



# Remote Network Connection™ Installation and Administration Guide for Windows



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All support services will be delivered in accordance with your support agreement and the then-current enterprise technical support policy.

### Contacting Technical Support

Customers with a current support agreement may access Technical Support information at the following URL:

<http://cloudtrust.solutions/support/>

Before contacting Technical Support, make sure you have satisfied the system requirements that are listed in your product documentation. Also, you should be at the computer on which the problem occurred, in case it is necessary to replicate the problem.

When you contact Technical Support, please have the following information available:

- Product release level
- Hardware information
- Available memory, disk space, and NIC information
- Operating system
- Version and patch level
- Network topology
- Router, gateway, and IP address information
- Problem description:
  - Error messages and log files
  - Troubleshooting that was performed before contacting CloudTrust
  - Recent software configuration changes and network changes



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## Installing Remote Network Connection™

### Planning the installation

#### Plan your installation structure

Before you install the product, consider the size and geographical distribution of your network to determine the installation architecture. To ensure good network performance, you need to evaluate several factors. These factors include how many computers need networking, whether any of those computers connect over a wide-area network, or how often to works.

- If your network is small, is located in one geographic location, and has fewer than 500 clients, you need to use only one Remote Network Connection™ server.
- If the network is very large, you can install additional sites. To provide additional redundancy, you can install additional sites for failover or load balancing support.
- If your network is geographically dispersed, you may need to install additional servers for load balancing and bandwidth distribution purposes.

#### Prepare for and then install Remote Network Connection™

Make sure the computer on which you install the management server meets the minimum system requirements.

To install Remote Network Connection™, you must be logged on with an account that grants local administrator access.

Install Remote Network Connection™.

Decide on the following items when you configure the Remote Network Connection™:

- A Remote Network Connection™ server address, which may be needed depending on the options that you select during installation
- A Ticket ID, which may be needed depending on the options that you select during installation
- A Passphrase, which may be needed depending on the options that you select during installation
- A local internet connection proxy settings, proxy server address, username and password



## System requirements for Remote Network Connection™

Component	Requirements
Processor	32-bit processor: 1 GHz Intel Pentium III or equivalent minimum (Intel Pentium 4 or equivalent recommended) 64-bit processor: 2 GHz Pentium 4 with x86-64 support or equivalent minimum
Physical RAM	512 MB (1 GB recommended), or higher if required by the operating system
Hard drive	60 MB of available hard disk space for the installation; additional space is required for content and logs  Disk space requirements depend on the type of client you install, which drive you install to, and where the program data file resides. The program data folder is usually on the system drive in the default location C:\ProgramData. Available disk space is always required on the system drive, regardless of which installation drive you choose.  Note: Space requirements are based on NTFS file systems
Display	800 x 600 or larger
Operating system (desktop)	Windows XP Home or Professional (32-bit, SP3; 64-bit, all SPs) Windows Vista (32-bit, 64-bit) Windows 7 (32-bit, 64-bit; RTM and SP1) Windows 8 (32-bit, 64-bit) Windows 8.1 (32-bit, 64-bit), including Windows To Go Windows 10 (32-bit, 64-bit), including Windows To Go
Operating system (server)	Windows Server 2003 (32-bit, 64-bit; R2, SP1 or later) Windows Small Business Server 2003 (32-bit) Windows Server 2008 (32-bit, 64-bit; R2, SP1, and SP2) Windows Small Business Server 2008 (64-bit) Windows Essential Business Server 2008 (64-bit) Windows Small Business Server 2011 (64-bit) Windows Server 2012 Windows Server 2012 R2 Windows Server 2016

Remote Network Connection™ client for Windows system requirements



## Internationalization requirements

Certain restrictions apply when you install Remote Network Connection™ in a non-English or mixed-language environment.

Component	Requirements
Computer names, server names, and workgroup names	Non-English characters are supported with the following limitations: <ul style="list-style-type: none"><li>• Network audit may not work for a host or user that uses a double-byte character set or a high-ASCII character set.</li><li>• Double-byte character set names or high-ASCII character set names may not appear properly on the Remote Network Connection™ client user interface.</li><li>• A long double-byte or high-ASCII character set host name cannot be longer than what NetBIOS allows.</li></ul>
English characters	English characters are required in the following situations: <ul style="list-style-type: none"><li>• Deploy a client package to a remote computer.</li><li>• Define the installation path for Remote Network Connection™.</li></ul>

Internationalization requirements

## Product license requirements

If you want to use Remote Network Connection™ after the trial period expires, you must purchase and then activate a product license.

A trial license refers to a fully functioning installation of Remote Network Connection™ operating within the free evaluation period. If you want to continue using Remote Network Connection™ beyond the evaluation period, you must purchase and activate a license for your installation. You do not need to uninstall the software to convert from trialware to a licensed installation.

The evaluation period is 1 day from the initial installation of Remote Network Connection™.



## Supported virtual installations and virtualization products

You use the Remote Network Connection™ clients to protect the supported operating systems that run in the virtual environments. You can also install and manage Remote Network Connection™ on the supported operating systems that run in virtual environments. You install Remote Network Connection™ on the guest operating system, not the host.

Component	Virtualization product
Remote Network Connection™ components	Windows Azure Amazon WorkSpaces VMware WS 5.0 (workstation) or later VMware GSX 3.2 (enterprise) or later VMware ESX 2.5 (workstation) or later VMware ESXi 4.1 - 5.5 Microsoft Virtual Server 2005 Microsoft Enterprise Desktop Virtualization (MED-V) Windows Server 2008 Hyper-V Windows Server 2012 Hyper-V Windows Server 2012 R2 Hyper-V Citrix XenServer 5.6 or later Virtual Box, supplied by Oracle

Supported virtualization products

## Network architecture considerations

You can install Remote Network Connection™ for testing purposes without considering your company network architecture. You can install Remote Network Connection™ with a few clients, and become familiar with the features and functions.

When you are ready to install the production clients, you should plan your deployment based on your organizational structure and computing needs.

You should consider the following elements when you plan your deployment:

- Remote console: Administrators can use a remote computer that runs the console software to access Remote Network Connection™. Administrators may use a remote computer when they are away from the office. You should ensure that remote computers meet the remote console requirements.
- Local and remote computers: Remote computers may have slower network connections. You may want to use a different installation method than the one you use to install to local computers.
- Portable computers such as notebook computers: Portable computers may not connect to the network on a regular schedule.
- Computers that are located in secure areas: Computers that are located in secure areas may need different security settings from the computers that are not located in secure areas.





### Communication server ports

Remote Network Connection™ uses the following ports by default. To change the default ports, choose the custom installation type when you run the Setup Wizard.

All communication over these ports is sent over TCP.

Setting	Default	Description
Remote Network Connection™ server port	443	Remote Network Connection™ server listens on this port. The Remote Network Connection™ clients communicate with the server on this port.
Remote Network Connection™ LiveUpdate server port	443	The Remote Network Connection™ clients checks and downloads the latest client version on this port.

Remote Network Connection™ ports



## Installing Remote Network Connection™

To install Remote Network Connection™

If you downloaded the product, extract the entire installation file to a physical disk, such as a hard disk. Run Setup.exe from the physical disk. If you have a product disc, insert it into the optical drive. The installation should start automatically. If it does not start, open the disc, and then double-click Setup.exe

In the Remote Network Connection™ Installation Program dialog box, click Install Remote Network Connection™, and then click Remote Network Connection™.

Review the sequence of installation events, and then click Next to begin.

In the License Agreement panel, click I accept the terms in the license agreement, and then click Next.

In the Destination Folder panel, accept the default destination folder or specify another destination folder, and then click Next.

Click Install.

When the installation is complete, click Next.

After the initial installation completes, you configure the Remote Network Connection™ server address and Ticket ID. Click Save.



## Uninstalling Remote Network Connection™

Uninstalling Remote Network Connection™ uninstalls the client application. If you plan to reinstall Remote Network Connection™, you should back up the configuration before you uninstall it.

To uninstall Remote Network Connection™

The text that you see depends on the operating system of the computer.

- On the server computer, on the Start menu, click Control Panel > Add or Remove Programs (or Control Panel > Programs > Uninstall a program).
- In the Add or Remove Programs (or Uninstall or change a program) dialog box, click Remote Network Connection™, and then click Change, Remove, or Uninstall.
- Follow the onscreen prompts to remove Remote Network Connection™.

In some cases, you may have to uninstall Remote Network Connection™ manually.

## Product updates

Product updates are improvements to the installed client software. These updates are usually created to extend the operating system or hardware compatibility, adjust performance issues, or fix product errors. Product updates are released on an as-needed basis. Clients can receive product updates directly from a Remote Network Connection™ LiveUpdate server.



## Interconnection with other networks

There are several ways to extend the virtual network segment created by the Remote Network Connection™ VPN solution, depending on the usage needs and the requirements of the applications to be used:

- Internet Connection Sharing (ICS),
- IP Routing,
- Port Forwarding,
- Routing and Remote Access Service (RRAS) can all be used.

Internet Connection Sharing (ICS) and Routing and Remote Access Service (RRAS) are both based on network address translation (NAT). The second one is aimed at enterprise environments, while the first one is practical for small or home offices (SOHO).

The Remote Network Connection™ VPN solution can be extended using other, classic, standard network solutions - e.g. L2TP/IPSec server connections.

To select the best way to connect to the other networks, you may need to investigate the usage patterns, and you may need to analyze the operation and the traffic patterns of the applications to be used.

The Remote Network Connection™ VPN solution can be used to build point-to-point, point-to-site, and even site-to-site connections.



## Remote Network Connection™ by default enables split tunneling

When you configure a Remote Network Connection™ VPN solution, the default setting is to enable split tunneling. What split tunneling refers to is the fact that only connections to the private network are sent over the Remote Network Connection™ VPN tunnels. If the user wants to connect to resources on the Internet, the connection is made over the local link - that is to say, the connection is sent directly to the Internet based on the IP addressing configuration on the Remote Network Connection™ client computer's NIC.

Remote Network Connection™ by default use 10.238.0.0/16 IPv4 addresses as VPN address as a unique IP address to each Remote Network Connection™ Adapter in the range of 10.238.0.0/16 subnet.

### What is split tunneling?

Split tunneling is a computer networking concept which allows the user to access dissimilar security domains like a public network (e.g., the Internet) and a local LAN or WAN at the same time, using the same or different network connections. This connection state is usually facilitated through the simultaneous use of a Local Area Network (LAN) Network Interface Card (NIC), Wireless Local Area Network (WLAN) NIC, and Remote Network Connection™ VPN client software application without the benefit of access control.

The advantage of split tunneling is that users have a much better computing experience, especially when accessing Internet based resources. In addition, users on the private network are likely to have a better computing experience when accessing resources on the Internet, since the Remote Network Connection™ client traffic isn't consuming corporate Internet bandwidth to connect to Internet resources - it alleviates bottlenecks and conserves bandwidth. The combined advantages of improved Remote Network Connection™ client and private network client Internet computing experience makes it worthwhile to make split tunneling the default configuration for Remote Network Connection™ VPN communications.

Another advantage is in the case where a user works at a supplier or partner site and needs access to network resources on both networks throughout the day. Split tunneling prevents the user from having to continually connect and disconnect.



## Identity authentication with Remote Network Connection™

Remote Network Connection™ server can be configured to require endpoint SSL authentication certificates when establishing the SSL/TLS communications channel. Remote Network Connection™ VPN application supports USB tokens as a mean to increase identity authentication, to enforce security policy while keeping it simple for users and IT managers.

Remote Network Connection™ VPN application is natively interoperable with a large range of tokens and smart cards because it supports smart cards interface to the Microsoft Smart Card Base Cryptographic Service Provider (CSP). Remote Network Connection™ VPN application always accesses the Windows Certificate Store in CSP mode.

Remote Network Connection™ VPN application recognizes the smart cards or USB tokens from leading manufacturers (Gemalto, Oberthur, Aladdin, SafeNet, Yubico, Feitian, etc.). The list below shows the qualified or supported tokens with Remote Network Connection™ VPN application:

- SafeNet/Aladdin - eToken PRO 64k
- Yubico - Yubikey Neo
- Omnikey - Omnikey Cardman 3121, Omnikey CM 6121
- Gemalto - Gemalto IDBridge K30 USB Token

Remote Network Connection™ VPN application can be configured to check the certification chain of the certificate received from the Remote Network Connection™ server. This feature requires importing the root certificate and all the certificates of the certification chain in the Windows Certificate Store.

Remote Network Connection™ VPN application will also use the CRL (Certification Revocation List) of each intermediate certification authority. This CRL must be accessible, either in the Windows Certificate Store or downloadable. If not, the Remote Network Connection™ VPN application won't be able to check the validity of the certificate.

Remote Network Connection™ VPN application checks the following elements of the certification chain:

- the expiration date of the certificate
- validity beginning date of the certificate
- signature of each certificate in the certification chain (included the root certificate, the intermediate certificates, and the server certificate)
- the update of each CRL

\* Unique installation of Remote Network Connection™ VPN solution allows integrating Identity authentication into Remote Network Connection™ application's sign-in processes and providing secure TLS communication channel.



## Remote Network Connection™ in Docker Container

Docker can build images automatically by reading the instructions from a Dockerfile. A Dockerfile is a text document that contains all the commands a user could call on the command line to assemble an image. Using docker build users can create an automated build that executes several command-line instructions in succession.

This paragraph describes the commands you can use in a Dockerfile to install Remote Network Connection™.

Remote Network Connection™ Dockerfile location: <https://rnc.services/Dockerfile>

### Create a Dockerfile for Remote Network Connection™ application

Create a Dockerfile in your project folder.

Add the text below to your Dockerfile for either Linux or Windows Containers. The tags below are multi-arch meaning they pull either Windows or Linux containers depending on what mode is set in Docker Desktop for Windows. Reference: <https://docs.docker.com/engine/reference/builder/>

#### Dockerfile

```
# Remote Network Connection(TM) setup for Docker Container
FROM mcr.microsoft.com/dotnet/core/sdk

ENV RNC_TICKET_ID=
ENV RNC_SERVER_ADDRESS=services.rnc.services
ENV RNC_NETWORK_PASSPHRASE=

# Installing required packages
RUN apt-get update
RUN apt-get update -y
RUN apt-get install sudo
RUN apt-get install libunwind8
RUN apt-get install wget
RUN apt-get install openssl
RUN apt-get install uuid-runtime

# Download Remote Network Connection setup.tar.gz package
RUN wget https://rnc.services/setup.tar.gz

# Extracting Remote Network Connection application
RUN mkdir ./root/bin
RUN tar -zxvf setup.tar.gz -C ./root/bin

# Setting up Remote Network Connection appsettings.json parameter file
RUN echo "{" >> ./root/bin/appsettings.json
RUN echo "  \"TicketID\" : \"$RNC_TICKET_ID\"," >> ./root/bin/appsettings.json
```



```

RUN echo " \"ServerAddress\": \"$RNC_SERVER_ADDRESS:443\"> >> ./root/bin/appsettings.json
RUN echo -n " \"NetworkPassphrase\": \"\"> >> ./root/bin/appsettings.json
RUN printf $RNC_NETWORK_PASSPHRASE | openssl base64 | awk 'BEGIN{ORS=""}; {print}' >>
./root/bin/appsettings.json
RUN echo "\",\"> >> ./root/bin/appsettings.json
RUN echo -n " \"MemberID\": \"\"> >> ./root/bin/appsettings.json
RUN echo "" | uuidgen | tr /a-z/ /A-Z/ | tr "\n" "\",\"> >> ./root/bin/appsettings.json
RUN echo "\",\"> >> ./root/bin/appsettings.json
RUN echo " \"MemberDescription\": \"$HOSTNAME\"> >> ./root/bin/appsettings.json
RUN echo "}"> >> ./root/bin/appsettings.json

# Finalizing Remote Network Connection setup
RUN chmod u+x ./root/bin/RNCLnxClient.out

# Running Remote Network Connection application
WORKDIR ./root/bin/
ENTRYPOINT ["dotnet", "RNCSservice.dll"]

```

## Build and run the Remote Network Connection™ Docker image

Open a command prompt and navigate to your project folder.

Use the following commands to build and run your Docker image:

```

docker
$ docker build -t rnc:latest .
$ docker run --cap-add=NET_ADMIN --device=/dev/net/tun -it rnc

```

## List Docker images

```

docker
$ docker image ls

```

## Remove Remote Network Connection™ Docker image

```

docker
$ docker image rm -f rnc

```