

常问问题•10/2018

SINEMA RC NAT 功能说明

SINEMA RC, NAT

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目录

1	西门子 SINEMA RC NAT3						
	1.1	概述	3				
	1.2	NAT	4				
2	SINEMA	RC NAT 设置	5				
	2.1	RC SERVER 基本配置	5				
	2.2	远程设备状态	7				
3	SINEMA	RC Client 远程访问1	0				
4	工程软件的操作13						

西门子 SINEMA RC NAT

1.1 概述

1

SIEMENS		SINEMA Remo	ote Connect								
Logged on as "admin"		Devices / s627_	Devices / s627_rc								
Log off	3	Device	VPN connection mode	Network settings	Group memberships	Change password	Device overview				
C Exit dialog		Connection parameter	ers: iel 192.168.36.0/24 and the ress: lask:	exported local subnet I	rrom sc642 overlap *	Add					
			Local subnet	Net	work gateway	Actions					
			192.168.20.0/24	Yes		×					
			192.168.36.0/24		Yes						

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。

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IP:192.168.2.1/24

Gateway: 192.168.2.151

r.

RC Client

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。

IP: 192.168.2.1/24

Gateway: 192.168.2.151

172.17.4.1/24

IP: 192.168.2.1/24

Gateway: 192.168.2.151

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。

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SIEMENS	SINEMA Remot	e Connect				
Logged on as "admin"	Devices / sc636					
	Device	VPN connection mode	Network settings	Group memberships	Change password	Device overview
Exit dialog	Connection parameter Connected local subnu- Local LAN IP addre Network ma	s: ets ss: sk:	Device is a networ	k gateway	Add	
		Local subnet	Netw	vork gateway	Actions	
		192.168.36.0/24	Yes		×	
	1:1 NAT NAT for local subnet Virtual subnet IP addre Network ma	ss: 172.17.0.0 sk: 255.255.255.0	Local subnet: 19	92 168 36 0/24 🗸	Add	
		Virtual subnet	Local subnet	Network gatewa	y Actions	
		172.17.36.0/24	192.168.36.0/24	Yes	×	
	NAT for local hosts	ss: 172.17.36.0/24 🗸	Local host:		Add	
		Save				

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 Remot	te Connect				
		Devices / sc636					
	С	Device	VPN connection mode	Network settings	Group memberships	Change password	Device over
Exit dialog		Connection parameter	rs:				
		Connected local subn	ets				
		Local LAN IP addre	SS:				
		Network ma	sk:	Device is a network	k gateway	Add	
			Local subnet	Netw	ork gateway	Actions	
			192.168.36.0/24	Yes		×	
		1:1 NAT					
		☑ NAT for local subnet					
		Virtual subnet IP addre	ss: 172.17.0.0				
		Network ma	sk: 255.255.255.0	Local subnet: 19	2.168.36.0/24 ~	Add	
			Virtual cubact	Logal subpot	Notwork gatowa	v Actions	
			172 17 26 0/24	102 169 26 0/24	Vec	×	
			112.11.30.0/24	192.100.30.0/24	163		
		NAT for local bosts					
		Virtual subnet IP addre	ss: 172 17 36 0/24 v	Local host: 19	2 168 36 12	bbA	
		Virtual Subject in Buddle	33. 112.11.00.0/24	Eocarnost. 13	2.100.00.12	Huu	
			Virtual subnet IP address	Local host	Network gatewa	y Actions	
			170 17 00 1/01	100 100 00 1	Vee	×	
			172.17.36.1/24	192.100.30.1	res		

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。

SIEMENS	SINEMA Remote C	Connect					Help 😡	10/25/2018, 2:55:39 PM (UTC +6	8:00) O Language: English
Logged on as "admin" Log off	Devices								
System Remote connections Devices Device update Address spaces	! To create further devices/users i No filter active Search filter: All	you need to purchase a n	ew license. Q	ise match Apply filt	er Show all				
Participant groups Communication relations User accounts Security Any account	Name of the device	VPN address - 10.8.1.3 10.8.1.2 Copy D	Remote subnet 192.168.20.0/24 192.168.36.0/24 192.168.36.0/24 elete	Virtual subnet - 172.17.36.0/24 172.17.42.0/24	Status \$ Image: Online (2018-10-25; 08:45) Online (2018-10-25; 14:45) Image: Online (2018-10-25; 14:45) Online (2018-10-25; 14:45)	Location Beijing Shanghai	Type of connection ¢ Permanent Permanent Permanent	VPN protocol IPsec [s627_RC] OpenVPN OpenVPN	Actions 0 c% 스 볼 0 c% 스 속 ● 볼 0 c% 스 속 ● 볼

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。

SIEMENS

	192.168.0.136/S	CALANCE	SC636-2C
Welcome admin	SINEMA Remote Connect	t (SINEMA RC)	e "Write Startun Config" to save immediately
Logout	Changes will be saved automatica	<u>any in 44 Seconds. 165</u>	s white Startup Coning to save inimediately
▶Information		Enable SINEMA RC	
▼System			
▶Configuration		Server Settings	
▶General	SINEMA RC Address:	192.168.0.153	
▶DNS	SINEMA RC Port:	443	
▶Restart		One was Marifi and in a	
▶Load&Save	Verification Turne	Server ventication	_
►Events	vernication Type.	Fingerprint	
▶DHCP	Fingerprint:	9C:78:A6:DA:A9:9A:14	(FB:9)
▶SNMP	CA Certificate:	SINEMA_RC_CA.pem	\checkmark
▶System Time		Desites One desited	
►Auto Logout	Device ID	Device Credentials	
▶Button	Device ID:	41	
▶Syslog Client	Device Password.		
▶Ports	Device Password Committation.		
Fault Monitoring		Optional Settings	
▶PLUG		Auto Firewall/NAT R	ules
▶Ping	Type of connection:	Auto	
▶Port	Use Proxy:	none	\sim
Diagnostics	Autoenrollment Interval [min]:	60	
Proxy Server			
► SINEMA RC			
▶Layer 2	Set Values Refresh		
▶Layer 3			
▶Security			

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	102 169 0 126/		
Welcome admin	SINEMA Remote Conne Changes will be saved automatic	ct (SINEMA RC) Information) save immediately
Loavit →Information → Start Page → Versions → ARP Table → Log Tables → Faults → DHCP Server → LLDP → Routing → SNMP → Security → SINEMA RC → System → Layer 2 → Layer 3 → Security	Status: Device Name: Device Location: GSM Number: Vendor: Comment: Type of Connection (Device): Fingerprint: Remote Address: Connected Local Subnet(s): Connected Local Host (s): Tunnel Interface Address: Connected Remote Subnet(s):	established (192.168.0.153, Port 1194, UDP) sc636 Beijing - - - Permanent Auto 9C.78.7A6:DA:A9:9A:14:FB:99:C2:50:6F:08:72:B8 192.168.0.153 192.168.0.153 192.168.36.0/24 translated to 172.17.36.0/24 10.8.1.3 10.8.1.3 10.8.1.0/24 10.8.1.0/24 10.8.0.0/24 172.17.42.0/24 192.168.20.0/24 192.168.248.0/24 192.168.248.0/24	:AC:11:03:8A:AA:7A:51:C9:11:6F:34:5E:10:17:4D:32:BI

SIEMENS

192.168.0.142/SCALANCE SC642-2C

Welcome admin	SINEMA Remote Conne	ct (SINEMA RC) Information
Logout		
 Information 	Status:	established (192.168.0.153, Port 1194, UDP)
▶ Start Page	Device Name:	sc642
▶ Versions	Device Location:	Shanghai
♦ARP Table	GSM Number:	
▶Log Tables	Vendor:	
Faults	Comment:	
▶DHCP Server	Type of Connection (Server):	Permanent
►LLDP	Type of Connection (Device):	Auto
▶Routing	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
▶ SNMP	Remote Address:	192.168.0.153
▶Security	Connected Local Subnet(s):	192.168.36.0/24 translated to 172.17.42.0/24
►IPsec VPN		
► SINEMA RC	Connected Local Host (s):	
▶ System		
▶Layer 2	Tunnel Interface Address:	10.8.1.2
▶Laver 3	Connected Remote Subnet(s):	10.8.1.0/24 10.8.0.0/24
		172.17.36.0/24
▶ Security		192.168.248.0/24 192.168.248.0/24 172.32.0.0/16
	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。 Copyright © Siemens AG Copyright year All rights reserved 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。

SIEMENS

192.168.0.142/SCALANCE SC642-2C

Welcome admin	Internet Protocol (IP) Masquerading					
Logout						
▶Information	Masquerading NAPT	Source NAT NETMAP				
▶System	Interface	Enable Masquerading				
	vlan1 (INT)					
▶Layer 2	vlan2 (EXT)					
▼Layer 3	Dell'Internet Defeed					
▶Subnets	Set values Refrest	n				
►NAT						
▶ Static Routes						
▶Security						

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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。

SIEMEN	IS S	SINEMA RC (Client						_ C) X
					Settir	ngs	Er	nglish		?
SINEMA Remote C	onnect Account							ပ္ Lo	g off	
SINEMA RC URL: 1	92.168.0.153:443		VPN status:	CONNECTED			Establis	h VPN tu	nnel	
Logged on as: III	klaowel		VPIN address: 10.8.	1.4			Terminate VPN tunnel			
Device list								۹	e	
Participant groups of the device	Name of the device	VPN address	Remote subnet	Virtual subnet		Status	Locat	ion		
device	s627_rc		192.168.20.0/24		⊘	online			*	0
device	sc642	10.8.1.2	192.168.36.0/24	172.17.42.0/24	0	online	Shang	hai	Â	
device	sc636	10.8.1.3	192.168.36.0/24	172.17.36.0/24	۲	online	Beijing		Â	
device	SINEMA RC LAN 1		192.168.248.0/24		0	online			Â	
Activate NAT on (Use destinat Use manual	Activate NAT on Client Use destination NAT settings of the device Use manual NAT settings NAT configuration Show log files									
								Exit		

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。

Command Prompt —	×
614 4f 8a d3 74 52Bluetooth Device (Personal Area Network)	^
1Software 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. 0n-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 Un-link 127.0.0.1 331	
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-1ink 192.168.0.120 281	
192.168.0.120 255.255.255.255 On-1ink 192.168.0.120 281	
192.168.0.255 255.255.255.255 On-1ink 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. 0255. 255. 255. 0 On-link 192. 168. 137. 1 291	
192.168.137.1 255.255.255.055 On-link 192.168.137.1 291	
192. 168. 137, 255–255, 255, 255, 255–0n-link 192. 168. 137, 1–291	
192. 168. 248. 0 255. 255. 25. 0 10. 8. 1. 1 10. 8. 1. 4 35	
224.0.0.0 $240.0.0.0$ $0n-11nk$ $127.0.0.1$ 331	
224. 0, 0, 0 240. 0, 0 00-11nk 192. 168. 0, 120 281	
224.0.0.0 $240.0.0.0$ $0n-11nk$ 192.168.137.1 291	
224.0.0.0 $240.0.0.0$ $0n-11nk$ 192.168.60.1 291	
224.0.0.0 $240.0.0.0$ $0n-11nk$ $10.8.1.4$ 291	
255, 255, 255, 255, 255, 255, 255, 255,	
255, 255, 255, 255, 255, 255, 255, 255,	
255, 255, 255, 255, 255, 255, 255, 255,	
255, 255, 255, 255, 255, 255, 255, 255,	
200.200.200.200.200.200.200 On This 10, 0, 1, 4 201	

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。

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Command Prompt × Contro1-C °C C:\Users\1ixw>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\1ixw>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\1ixw>_

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。