.sh

```
#!/bin/bash

nxdaemonport=$(/usr/bin/sudo cat /usr/NX/var/db/server/port);
`/usr/bin/sudo /usr/sbin/semanage port -a -t ssh_port_t -p tcp $nxdaemonport`
if [ $? -eq "0" ]
then
echo $nxdaemonport > /tmp/selinux;
fi
```

remove_token_policy.sh

```
#!/bin/bash

nxdaemonport=$(/usr/bin/sudo cat /usr/NX/var/db/server/port);

`/usr/bin/sudo /usr/sbin/semanage port -d -t ssh_port_t -p tcp $nxdaemonport`

rm /tmp/selinux;
```

We placed these scripts in the home directory of the nx user: /var/NX/nx/ and set permissions 740.

Then we configured the server accordingly:
ScriptBeforeServerDaemonStop "/var/NX/nx/clean_up_token_policy.sh"

ScriptAfterServerDaemonStart "/var/NX/nx/add_token_policy.sh"
ScriptBeforeServerDaemonStart "/var/NX/nx/remove_token_policy.sh"

Finally we restarted NoMachine in order to execute the script for adding the necessary SELinux policy.

3.5. Federating 'Foreign servers' under a Cloud Server

NoMachine Cloud Server allows also to federate the so called 'foreign servers', which are Unix-like hosts running an unsupported Operating System for which we don't build native packages.

Pre-requisites to integrate a Foreign server in the NoMachine hierarchical infrastructure are:
1. A Unix-based operating system is running on the Foreign server host, e.g. Solaris X86 , HP-UX, AIX, BSD etc ...

2. An X server is up and running on the Foreign server host.

3. The X server listens for TCP connections.

This is necessary to let the X server listen to remote connections from clients and enables the X11 forwarding from an external host. Please consult the official documentation of your Linux distribution for instructions and advices.

4. A desktop environment (e.g. GNOME) is installed on the Foreign server host.

5. A system account is present for each user who will need to log-in from remote to the Foreign server host.

6. The xauth command is installed on the Foreign server host.

7. The foreign server has SSH connectivity.

To add the Foreign server to the main Cloud Server, on the Cloud Server host execute the following command:

```
nxserver --serveradd <foreign server IP or hostname> --foreign

Further options:

nxserver --serveradd <foreign server IP or hostname> [ --manual-selection yes | no ] [ --label <label>] [ --comment <comment>]
```

3.6. Assigning Users to a Single Federated Server (optional)

In the default configuration, all the available servers are listed to users, which will then be able to choose any of them. If the 'manual selection' is disabled for a child server, this server will be not listed to users. In this case, users will be able to connect to such server only if they have been explicitly

redirected or assigned.

Assigning the user to a federated server is not mandatory but if this is set, the user's connection will be transparently routed to the specific server, even if it doesn't have the manual selection disabled.

User's assignment can be modified, set and unset at any moment.

There are three ways for routing user's connections to a given server.

FIRST METHOD, --redirect:
redirect the user's connection by username or client IP. This method doesn't require that the target server is federated under the Cloud Server.

SECOND METHOD, --forward-connection: forward the user's connection to the federated server. Depending on settings applied to the child server, client connections can be redirected (client will authenticate with a token or system credentials) or tunneled through the parent server.

Main differences between the two methods
When **--redirect** is used (first method in the list above), user's connection can be redirected by client IP or by username. In this last case it can be redirected before or after the user's login. Only if the connection is redirected after user's log-in, the user is not requested to authenticate on the target server. Redirection by username can be set on a **per user-basis** or on a **per-group basis**. When the user belongs to multiple groups, the directive set for the group with highest priority overrides the other settings.
The target server can be whichever type of NoMachine server. This method can also redirect the user's connection to a NoMachine server not federated under this Cloud Server or to a server that it's not a first-level one.

When **--forward-connection** is used (second method), the server must be federated under the Cloud Server.

TIP

If the user or the group has both the '--redirect' and '--forward-connection' options set, the '--redirect' setting overrides the other one.

FIRST METHOD:
redirect the user's connection by username or client IP

Redirection can be modified, set and unset at any moment.

Redirecting per-Client IP

```
nxserver --hostadd CLIENT --redirect SERVER:PORT

where CLIENT can be hostname or IP address. A family of IP addresses can be set by using the star wildcard. SERVER is the hostname or IP address of the server where the client will be redirected and PORT is the port where the client will contact that server.
```

By default redirection is done before the user's authentication on the system. To make it occur after user's authentication, use the '--switch afterauthentication' parameter.

For example on Linux or Mac

```
redirect client 152.4.56.2 to testdrive.nomachine.com

$ sudo /etc/NX/nxserver --hostadd 152.4.56.2 --redirect testdrive.nomachine.com:4000 --switch afterauthentication
```

TIP

Multiple directives to redirect the same client IPs or hostnames to different servers are disallowed. To redirect a family of client IPs, use the * wildcard. For example (on Linux or Mac):

```
$ sudo /etc/NX/nxserver --hostadd 192.168.*.* --redirect testdrive.nomachine.com:4000
```

Redirecting per-username
To redirect the given user, use:

```
nxserver --useradd USERNAME --redirect SERVER:PORT

or, if the system account has to be created on the Cloud Server:

nxserver --useradd USERNAME --system --redirect SERVER:PORT
```

Some examples (for Linux and Mac)

```
Create a new system user and redirect him/her to server testdrive.nomachine.com (user must have an account also on testdrive)

$ sudo /etc/NX/nxserver --useradd nxtest01 --system --redirect testdrive.nomachine.com:4000

Redirect an existing user:

$ sudo /etc/NX/nxserver --useradd nxtest02 --redirect testdrive.nomachine.com:4000

Create a group of NoMachine users on the Cloud Server, if it doesn't exists already, and specify the --redirect option to redirect all users of such group to the given host:

nxserver --groupadd GROUPNAME --redirect SERVER:PORT

To create a new user on the Cloud Server and add it to the group:

nxserver --useradd USERNAME --group GROUPNAME

To add an existing user to the group:
```

```
nxserver --useredit USERNAME --group GROUPNAME
```

Listing redirection directives set per clients

```
nxserver --hostlist

To list instead the directive set for a specific client IP or family of IP addresses, specify the client:

nxserver --hostlist CLIENT

CLIENT can be hostname or IP address, or IP address family specified by using the star wildcard to list all the available directives for that family
```

List redirection directives set per users

The redirection directive, if set for the user, is displayed as output of the 'nxserver --userlist' command used to list all the users. Run:

```
nxserver --userlist

or to display details about a single user:

nxserver --userlist USERNAME

or about groups of users:

nxserver --grouplist
```

Modifying redirection directive set per client

```
nxserver --hostedit CLIENT --redirect SERVER:PORT [ --switch beforeauthentication | afterauthentication ]

For example change redirection settings to redirect client 192.168.2.222 to a new server, nxhost.nomachine.com:

$ sudo /etc/NX/nxserver --hostedit 192.168.2.222 --redirect nxhost.nomachine.com:4000
```

Modifying redirection directive set per user

To modify IP or hostname and port of the server where sessions run by that user will be redirected, use:

```
nxserver --useredit USERNAME --redirect SERVER:PORT

For example, to redirect system user nxtest01 to testdrive:

sudo /etc/NX/nxserver --useredit nxtest01 --redirect testdrive.nomachine.com:4000
```

```
To modify directive set for a given group:

nxserver --groupedit GROUPNAME --redirect SERVER:PORT
```

Removing redirection directives set per client

```
nxserver --hostdel CLIENT
```

Removing redirection directive set per user(s)

```
nxserver --useredit USERNAME --redirect none

or remove redirection directive set per group of users:

nxserver --groupedit USERNAME --redirect none
```

SECOND METHOD:
assign the user to a federated server

User's connections can be forwarded to a specific target server, given that such server is federated under this Cloud Server.

A practical example

```
Federate testdrive.nomachine.com under this Cloud Server. Unless there are specific policies, it's not necessary to change default settings. The --forward-nx-method and --forward-ssh-method parameters can therefore be omitted:

nxserver --serveradd testdrive.nomachine.com

Let's assume that user nxtest01 has already a system account on the Cloud Server and on testdrive.nomachine.com, let's assign him/her to testdrive:

$ sudo /etc/NX/nxserver --useredit nxtest01 --forward-connection testdrive.nomachine.com:4000

When user nxtest01 connects to this Cloud Server, the client connection will be automatically routed to testdrive.
```

The --forward-connection option can be set also on a **per-group** of users basis:

```
nxserver --groupadd GROUPNAME --forward-connection SERVER:PORT | UUID

nxserver --groupedit GROUPNAME --forward-connection SERVER:PORT | UUID
```

TIP

The server's **UUID** is the unique string identifier of the federated server. Run 'nxserver --serverlist --extended' to retrieve it.

Listing forwarding directives
The forwarding directive is displayed as output of the nxserver --userlist command used to list all the users:

```
nxserver --userlist

It's also possible to display details only about one single user with:

nxserver --userlist USERNAME

To list the forwarding directive set on a per-group basis, use:

nxserver --grouplist [GROUPNAME]
```

Removing the forwarding

```
nxserver --useredit USERNAME --forward-connection none

or, to remove the forwarding for a group:

nxserver --groupedit GROUPNAME --forward-connection none
```

3.7. Assigning Users to a Pool of Federated Server (optional)

Since v. 6.1, the Cloud Server allows administrators to assign the user or the group of users to a pool of child servers. In this way, when the user connects to the Cloud Server, he/she will see only a subset of servers and will be able to choose to which one to connect among them.

For example if servers federated under the Cloud Server are ED1, ED2, WS1, WS2 and WS3, administrator can configure the Cloud Server to make ED1 and ED2 visible to userA (but not to userB) and WS1, WS2 and WS3 visible to userB (but not to userA).

The general format of the command to allow/deny a child server is:

```
nxserver --ruleadd --class server --type UUID | SERVER:PORT --value no | yes OPTIONS

where UUID is the unique ID of the federated server (retrieve it from the output of 'nxserver --serverlist --extended'
```

```
command).
If the server is a first-level child (i.e. its parent is this Cloud Server), it's possible to specify it by the SERVER:PORT pair, as it appears in the 'Server' column in the output of the 'nxserver --serverlist' command.
OPTIONS can be any of the following options:
--system (this is the default and can be omitted in the command line)
-- user USERNAME
--group GROUPNAME
--guest

For example, let's say the the Cloud Server has four child servers: ED1, ED2, WS3 and WS4.
First of all, let's retrieve their UUID and server name:

sudo /etc/nxserver --serverlist --extended

which provides in our example:
7596bc90-f81c-483e-9d91-4571dc582596, ED1:4000
bd23e474-38cc-44d2-af06-efad27d56939, ED2:4000
53532db3-0626-4074-ae50-a87ab1f84538, WS3:22
453a8dfc-486b-476d-aeb3-34beb2c790b6, WS4:2222

If we want to deny ED1 and ED2 for user nxtest01 but allow WS3 and WS4, it's enough to create rules to deny ED1 and ED2:

sudo /etc/nxserver --ruleadd --class server --type 7596bc90-f81c-483e-9d91-4571dc582596 --value no --user nxtest01
sudo /etc/nxserver --ruleadd --class server --type ED2:4000 --value no --user nxtest01

In a similar way, it's possible to specify a pool of servers for a given group. For example, deny all servers to all users but allow users of group nxgroup01 to access ED1 and ED2:

sudo /etc/nxserver --ruleadd --class server --type 7596bc90-f81c-483e-9d91-4571dc582596 --value no
sudo /etc/nxserver --ruleadd --class server --type ED2:4000 --value no
sudo /etc/nxserver --ruleadd --class server --type WS3:22 --value no
sudo /etc/nxserver --ruleadd --class server --type WS4:2222 --value no

sudo /etc/nxserver --ruleadd --class server --type 7596bc90-f81c-483e-9d91-4571dc582596 --value yes --group nxgroup01
sudo /etc/nxserver --ruleadd --class server --type ED2:4000 --value yes --group nxgroup01

When support for guest users is enabled (see the corresponding chapter in this guide), a subset of servers can be defined only for guests by using the --guest option. E.g.:

sudo /etc/nxserver --ruleadd --class server --type WS4:2222 --value yes --guest
```

To remove rules:

```
nxserver --ruledel --class server --type TYPE OPTIONS

Where TYPE is the specific rule and OPTIONS is any of the following ones:
--system (this is the default and can be omitted in the command line)
-- user USERNAME
--group GROUPNAME
--guest
```

For example, remove the rule which allows user nxtest01 to access child server ED1:

```
sudo /etc/NX/nxserver --ruledel --class server --type 7596bc90-f81c-483e-9d91-4571dc582596 --user nxtest01
```

To remove all rules set for the given user, or group or guests:

```
nxserver --ruledel OPTIONS
```

For example:

```
sudo /etc/NX/nxserver --ruledel --group nxgroup01
```

3.8. Setting-up a Failover Cluster with a Second Cloud Server (optional)

A NoMachine failover cluster is a group of two Cloud Servers that work together to maintain high available access to the centralized infrastructure. This is an active/passive cluster where the primary server is at the beginning active and ready to accept users' connections, while the secondary server is passive, its task is to constantly monitor the primary server.

When the secondary server loses contact with the primary server, the cluster failover occurs: the secondary server takes place of the primary server to grant the continuity of services. Sessions running on the remote nodes continue to stay connected, management of server-node connections is passed from the primary to the secondary server, the virtual IP of the cluster is taken by the secondary server, an ARP notification is sent to local network devices to update their ARP cache entries (Ethernet MAC to IP address link associations).

TIPS

I If the Cloud Server has already a number of federated servers and you want to set it in a failover cluster, just create the cluster. The multi-server environment doesn't need further configurations. Please note that when the failover cluster is set, the uuid of the main Cloud Server will be different. Additionally, users will then have to connect to the shared IP of the cluster server, not to the IP of the main Cloud Server as before.

II If the Cloud Server is instead a federated server, it's necessary to remove it from the multi-host environment before setting it in a failover cluster. Then create the failover cluster. Finally federate it again under its parent Cloud Server by specifying the shared IP of the failover cluster, not the IP of the single Cloud Server.

Set-up the failover cluster

STEP 1: Identify which Cloud Server host will be the primary server (CS1) and which will be the secondary server (CS2).

STEP 2: Ensure that CS1 is already configured as federation server, i.e. all the required servers

subsystems have been already added to this Cloud Server.

STEP 3: Set-up the 'primary server' role to CS1.

On **CS1** execute:

```
nxserver --clusteradd --local <local IP of CS1> --shared <IP of the cluster host>
```

Optionally you may specify the following parameters to the 'nxserver --clusteradd' command:

Parameter	Description
--master SERVER	If you want to specify a primary server different from CS1, use the --master option. We strongly advise for sake of simplicity, to set-up the cluster from the primary server host
--proto PROTOCOL:PORT	The supported protocols are NX and SSH which uses port 4000 and 22 respectively. Protocols and ports can be specified as a comma-separated list by using the --proto option, e.g. '--proto nx:4000,ssh:22' or '--proto nx:4000,ssh:4022' on Windows
--interface INTERFACE	The virtual network interface (by default eth0:0) is always created on the primary server. It's created on the secondary server only when it's detected that connection with the primary server is lost.
--netmask MASK	--interface and --netmask parameters allow to set-up a network interface and subnet mask for the cluster different from the default 'eth0:0' and '255.255.255.0'
--grace TIME and --retry VALUE	Grace period is time to be elapsed at cluster startup before initiating the failover procedure and is set by default to 30 seconds while retry interval is 10 seconds. Change them by using the --grace and --retry options respectively
--probe TIME and --interval VALUE	Probe timeout indicates for how long cluster monitor must stay connected to a cluster machine and interval for probing specify how often the monitor must probe status of cluster machines. They are set to 60 and 5 seconds. Provide --probe and --interval to modify these values
--timeout VALUE	Cluster timeout is for how long cluster monitor has to wait before considering the machine as faulty. It is set to 10 seconds. It can be modified by issuing the --timeout parameter

STEP 4:
Set-up the 'secondary server' role to CS2

Always on **CS1** execute:

```
nxserver --clusteradd <local IP of CS2>
```

STEP 5:
Restart CS1 and CS2

Firstly on **CS1**, then on **CS2** execute:

```
nxserver --restart
```

TIP

It's mandatory to restart both the primary and the secondary server.

A practical example
Target is to set-up the failover cluster between 2 NoMachine Cloud Servers hosts, Cloud1 and Cloud2. This example assumes that they are both Linux hosts.

1. Install your Cloud Server on Cloud1.

2. Federate the necessary servers under Cloud1 via:

```
nxserver --serveradd <ip of the server>

For example:

$ sudo /etc/NX/nxserver --serveradd 172.17.10.12
```

3. Install your second Cloud Server on Cloud2.

4. Assign to Cloud1 the active role **(execute the command on Cloud1)**

```
nxserver --clusteradd --local <ip of Cloud1> --shared <virtual IP to be shared across both Cloud Servers> --netmask <netmask, only needed if different than 255.255.255.0>

For example:

$ sudo /etc/NX/nxserver --clusteradd --local 172.17.10.10 --shared 172.17.10.100 --netmask 255.255.0.0
```

5. Associate the second Cloud Server to the cluster with the following command **(execute the command on Cloud1):**

```
nxserver --clusteradd <IP of second Cloud Server, Cloud2> --netmask <netmask, only needed if different than 255.255.255.0>

For example:

$ sudo /etc/NX/nxserver --clusteradd 172.17.10.11 --netmask 255.255.0.0
```

6. Restart nxserver on **Cloud1**:

```
nxserver --restart
```

7. Restart nxserver on **Cloud2**:

```
```

```
nxserver --restart
```

8. Connect via NoMachine client or browser to virtual IP (172.17.10.100)

Finally, you can then verify that high-availability works as expected.

9. Kill Cloud1: you will be disconnected.

10. Reconnect to virtual IP (172.17.10.100) while leaving Cloud1 down and you should be given the option connect again as Cloud2 should have now taken over duty.

3.9. Tuning the Failover Cluster Parameters

Default settings apply to the most common cases. It may be necessary, however, to tune some parameters to fit some specific business requirements or network conditions. These are the default settings which define the cluster's heartbeat and rule health detection between the two NoMachine servers in the cluster.

Health detection parameters	Threshold/Interval	Default value (seconds)
Define time to be elapsed (grace period) before failover is triggered and attempts' frequency (retry interval)	Grace period Retry interval	30 10
Define frequency for sending heartbeat (interval) and for how long the cluster monitor has to stay connected (probe time)	Interval Probe time	5 60
Define time to be elapsed before the cluster monitor considers the machine faulty	Timeout	10

The global failover time depends on:

global failover time = grace period + timeout + router's convergence time

3.10. Administering the Failover Cluster

Replacing the RSA key pair for the Failover Cluster (optional)
The primary and secondary Cloud Servers use a RSA key pair to connect and synchronize information between their databases. This key pair is valid only for the nx user. You may replace the default RSA key-pair provided with the installation by generating your own key-pair.

See https://www.nomachine.com/DT03O00127 for detailed instructions about how to replace the default RSA key-pair for the Cluster.

Once replaced, remember to update the cluster configuration by running on the primary Cloud Server **or** on the secondary Cloud Server (configurations will be propagated to the other server in the cluster) the following command:

```
nxserver --clusterupdate
```

Changing network interface and/or subnet mask for the given Cloud Server machine

```
nxserver --clusterupdate <Cloud Server IP> --interface <interface> --netmask <mask>
```

Changing IP of localhost, primary server and/or failover cluster

```
nxserver --clusterupdate --local <server IP> --master <server IP> --shared <server IP>
```

Changing Failover Cluster Parameters (heartbeats)

```
nxserver --clusterupdate --grace <time> --retry <number> --probe <time> --interval <number> --timeout <number>
```

Removing a Cloud Server from the Failover Cluster

```
nxserver --clusterdel SERVER_IP
```

Federating a new server to the primary Cloud Server CS1 and updating the Failover Cluster accordingly
Execute on CS1:

```
nxserver --serveradd SERVER_IP

nxserver --clusterupdate
```

Removing any of the federated servers from Cloud Server CS1 and updating the Failover Cluster accordingly
Execute on CS1:

```
nxserver --serverdel SERVER_IP
```

```
nxserver --clusterupdate
```

4. Initiating a NoMachine Connection (end-user's side)

First of all, ensure that the user has a system account on the Cloud Server and on each of the federated servers he/she needs to acces. Username must be the same on all machines, password can be different.

TIP

If you have two Cloud Servers in a failover cluster the same system user's account (username and password) has to be created on both server hosts.

4.1. Connecting by Browsers Via Cloud Server Web Tools

Once installation is complete, Cloud Server is ready to go.

The end-user should point the browser on his/her device to:

http://SERVER:4080

Where SERVER is either the name or IP address of the host you want to reach.

E.g., if Cloud Server is installed on a host named 'myserver.com', the URL will look like this:

http://myserver.com:4080

Connection will be automatically switched to HTTPS protocol:

https://myserver.com:4443/nxwebplayer

In the login form, the end-user has to provide username and password of his/her system account on the Cloud Server host and connect.

Depending on how the Cloud Server is configured, the end-user will:
i) be re-directed to a specific server federated under this Cloud Server

ii) or will access the list of all federated servers with the possibility to choose any of them.

4.2. Connecting by NoMachine Client

From a client device, where you have already installed a NoMachine package type or the Enterprise Client, run the NoMachine GUI from the programs or applications menu. A wizard will take you through the steps necessary to set-up your first connection, just click on 'Create a new connection'. If you prefer to skip the wizard, click on 'Continue'.

The fastest way to create a new connection is to write the name or IP of the NoMachine host you want to connect to in the text field and click on the 'Press enter to create a new connection' link. This method will use the default NX protocol on port 4000.

Alternatively, you can click on the 'New' icon next to the white text field to configure the session in more detail.

Note that IPv6 is supported: specify the IP address of the server host in IPv6 format (e.g. 2001:0:5ef5:79fb:30c6:1516:3ca1:5695) if you want to use it instead of IPv4.

See also the NoMachine Enterprise Client - Installation and Configuration Guide, https://www.nomachine.com/DT04O00140

4.3. Preventing Users from Storing their Credentials

To prevent NoMachine client users from storing their credentials, use the EnableClientCredentialsStoring key in the server configuration file. The accepted values are:
player Only users connected via NoMachine client are enabled to save username and password in the connection file stored on their devices (computer, tablet etc ...)
webplayer Only users connected via browser can choose to save their access credentials. They are stored in the browser's cookie, given that the user's browser has cookies enabled.
both All users, regardless if connected via NoMachine client or via web, can store their credentials.
none Users cannot save their username and password. They will be requested to provide their log-in credentials at each connection.

For example, to allow only users connecting via NoMachine client to store credentials, set in the server configuration file:
EnableClientCredentialsStoring player

5. Configurations and Optimizations for Web Sessions

5.1. Configuring NoMachine Cloud Server

The configuration file for the web player program (which provides the graphical front-end) and the web client program (which manages web sessions) is server.cfg, located in the BaseDirectory/NX/etc directory on Linux, BaseDirectory/NoMachine/etc directory on Windows and

/Applications/NoMachine.app/Contents/Frameworks/etc on Mac.

For example on Linux: /usr/NX/etc/server.cfg.

Default settings
The Section directive defines settings for the NoMachine server(s) where the web player application will connect. This directive, by default, points to localhost and looks like:

```
Section "Server"

Name "Connection to localhost"
Host localhost
Protocol NX
Port 4000
Authentication password

EndSection
```

Name is a label that can be displayed as an alternative to show hostname of the server.
Host is IP or hostname of the NoMachine server host.
Protocol and **Port** indicates protocol and port that web player will use to connect to the NoMachine server.
Authentication defines the authentication method to be used when connecting by the web: 'password' for password-based authentication (default) or 'private-key' for key-based authentication.

Changing protocol and port
By default when users connect via web, they will use the NX protocol on port 4000. Supported protocols are NX and SSH with system login

To use the NX protocol (this is the default), set:

```
Protocol NX
Port 4000
```

To use SSH protocol and system login, set for Linux and Mac:

```
Protocol system
Port 22
```

and for Windows:

```
Protocol system
Port 4022
```

Define the authentication method
When connecting by the web and since v. 6.6.8, it's possible to use password-based authentication or key-based authentication (available at the moment only for the NX protocol).

To use password-based authentication (this is the default), set:

```
Authentication password
```

To use SSH key-based authentication, set:

```
Protocol NX

Authentication private-key
```

TIP

NoMachine uses by default port 22 for SSH protocol on Linux and Mac, and port 4022 on Windows. The default port for NX protocol is 4000. In order to change the port for NX protocol, change the port for the nxd service and restart it. See the paragraph **'Connecting by NX Protocol'**. To change the port for connections by SSH to Linux and Mac hosts it's necessary to modify the listen port for the SSH server on the system. On Windows instead, change the port for the nxsshd service.

Showing hostname or a custom label
To display hostname or IP of the Cloud Server host when connecting by the web, set the following key. This is the default:

EnableWebConnectionName 0

To display the label set in the 'Name' field of Section "Server" set:

EnableWebConnectionName 1

Hiding the tutorial wizard at web session startup
To not display the tutorial wizard for the menu panel at session startup, set:

EnableWebMenuTutorial 0

and to show it (this is the default):

EnableWebMenuTutorial 1

Allowing to log-in as a guest
f the Cloud Server has support for guest accounts enabled, set the following key if you need that users connect by the web always as guest users:

EnableWebGuest 1
If this key is disabled, users will have the possibility to choose if log-in with their credentials or as a guest.

5.2. Managing Cloud Server Web Services

You can start and stop the NoMachine HTTP server (nxhtd) from the Server preferences GUI -> Services panel. From the NoMachine GUI you can also change the port where the web server will be listening (by default 4080 and 4443 for secure connections).

From command line instead it's possible to do the following.

Stop, start or restart nxhtd

```
nxserver --stop nxhtd

or:
```

```
nxserver --start nxhtd

or:

nxserver --restart nxhtd
```

Automatic restart of the nxhtd service
Each service is automatically restarted at the next boot. You can change the default behavior for the nxhtd service by setting:

```
nxserver --startmode nxhtd manual

or to enable the automatic restart of the service:

nxserver --startmode nxhtd automatic
```

The nxserver --startmode command operates on the StartHTTPDaemon server configuration key:

StartHTTPDaemon Automatic

and:

StartHTTPDaemon Manual

Disabling the starting of the NoMachine HTTP server
Edit the server configuration file and remove HTTP from the ClientConnectionMethods key. It should then look like:

Then restart NoMachine server to make this change effective:

```
nxserver --restart
```

5.3. Using an Alternative Apache Web Server

NoMachine Cloud Server is designed to provide a fully integrated service to deploy sessions on the web which doesn't require additional software to be installed or manual configuration. The minimal Apache web server, nxhtd, provides the necessary modules and is pre-configured to work with the web player application.

However, it is possible to run the web player application with an alternative Apache web server. This requires the configuration of Apache and the web player.

Instructions are available at: https://www.nomachine.com/DT03O00128

5.4. Web Optimizations: Using WebRTC (Real-Time Web Communication)

The implementation of WebRTC support in browser-based remote desktop sessions has inititally been released as beta and must be enabled explicitly by the administrator by editing the server.cfg file.

With the help of a STUN/TURN server for negotiating NAT traversal, peer-to-peer WebRTC communication can be established also when the web session has to be run behind a NAT.

STEP 1: Uncomment and set the AcceptedWebMethods key as follows to enable the use of WebRTC:

AcceptedWebMethods webrtc

STEP 2: If the node machine where the web session will be started is behind a NAT, you need to uncomment the following section in server.cfg:

Section "STUN"

Host hostname
Port portnumber
User username
Password password

EndSection

and provide relevant information to contact a STUN or TURN server. In this last case change Section name to "TURN".

See also: https://www.nomachine.com/AR07N00892 for further intructions about the configuration and: https://www.nomachine.com/AR07N00894 for an example about how to set up your own STUN/TURN server and configure the Cloud Server accordingly.

6. Cloud Server Configuration

6.1. Configuration Files

The configuration files for the nxserver and nxweplayer/nxwebclient programs is server.cfg. The configuration file for the nxnode program is node.cfg.

They are placed in the:
BaseDirectory/NX/etc directory on Linux

BaseDirectory/NoMachine/etc directory on Windows

/Applications/NoMachine.app/Contents/Frameworks/etc/ directory on Mac.

For example on Linux:
/usr/NX/etc/server.cfg
/usr/NX/etc/node.cfg

The Default Configuration
NoMachine Cloud Server comes with a default configuration that is sufficient to grant a working setup in the majority of environments. NoMachine administrators can tune their installation at any moment and according to their specific needs by setting the related configuration keys. In some cases this will require to restart all NoMachine services.

Edit the Configuration Files
NoMachine configuration files are text files made up of a number of key-value pairs. All the configuration files can be edited manually by a text editor. For example 'vi' can be used on Linux and Mac, and 'notepad' on Windows. On Windows it can be necessary that you copy the cfg file in a different place, edit it and move it to the etc directory.

Be sure to uncomment the configuration key (i.e., remove the '#' pre-pended to the key) to set a value different from the default.

When a configuration key supports an on/off status, set value to '0' to disable it and to '1' to enable it.

Make Changes to the Default Configuration Effective
Changes will be effective with the next new connection without the need to restart the server if not otherwise specified.

TIP

Configuration settings apply only to this Cloud Server, they aren't propagated to any of the federated servers (which in turn need to be configured via their configuration files). Additionally, please consider that the Cloud Server doesn't run sessions on its host (except for connections to the physical display made by authorized users like administrators).

7. Services Management

Installation and upgrade procedures take care of configuring and starting all the necessary services to make NoMachine Cloud Server ready to accept connections. The necessary services are configured to be restarted at each reboot of the host machine.

7.1. Accepting Connections

You can stop and start accepting new connections via:

the GUI
from the Server status GUI click on 'Stop the server' and 'Start the server' respectively: this will prevent users from running new connections

or **from command line**
to disable accepting new connections from the command line, run:

```
nxserver --stop

or to enable accepting new connections:

nxserver --start
```

7.2. Stopping and Starting Cloud Server and Services

All NoMachine services can be stopped via:

the GUI
all NoMachine services can be stopped by the Server status GUI ('Shutdown the server'). When doing so, you will be asked if services must be started at the next reboot or not. You can restart services also from the Server status GUI ('Start the server').

or **from command line**.

Stopping all the NoMachine services

```
nxserver --shutdown

This will completely disable access to the server host machine and terminate all connections already running on that host. By default, all services will be restarted when the machine is booted. To override this behavior, specify the --startmode option when stopping the services:

nxserver --shutdown --startmode manual
```

Starting NoMachine server and services

```
nxserver --startup

All services will be restarted at the next reboot. To not start services when the machine is rebooted, specify the start mode while running the --startup command:

nxserver --startup --startmode manual
```

Specifying the start mode
It's possible to set the 'start mode' (if services will be started automatically at boot or not) by using:

```
nxserver --startmode manual

or:

nxserver --startmode automatic
```

Stopping and restarting NoMachine server and services

```
nxserver --restart
```

7.3. Stopping and Starting a Network Service

The NoMachine networks services available for NoMachine Cloud Server are nxd, nxhtd (both installed on all platforms) and nxsshd (installed on Windows only):

Program	Default port	Scope	Available on
nxd	4000	Accept connections by NX protocol	Linux, Windows and Mac
nxhtd	4080 and 4443	Accept connections by HTTP protocol (connections by the web)	Linux, Windows and Mac
nxsshd	4022	Accept connections by SSH protocol	Windows

You can stop a single service:

via the GUI
in the Server status -> Server preferences -> Network services GUI. You can choose there also the start mode: if the service must be started automatically at the next boot or not.

or **from command line**.

Stopping a service

```
nxserver --stop SERVICE
```

where SERVICE can be:
nxd, the Network Server for accepting connection by NX protocol

nxhtd, the NoMachine web server for web sessions

nxsshd, the SSH server for Windows

Starting or restarting a service

```
nxserver --start nxd

nxserver --start nxhtd

nxserver --start nxsshd (on Windows only)

or:

nxserver --restart nxd

nxserver --restart nxhtd

nxserver --restart nxsshd (on Windows only)
```

Specifying the start mode

By default each service is automatically restarted at the next boot. You can configure that on a per-service basis by running:

```
nxserver --startmode SERVICE manual

or to restore the default behavior:

nxserver --startmode SERVICE automatic
```

Commands above operate on the configuration keys listed below. You can change them manually in the server configuration.

Configuration	Key setting
Enable automatic starting of the NX Network server, nxd	StartNXDaemon Automatic
Disable automatic starting of the NX Network server, nxd	StartNXDaemon Manual
Enable automatic starting of the NoMachine web server, nxhtd	StartHTTPDaemon Automatic
Disable automatic starting of the NoMachine web server, nxhtd	StartHTTPDaemon Manual
Enable automatic starting of the SSH server, nxsshd on Windows	StartSSHDaemon Automatic
Disable automatic starting of the SSH server, nxsshd on Windows	StartSSHDaemon Manual

7.4. Handling with Discovering of this Server on LAN

By default NoMachine Cloud Server broadcasts information to let other NoMachine computers to discover it on the local network. You can disable this feature via:

the GUI
in the Server status -> Server preferences -> "Network services" GUI

or in **the server configuration file**
set the following key in the server configuration:

EnableNetworkBroadcast 0

Then restart the server to make changes effective:

```
nxserver --restart
```

TIP

By default, also each of the NoMachine servers federated under the Cloud Server broadcast their information over the LAN. If they are configured to be directly accessible by the user (i.e. they accept connections to their IP), users will be able to see them and connect. If they are configured to accept connections via the Cloud Server only, their information is not broadcasted and they cannot be visible to users.

8. Users Management

8.1. Managing Users on the Cloud Server Host

You can manage (create, delete and modify) user accounts by using tools provided by your Operating System or the NoMachine server commands as explained below.

Creating Accounts
The Cloud Server is able to handle two types of accounts: system accounts and NoMachine accounts. The latter allows to separate the system password from the NoMachine password.

Creating a System Account
The system account will be created with the default system settings. The new user will be also added to the NoMachine Users db:

```
nxserver --useradd USERNAME --system
```

Creating a NoMachine Account
Use this command when the user already has a system account:

```
nxserver --useradd USERNAME
```

TIPS

I To assign a password different from system password to a system user, enable NoMachine Password DB EnablePasswordDB 1

II To verify if the user's authentication is based or not on NoMachine Password db:

```
nxserver --userauth USERNAME
```

III Each user must have the same system account on the Cloud Server host and on each of the federated server hosts he needs to be able to connect to. Password can be different.

Enabling and Disabling access for a NoMachine User
Prerequisites are:

(i) The user has run at least one session **or** have been added to NoMachine dbs by means of 'nxserver --useradd' command.

(ii) NoMachine Users DB is enabled (EnableUsersDB 1 is set in server.cfg)

You can enable/disable a user and allow/forbid his access to the Cloud Server by running:

```
nxserver --userenable USERNAME

or:

nxserver --userdisable USERNAME

Note that 'nxserver --useradd USERNAME' adds the user to NoMachine dbs and automatically enables the user to log-in, while 'nxserver --userdel USERNAME' removes the user from NoMachine dbs and disables the user's ability to login by NoMachine.
```

Modifying the User's Password

You can modify user's system password by running:

```
nxserver --passwd USERNAME --system

or, the NoMachine password when Password db is in use(EnablePasswordDB 1 is set in server.cfg):

nxserver --passwd USERNAME
```

Listing the NoMachine Users

All users who have run at least one session or have been added to NoMachine dbs are stored in the Users db. You can retrieve the complete list by running:

```
nxserver --userlist
```

The output of this command provides the following fields:
Redirected to: IP/hostname of the server to which the user's connection is redirected (by means of the 'nxserver --redirect' command)..

Trusted for: it shows if the user is trusted and therefore allowed to connect to the physical desktop of this host (only specific user are permitted to do that).

Screen Sharing: it shows which user has the sharing of their physical screen disabled.

Access: it shows if the user is enabled or not to access the NoMachine system. This works in conjuction with the use of the NoMachine Users DB: when enabled (EnableUserDB 1 in the server configuration), it's possible to enable/disable user's access to the whole NoMachine system.

Forwarded to: it indicates to which federated server, if any, the user will be forwarded when connecting to the Cloud Server.

Removing Accounts

To remove an account from the system:

```
nxserver --userdel USERNAME --system
```

For removing a NoMachine user and delete his account from the NoMachine dbs

```
nxserver --userdel USERNAME

This will not remove the system account.
```

Redirecting the user to a specific NoMachine server

To create a new system user and set-up a redirect directive to forward the user's connection to the given server:

```
nxserver --useradd USERNAME --system --redirect SERVER:PORT

For example (on Linux or Mac):

$ sudo /etc/NX/nxserver --useradd nxtest05 --redirect testdrive.nomachine.com

Redirection can be set at any moment by editing the user:

nxserver --useredit USERNAME --system --redirect SERVER:PORT
```

Forwarding the user to a specific NoMachine server (federated under this Cloud Server)
To create a new system user and set-up a directive to forward the user's connection to the given server:

```
nxserver --useradd USERNAME --system --forward-connection SERVER:PORT | uuid

Redirection can be set at any moment by editing the user:

nxserver --useredit USERNAME --system --forward-connection SERVER:PORT | uuid
```

8.2. Managing Groups of Users

NoMachine Cloud Server allows to create groups of users. Groups of users can be also redirected to a specific NoMachine server federated under the Cloud Server.

Creating groups of users

```
nxserver --groupadd GROUP

where GROUP is the name of the group.

For example (on Linux or Mac):

$ sudo /etc/NX/nxserver --groupadd developers
```

TIPS

I When there are multiple groups with different rules associated and the same user belongs to more than one group, it is possible to associate a **priority level** to the group. This can be done when creating the group by using the --priority <priority> option or later by editing the group settings. For example (on Linux or Mac):

```
$ sudo /etc/NX/nxserver --groupadd testers --priority 2
```

II When the user belongs to one or more groups having all the same priority level, the most permissive settings of any of these groups are applied. For example if group A is trusted for accessing the physical desktop and group B is not trusted, users who belongs to both grou A and B are permitted to connect to the physical desktop.

Assigning a user to a group
To assign an existent user to a group:

```
nxserver --useredit USERNAME --group GROUPNAME

For example, to assign user nxtest01 to group developers (on Linux or Mac):

$ sudo /etc/NX/nxserver --useredit nxtest01 --group developers
```

If the user doesn't yet have a system account, it's possible to assign it to a group while creating the system account:

```
nxserver --useradd USERNAME --group GROUPNAME --system
```

Redirecting all users of the given group to a specific NoMachine server
It's possible to set-up a redirect directive to forward all users belonging to this group to a different NoMachine server by using the --redirect SERVER:PORT option:

```
nxserver --groupadd GROUPNAME --redirect SERVER:PORT

The --priority and --redirect options can be used simultaneously. Additionally, it's possible to set redirection at any moment by editing the group:

nxserver --groupedit GROUPNAME --redirect SERVER:PORT
```

Forwarding all users of the given group to a specific NoMachine server (federated under this Cloud Server)
To create a new group and set-up a directive to forward the users' connection to the given server:

```
nxserver --groupadd GROUPNAME --forward-connection SERVER:PORT | uuid

Redirection can be set at any moment by editing the group:

nxserver --groupedit GROUPNAME --forward-connection SERVER:PORT | uuid
```

Changing the group of a given user

```
nxserver --useredit USERNAME --group GROUPNAME
```

```
For example (on Linux or Mac), change group for user nxtest02 to group 'developers' (given that this group already exists):

nxserver --useredit nxtest02 --group developers
```

Deleting a user from the group

```
nxserver --userdel USERNAME --group GROUPNAME

For example (on Linux or Mac), remove user nxtest01 from group testers, but don't delete his system account:

$ sudo /etc/NX/nxserver --userdel nxtest01 --group testers

Remove user developer01 from group developers and delete his system account:

$ sudo /etc/NX/nxserver --userdel developer01 --group developers --system
```

Listing groups
The following command lists all users on a per-group basis and shows options set for the group like priority, redirection rules etc...

```
nxserver --grouplist
```

8.3. Special Users with Permission to Connect to the Physical Desktop

Only specific users are allowed to connect to the physical desktop of this Cloud Server host, mainly for maintenance operations. These specific users are:

a) Privileged system users (root or 'sudo' users on Linux and Mac, administrator users on Windows).

b) NoMachine administrators.

c) NoMachine users trusted for connections to the physical desktop.

a) Privileged system users
A privileged system account has to be defined by means of system tools.

The Cloud Server allows by default administrative users to connect. You can disable it by setting in the server configuration:

EnableAdministratorLogin 0

To re-enable the possibility to log in as root or administrator, set:

EnableAdministratorLogin 1

b) NoMachine administrators

To create a new user on the system with NoMachine administrative permissions, execute:

```
nxserver --useradd USERNAME --system --administrator yes

To manage an existing user and set NoMachine administator's permissions:

nxserver --useradd USERNAME --administrator yes

To remove NoMachine administrative permissions:

nxserver --userdel USERNAME --administrator

or:

nxserver --useredit USERNAME --administrator no

To list only NoMachine administrators:

nxserver --userlist --administrator
```

TIP

Only NoMachine administrators can federate servers under a Cloud Server or add Terminal Server Nodes to an Enteprise Terminal Server cia the GUI.

c) NoMachine users trusted for connections to the physical desktop
To create a new user on the system and make him trusted for connections to the physical desktop, run:

```
nxserver --useradd USERNAME --system --trusted physical

To manage an existing user, modify trusted permissions or remove them:

nxserver --useredit USERNAME --trusted [ physical | none ]

E.g. (Linux or Mac) Edit user 'nxtest01' and give him trusted authorization to physical desktop:

$ sudo /etc/NX/nxserver --useredit nxtest01 --trusted physical

Remove trusted authorization for user 'nxtest02':

$ sudo /etc/NX/nxserver --useredit nxtest02 --trusted none
```

```
To list only trusted users:

$ sudo /etc/NX/nxserver --userlist --trusted
```

8.4. Guest Users

The Cloud Server supports the possibility to generate temporary guest accounts on demand. The automatic generation of guests accounts is available on all platforms, i.e. Linux, Windows and Mac. This feature however is not enabled by default and must be activated via profile rules.

Once enabled, the Cloud Server will accept the request to log-in as a guest and forward it to any of its federated servers. The target server has to support guest users and have them enabled. Guests are supported by Enterprise Desktop, Terminal Server and Enteprise Server.

Note also that a system account **will not** be created on the Cloud Server host: the login as a guest is temporary and valid only once. On the target server, instead, a system account is created for each guest user. Time of validity and other features can be set for guest users by editing the server configuration on the target host. See the guide for your Enterprise Desktop, Terminal Server or Enteprise Server for more details.

TIP

Guest users don't know their username and password and cannot therefore unlock the remote screen if screen locking is enabled. It's therefore necessary to disable it on the system.

To enable guest accounts

```
nxserver --ruleadd --class feature --type enable-guest --value yes

To disable login as a guest:

nxserver --ruleadd --class feature --type enable-guest --value no
```

How guest accounts work

When the user connects to the Cloud Server and chooses to 'Login using a guest account option', the Cloud Server will set-up a kind of virtual account. The user will be able to choose a server the list of all federated servers(only those which support guest login will be listed), or will be automatically forwarded to the target server. The Cloud Server will then contact the target server and request to create the guest account. On the target host, the NoMachine server installed there will create a system account according to settings in its configuration file. Login as a guest is not supported in case of foreign servers.

8.5. Profiles

The Cloud Server uses profiles only to:
i) enable/disable support for login as a guest.
ii) All the other profile rules, for example to limit session types, services etc ... for users and groups need to be defined on any of the federated servers, if they support profiles. Profiles are available with NoMachine Terminal Server and Enterprise Terminal Server. Please refer to the guide specific for these products for more detailed instructions.

9. Automatic Updates

The Cloud Server, as well as the other NoMachine client and server products, periodically checks NoMachine repositories (by default every two days) to verify if updates are available and will prompt a dialog informing the user that a new version is available.

It will **never** automatically update the current installation. Also the download in background of a new software version will not lead to an automatic update of the current installation.

A separate guide deals specifically with all the possible options for the automatic software updates:

https://www.nomachine.com/DT10O00149

10. Logging Facilities

To retrieve logs by using the NoMachine tools, please refer to guides in the Configuration section at: https://www.nomachine.com/all-documents or collect them manually according to instructions here: https://www.nomachine.com/DT10O00163

TIP

When debug mode is enabled, server logs may increase consistently. It's suggested to keep debug level only for the time necessary to reproduce the problem and collect logs.

10.1. Using the System Logging Facilities

By default the nxserver, nxwebplayer/nxclient and nxnode programs log to the file defined in the SystemLogFile key in their configuration files (server.cfg for nxserver and nxwebplayer/nxwebclient and node.cfg).

It's possible to configure these applications to log to the system log file instead. Edit the server.cfg and node.cfg files, uncomment and set:

EnableSyslogSupport 1

Then restart the server and all services to make the change effective:

```
nxserver --restart
```

10.2. Redirecting Logs to a Custom File

You can redirect logs of nxserver, nxwebplayer/nxclient and nxnode programs to a custom file by uncommenting and setting the path to that file in the SystemLogFile key available in the server and node configuration files. By default this key is set to:

SystemLogFile /usr/NX/var/log/nxserver.log

Change it to point to a different file, for example:

SystemLogFile /tmp/NX.log

TIP

The custom file must be accessible (writable) to the 'nx' user and to the connected user.

10.3. NoMachine Log Rotation

NoMachine supports log rotation for its log files since v. 6.5.6. Once activated, in the default configuration, logs are rotated once per month when they exceed 100MB. If not otherwise specified, NoMachine preserves up to seven rotated files and deletes the oldest ones.

Rotated logs are saved in the following directories:
/usr/NX/var/log/logrotate on Linux
%PROGRAMDATA%\NoMachine\var\log\logrotate on Windows
/Library/Application Support/NoMachine/var/log/logrotate on Mac.

To activate log rotation:

```
nxserver --logrotateadd OPTION
```

```
OPTION can be any of the following:
--rotate VALUE, specify the maximum number of rotated files to be preserved in the logrotate directory. When this number is exceeded, the oldest files are deleted.
--timeinterval TIME, specify the frequency of log rotation. Frequency can be specified in seconds or by using the 'Daily', 'Weekly', 'Monthly', or 'Yearly' keyword. Rotate logs when the interval of time and the minimum log size is reached.
--minsize VALUE, specify the minimum file size for rotating logs according to the given interval of time. If the minimum size is not reached, logs are not rotated. Value is by default in kilobytes, add M or G to set it in megabytes or gigabytes respectively.
--size VALUE, specify the minimum file size for applying log rotation as soon as the file size is reached, regardless of the frequency set for log rotation.
--compress yes|no, by default each log file is compressed as a gz archive, use '--compress no' to not compress it.
--destination PATH, provide an alternative path where to store the rotated files.

If OPTION is not specified, the default settings will be applied.
```

By default, log rotation is applied to all NoMachine log files. It's possible to specify which log file should be under log rotation:

```
nxserver --logrotateadd LOG OPTIONS

LOG can be any of the following file name:
nxserver.log
nxerror.log
nxd.log
nxservice.log (on Windows only)
nxwebclient.log
nxhtd-error.log
nxhtd-access.log

If OPTION is not specified, the default settings will be applied.
```

To edit parameters set for log rotation:

```
nxserver --logrotateedit LOG OPTION

To list current settings for log rotation:

nxserver --logrotatelist

To delete all settings for log rotation:

nxserver --logrotatedel

To delete log rotation settings for a specific log file:

nxserver --logrotatedel LOG
```

Some examples:

```
Rotate all logs monthly (the minimum size is the default 100MB):

nxserver --logrotateadd --timeinterval Monthly

Rotate only nxserver.log (which usually has the most relevant size) weekly if it exceeds the default size of 250MB:

nxserver --logrotateadd nxserver.log --timeinterval Weekly --minsize 250M

Rotate nxserver.log when it exceeds 250MB:

nxserver --logrotateadd nxserver.log --size 250M

Rotate the given logs weekly when they exceed 250MB and save the rotated files in a specific path:

nxserver --logrotateadd nxserver.log --timeinterval Weekly --minsize 250MB --destination /var/log/
nxserver --logrotateadd nxerror.log --timeinterval Weekly --minsize 250MB --destination /var/log/
```

It's possible to force log rotation at any moment. This doesn't require to enable it. To apply log rotation to all files or to a given log only:

```
nxserver --logrotate LOG OPTIONS

OPTION can be any of the following options:
--compress yes|no, by default the log file is compressed as gz archive, use '--compress no' to not compress it.
--destination PATH, provide an alternative path where to store the rotated files.
```

TIP

To debug a problem easily reproducible, it could be helpful to clean up logs with 'nxserver --logrotate', activate the debug log level with 'nxserver --debug --enable all', reproduce the problem, collect logs with 'nxserver --debug --collect' and finally restore informational log level with 'nxserver --debug --disable all'.