

常问问题 • 10/2018

# SINEMA RC NAT 功能说明

SINEMA RC, NAT

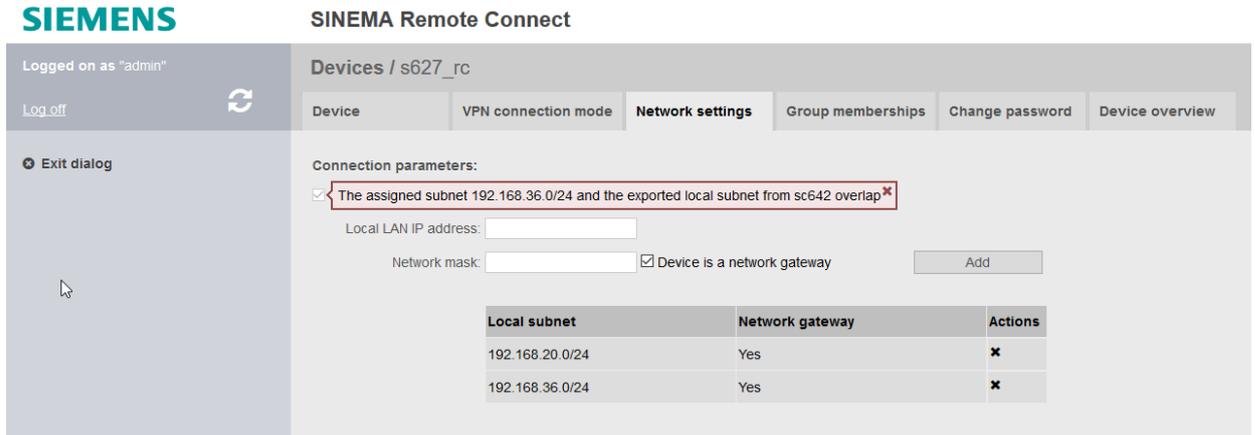
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# 1 西门子 SINEMA RC NAT

## 1.1 概述

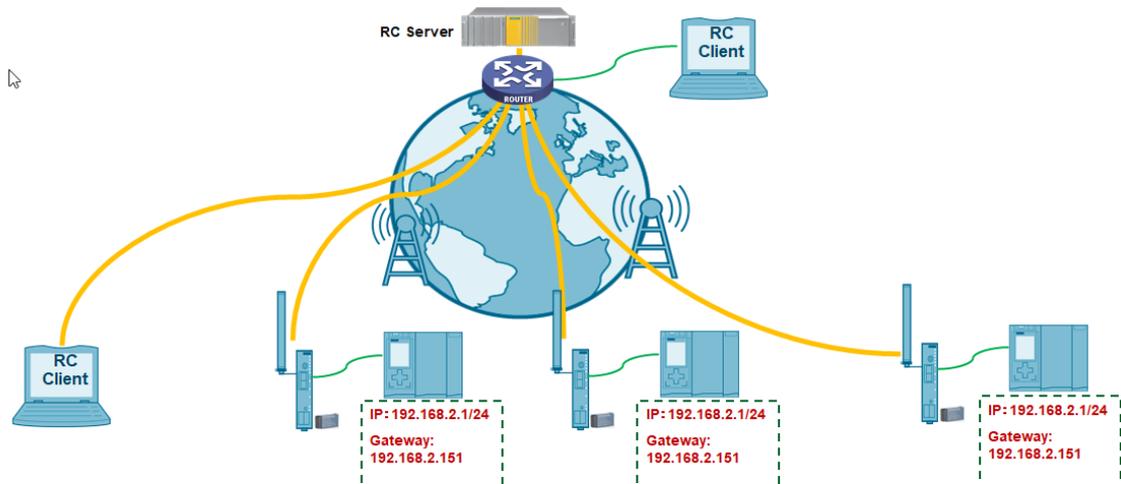


西门子 SINEMA RC 是基于 OPEN VPN 的远程访问方案，在网络里 SINEMA RC SERVER 相当于路由器的角色，这就要求每个连入的远程设备的本地子网必须不同。在配置设备本地子网时，如果目标子网已经存在，RC SERVER 将不允许添加，如上图。这就要求在项目实施前，必须做好项目规划，避免多个地点 IP 重复。

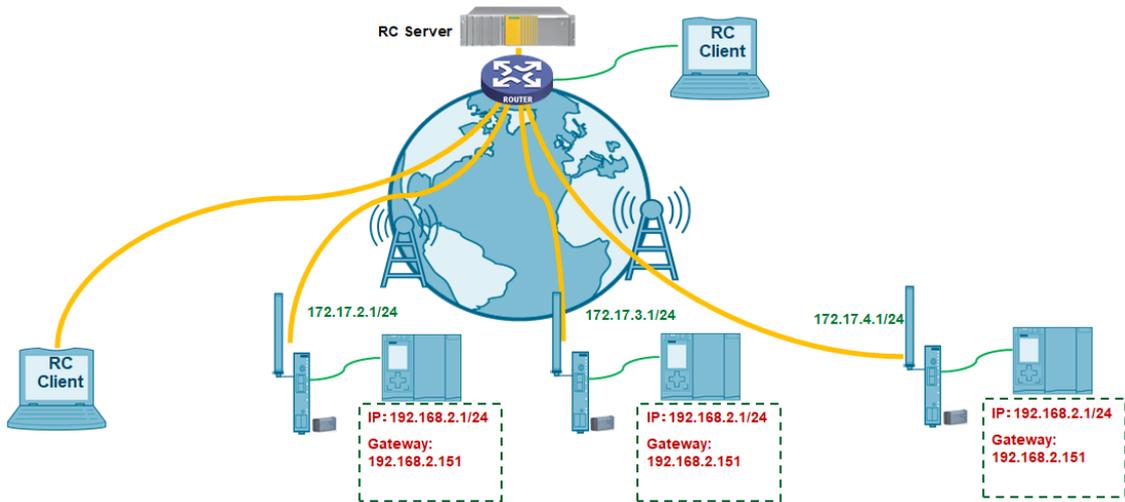
但是实际的应用中会存在很多的情况不允许更改子网信息，例如：

- ◆ OEM 厂商，标准化的程序，不方便修改子网
- ◆ 老项目，修改已经运行的设备子网不切实际
- ◆

这样就需要一种技术，即使在现场设备子网相同的情况，也可以接入到 SINEMA RC SERVER，如下图。



## 1.2 NAT

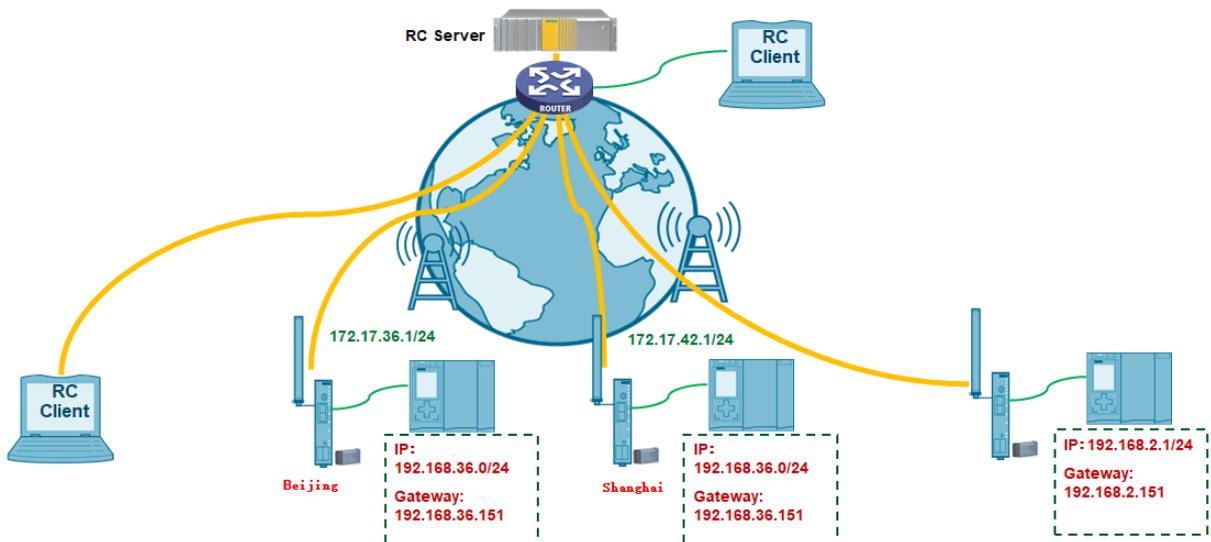


如上图，SINEMA RC V1.2 开始支持 NAT 技术，通过 NAT 技术，可以把每一个远程接入的设备本地子网转换成一个虚拟的独一无二的 IP，这样可以保证在 SINEMA RC 服务器的路由表中，每一个远程节点的内部子网是不同的 IP。

## 2 SINEMA RC NAT 设置

### 2.1 RC SERVER 基本配置

如下图情况，远程设备位于北京 和上海，但是内部子网相同 192.168.36.0/24。通过 NAT，北京设备子网 192.168.36.0/24 转换为 172.17.36.0/24；上海设备子网 192.168.36.0/24 转换为 172.17.42.0/24。



进入到 SINEMA RC SERVER 的设备网络配置页面，为北京的设备添加“Local subnet” 192.168.36.0/24。激活 1:1 NAT，“Virtual subnet IP address” 设置需要虚拟转换的 IP，此处为 172.17.36.0/24。

这样设置后，所有访问 172.17.36.0/24 在远程设备自动转换为 192.168.36.0/24，全子网一一对应，例如：172.17.36.1=192.168.36.1, 172.17.36.2=192.168.36.2 .....。

SIEMENS SINEMA Remote Connect

Logged on as "admin" | Log off

Devices / sc636

Device | VPN connection mode | **Network settings** | Group memberships | Change password | Device overview

Exit dialog

Connection parameters:

Connected local subnets

Local LAN IP address:

Network mask:   Device is a network gateway

Local subnet	Network gateway	Actions
192.168.36.0/24	Yes	✘

**1:1 NAT**

NAT for local subnet

Virtual subnet IP address:

Network mask:  Local subnet:

Virtual subnet	Local subnet	Network gateway	Actions
172.17.36.0/24	192.168.36.0/24	Yes	✘

NAT for local hosts

Virtual subnet IP address:  Local host:

如果不希望全子网一一对应，可以选择“NAT for local hosts”，如下图设置，172.17.36.1=192.168.36.1，172.17.36.2=192.168.36.12。

SIEMENS SINEMA Remote Connect

Logged on as "admin" | Log off

Devices / sc636

Device | VPN connection mode | **Network settings** | Group memberships | Change password | Device overview

Exit dialog

Connection parameters:

Connected local subnets

Local LAN IP address:

Network mask:   Device is a network gateway

Local subnet	Network gateway	Actions
192.168.36.0/24	Yes	✘

1:1 NAT

NAT for local subnet

Virtual subnet IP address:

Network mask:  Local subnet:

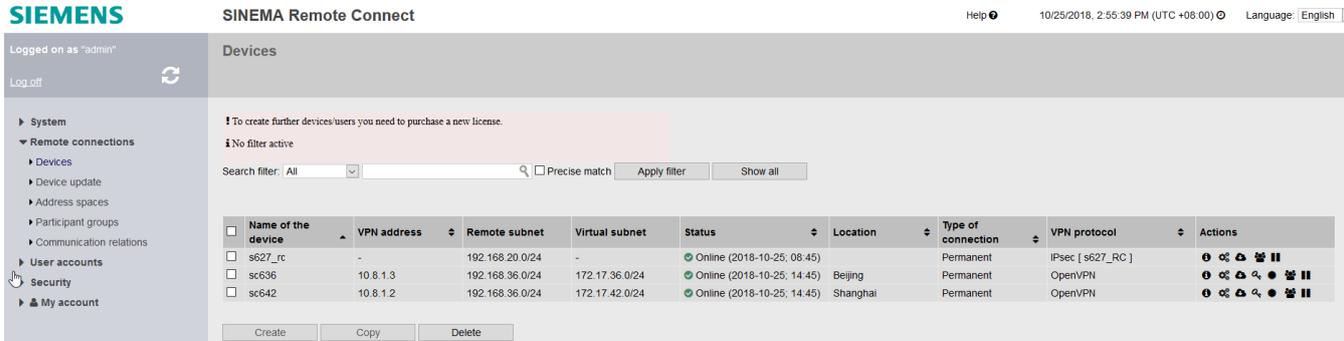
Virtual subnet	Local subnet	Network gateway	Actions
172.17.36.0/24	192.168.36.0/24	Yes	✘

NAT for local hosts

Virtual subnet IP address:  Local host:

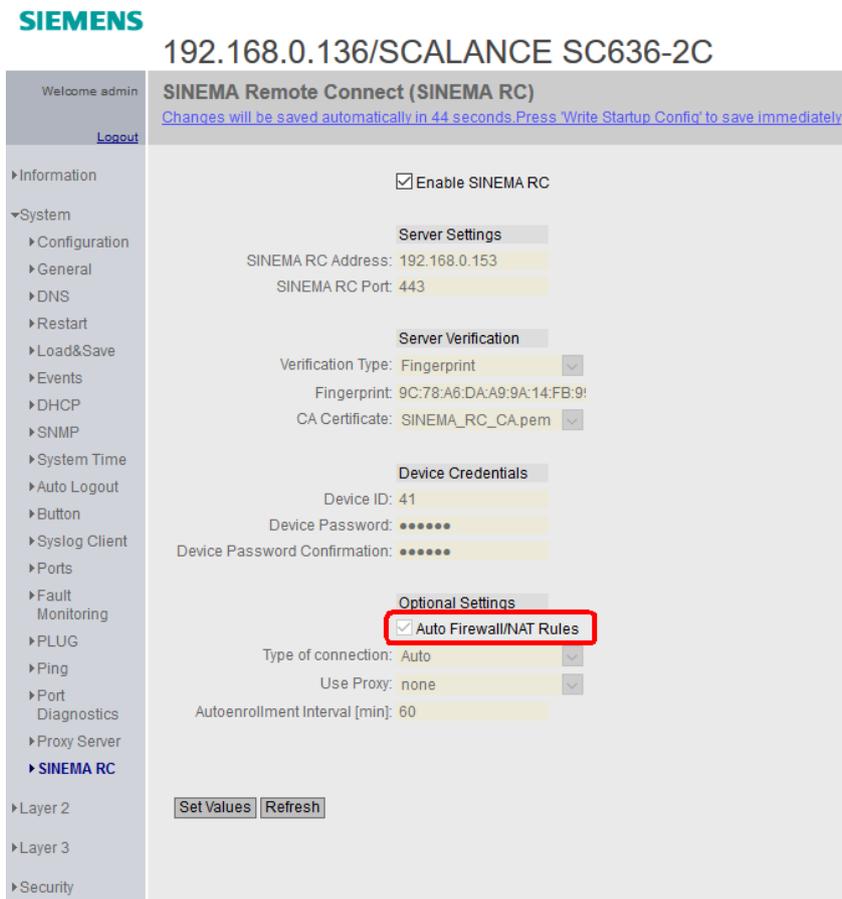
Virtual subnet IP address	Local host	Network gateway	Actions
172.17.36.1/24	192.168.36.1	Yes	✘
172.17.36.2/24	192.168.36.12	Yes	✘

同样的办法为上海的节点设置 NAT，本地中都以全子网对应为例。如下图，设置完成后，可以看到设备连接成功后的子网信息，北京设备子网 192.168.36.0-172.17.36.0/24；上海设备子网 192.168.36.0-172.17.42.0/24。



## 2.2 远程设备状态

如下图，远程设备（S615/SC600/M800）“Auto Firewall/NAT Rules”选项一定要勾选，这样会自动把 SINEMA RC SERVER 设置的 NAT 关系添加到本地系统后台。



如下图，远程设备（S615/SC600/M800）连接成功后，可以自动获得 NAT 的转换关系。

**SIEMENS** 192.168.0.136/SCALANCE SC636-2C

Welcome admin **SINEMA Remote Connect (SINEMA RC) Information**  
[Logout](#)  
Changes will be saved automatically in 36 seconds. Press 'Write Startup Config' to save immediately.

Information  
▶ Start Page  
▶ Versions  
▶ ARP Table  
▶ Log Tables  
▶ Faults  
▶ DHCP Server  
▶ LLDP  
▶ Routing  
▶ SNMP  
▶ Security  
▶ **SINEMA RC**  
▶ System  
▶ Layer 2  
▶ Layer 3  
▶ Security

Status: established (192.168.0.153, Port 1194, UDP)  
Device Name: sc636  
Device Location: Beijing  
GSM Number: -  
Vendor: -  
Comment: -  
Type of Connection (Server): Permanent  
Type of Connection (Device): Auto  
Fingerprint: 9C:78:A6:DA:A9:9A:14:FB:99:C2:50:6F:08:72:B8:AC:11:03:8A:AA:7A:51:C9:11:6F:34:5E:10:17:4D:32:BI  
Remote Address: 192.168.0.153  
**Connected Local Subnet(s): 192.168.36.0/24 translated to 172.17.36.0/24**  
Connected Local Host(s):  
Tunnel Interface Address: 10.8.1.3  
Connected Remote Subnet(s): 10.8.1.0/24  
10.8.0.0/24  
172.17.42.0/24  
192.168.20.0/24  
192.168.248.0/24  
172.32.0.0/16

[Refresh](#)

**SIEMENS** 192.168.0.142/SCALANCE SC642-2C

Welcome admin **SINEMA Remote Connect (SINEMA RC) Information**  
[Logout](#)

Information  
▶ Start Page  
▶ Versions  
▶ ARP Table  
▶ Log Tables  
▶ Faults  
▶ DHCP Server  
▶ LLDP  
▶ Routing  
▶ SNMP  
▶ Security  
▶ IPsec VPN  
▶ **SINEMA RC**  
▶ System  
▶ Layer 2  
▶ Layer 3  
▶ Security

Status: established (192.168.0.153, Port 1194, UDP)  
Device Name: sc642  
Device Location: Shanghai  
GSM Number: -  
Vendor: -  
Comment: -  
Type of Connection (Server): Permanent  
Type of Connection (Device): Auto  
Fingerprint: 9C:78:A6:DA:A9:9A:14:FB:99:C2:50:6F:08:72:B8:AC:11:03:8A:AA:7A:51:C9:11:6F:34:5E:10:17:4D:32:BI  
Remote Address: 192.168.0.153  
**Connected Local Subnet(s): 192.168.36.0/24 translated to 172.17.42.0/24**  
Connected Local Host(s):  
Tunnel Interface Address: 10.8.1.2  
Connected Remote Subnet(s): 10.8.1.0/24  
10.8.0.0/24  
172.17.36.0/24  
192.168.20.0/24  
192.168.248.0/24  
172.32.0.0/16

[Refresh](#)

远程设备（S615/SC600/M800）的内网连接设备，如果希望被远程访问，需要设置网关，网关地址设置为远程设备（S615/SC600/M800）的 IP 地址。

如果内网设备不方便设置网关，或者已经设置其他网关不能修改，可以在 S615/SC600/M800 NAT 设置里激活端口伪装，如下图。

The screenshot shows the configuration page for Internet Protocol (IP) Masquerading on a Siemens SCALANCE SC642-2C device. The page title is "192.168.0.142/SCALANCE SC642-2C". The main heading is "Internet Protocol (IP) Masquerading". There are four tabs: "Masquerading", "NAPT", "Source NAT", and "NETMAP". The "Masquerading" tab is selected. Below the tabs is a table with two columns: "Interface" and "Enable Masquerading". The table has two rows: "vlan1 (INT)" with a checked checkbox, and "vlan2 (EXT)" with an unchecked checkbox. A red box highlights the "vlan1 (INT)" row. Below the table are two buttons: "Set Values" and "Refresh".

SIEMENS

192.168.0.142/SCALANCE SC642-2C

Welcome admin [Logout](#)

Internet Protocol (IP) Masquerading

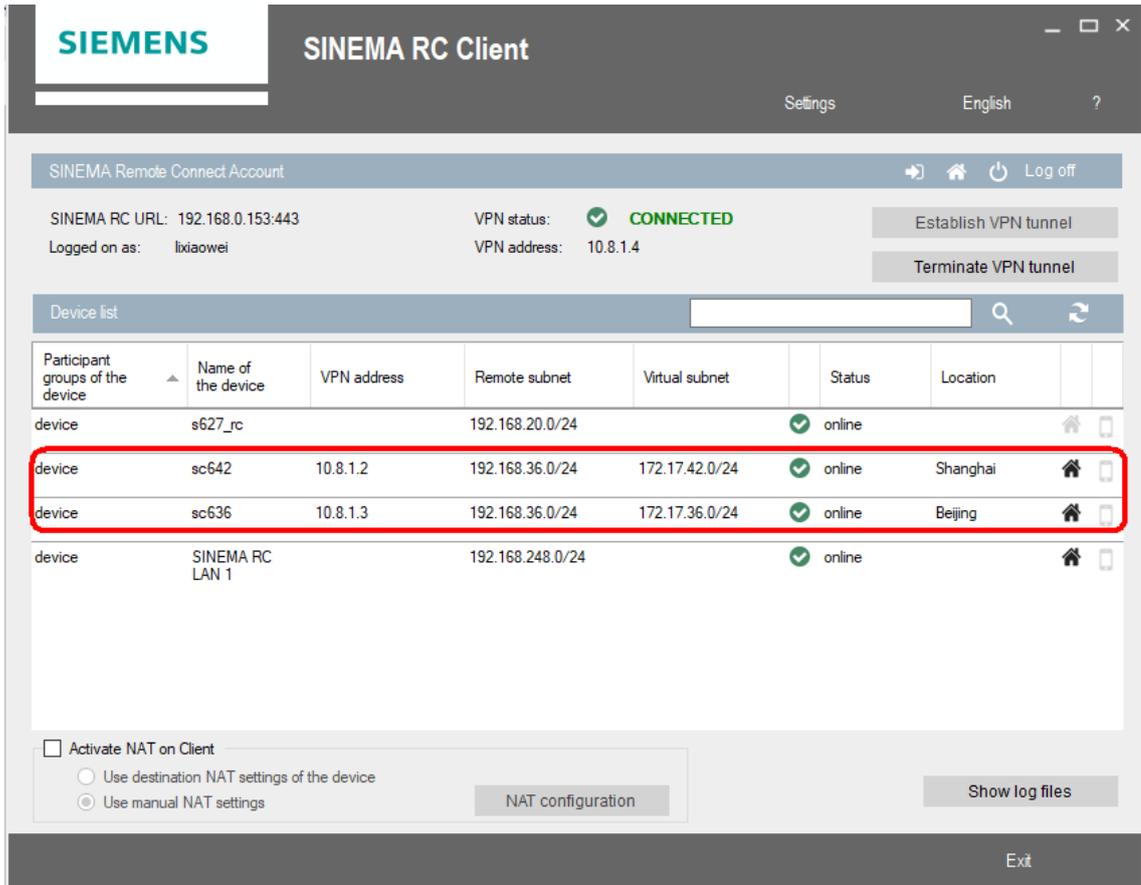
Masquerading NAPT Source NAT NETMAP

Interface	Enable Masquerading
vlan1 (INT)	<input checked="" type="checkbox"/>
vlan2 (EXT)	<input type="checkbox"/>

Set Values Refresh

### 3 SINEMA RC Client 远程访问

如下图，当 RC CLIENT 连接成功后可以看到北京和上海的本地子网信息，这时候查看本地路由表。



如下图，可以看到本地路由表中只能看到 NAT 转换后的子网信息，172.17.36.0/24 北京，172.17.42.0/24 上海。

```
ca: Command Prompt
6...14 4f 8a d3 74 52 .....Bluetooth Device (Personal Area Network)
1.....Software Loopback Interface 1
=====
IPv4 Route Table
=====
Active Routes:
Network Destination        Netmask          Gateway           Interface        Metric
-----
10.8.0.0                   255.255.255.0   10.8.1.1          10.8.1.4         35
10.8.1.0                   255.255.255.0   On-link          10.8.1.4         291
10.8.1.4                   255.255.255.255 On-link          10.8.1.4         291
10.8.1.255                 255.255.255.255 On-link          10.8.1.4         291
127.0.0.0                  255.0.0.0       On-link          127.0.0.1        331
127.0.0.1                 255.255.255.255 On-link          127.0.0.1        331
127.255.255.255          255.255.255.255 On-link          127.0.0.1        331
172.17.36.0               255.255.255.0   10.8.1.1          10.8.1.4         35
172.17.42.0               255.255.255.0   10.8.1.1          10.8.1.4         35
172.32.0.0                255.255.0.0     10.8.1.1          10.8.1.4         35
192.168.0.0               255.255.255.0   On-link          192.168.0.120    281
192.168.0.120            255.255.255.255 On-link          192.168.0.120    281
192.168.0.255            255.255.255.255 On-link          192.168.0.120    281
192.168.20.0             255.255.255.0   10.8.1.1          10.8.1.4         35
192.168.60.0             255.255.255.0   On-link          192.168.60.1     291
192.168.60.1            255.255.255.255 On-link          192.168.60.1     291
192.168.60.255           255.255.255.255 On-link          192.168.60.1     291
192.168.137.0            255.255.255.0   On-link          192.168.137.1    291
192.168.137.1           255.255.255.255 On-link          192.168.137.1    291
192.168.137.255          255.255.255.255 On-link          192.168.137.1    291
192.168.248.0            255.255.255.0   10.8.1.1          10.8.1.4         35
224.0.0.0                 240.0.0.0       On-link          127.0.0.1        331
224.0.0.0                 240.0.0.0       On-link          192.168.0.120    281
224.0.0.0                 240.0.0.0       On-link          192.168.137.1    291
224.0.0.0                 240.0.0.0       On-link          192.168.60.1     291
224.0.0.0                 240.0.0.0       On-link          10.8.1.4         291
255.255.255.255          255.255.255.255 On-link          127.0.0.1        331
255.255.255.255          255.255.255.255 On-link          192.168.0.120    281
255.255.255.255          255.255.255.255 On-link          192.168.137.1    291
255.255.255.255          255.255.255.255 On-link          192.168.60.1     291
255.255.255.255          255.255.255.255 On-link          10.8.1.4         291
=====
```

如下图，尝试访问现场设备，172.17.36.136 相当于访问到了北京远程设备内网的 192.168.36.136；172.17.42.142 相当于访问到了上海远程设备内网的 192.168.42.142。

```
Command Prompt
Control-C
^C
C:\Users\lixw>ping 172.17.36.136

Pinging 172.17.36.136 with 32 bytes of data:
Reply from 172.17.36.136: bytes=32 time=1ms TTL=63

Ping statistics for 172.17.36.136:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 1ms, Maximum = 1ms, Average = 1ms

C:\Users\lixw>ping 172.17.42.142

Pinging 172.17.42.142 with 32 bytes of data:
Reply from 172.17.42.142: bytes=32 time=1ms TTL=63

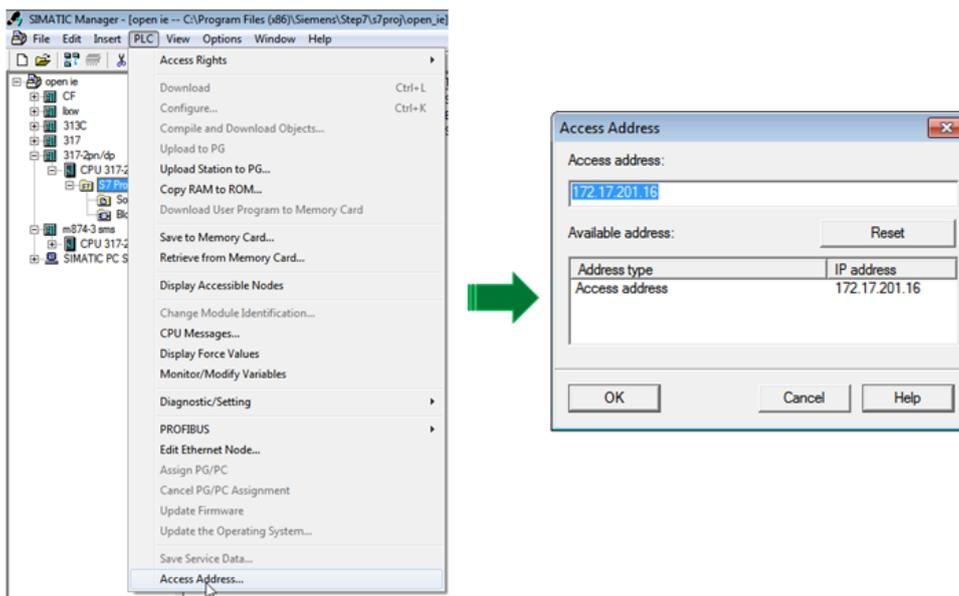
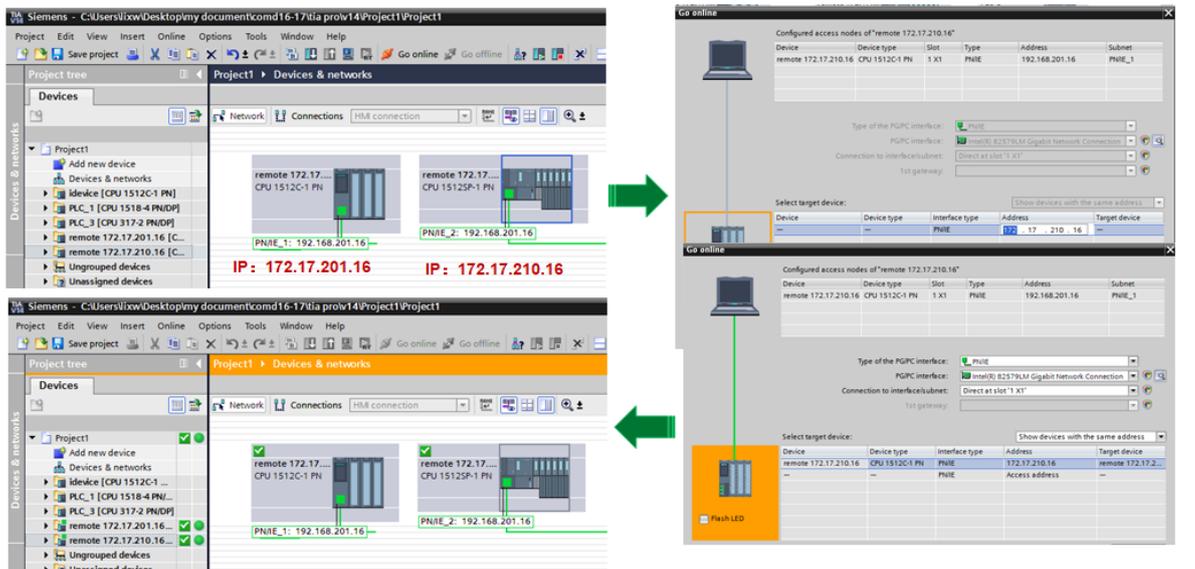
Ping statistics for 172.17.42.142:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 1ms, Maximum = 1ms, Average = 1ms

C:\Users\lixw>
```

## 4 工程软件的操作

客户端 PC 连接成功后可以通过工程软件访问现场的 PLC/HMI 设备，因为做了 NAT 的设置，下载时的目标 IP 是转换之后的虚拟 IP。

SINEMA RC VPN 使用的是三层隧道，因此浏览功能不能查看到现场设备，需要手动指定目标 IP，如下图 TIA PORTAL/STEP7 的操作，需要手动指定下载的目标 IP。



这样，虽然目标 IP 是虚拟 IP，但是通过 VPN 链路，最终的访问会到达现场实际的物理设备。