### 华为路由与交换配置命令

**说明：**

1.本文档没有目录，本文档在发布时为pdf文档，有章节书签，可以下载到本地来查看，点 击书签进入相应的章节。

2.蓝色的字为配置命令，绿色的字为命令的注释，有时命令太密集时，就不用蓝色标出了。

3.本文档仅为配置命令，相关的理论知识请参考其他文档。

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**0.安装华为eNSP模拟器**

首先，到华为官网下载**eNSP模拟器**的安装包，然后在安装eNSP之前，要先安装三个依赖软件：

**WinPcap**

**Wireshark**

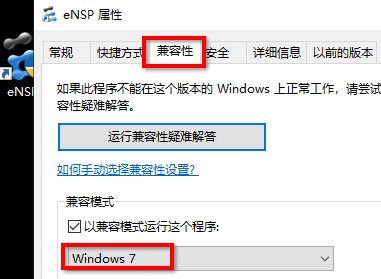
**Oracle VM VirtualBox**

所以一共是要准备4个软件包，如果找不到下载的资源，可以联系作者：[sysyear@163.com](mailto:sysyear@163.com)

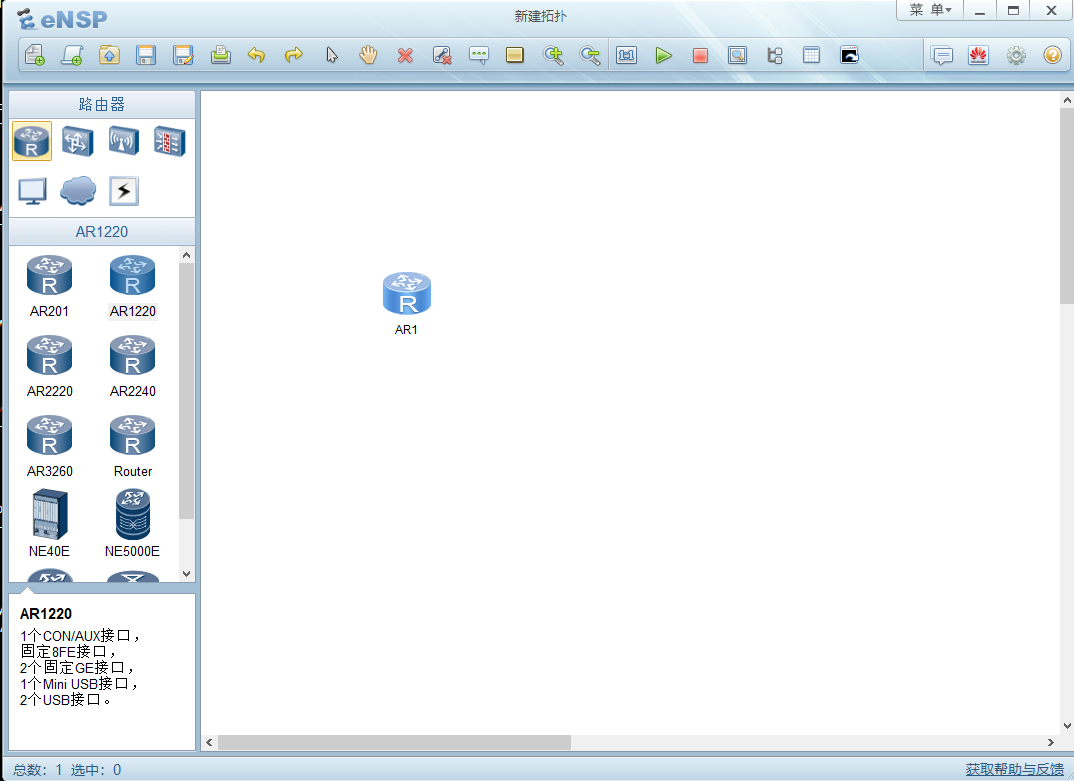
安装的过程就不多介绍了，装好eNSP模拟器后，找到它的图标：



点击右键，设置属性，将其兼容性改为Windows7，确定。这一步很重要，有时路由器不能正常启动就是因为没有以win7的兼容性来运行程序。



然后再双击图标，运行软件。



上图为eNSP的主界面，可以在左边拖入路由器或交换机等设备，放到右边的工作区里。

然后右击选择启动，再双击设备的图标就可以进入命令行了。具体的用法这里也不介绍了

本教程主要是教配置命令

如果有实体硬件设备，那最好是用真实的设备去测试。注意：不要在生产环境中做测试！！

**1.设备登录管理**

**带内管理（console本地登录）**

①**配置成仅用密码登录console**

<Huawei> //刚开始进入的是一般配置模式

<Huawei>system-view //在一般模式下输入system-view进入配置模式

Enter system view, return user view with Ctrl+Z.

[Huawei]user-interface console 0 //对console接口的配置

[Huawei-ui-console0]authentication-mode password //验证模式为仅密码

Please configure the login password (maximum length 16):123456 //如果是路由器，则

//要求立即输入密码，交换机则没有这一步

[Huawei-ui-console0]user privilege level 15 //设置console登录的权限级别

//15为管理员级别

[Huawei-ui-console0]set authentication password cipher 12pass6 //如果是交换机则要配这条

//表示密码为12pass6

[Huawei-ui-console0]

②**使用 用户名和密码登录**

[Huawei]user-interface console 0

[Huawei-ui-console0]authentication-mode aaa //使用aaa认证登录，需要配置aaa

[Huawei-ui-console0]

**带外管理（远程登录）**

①**Telnet仅密码登录**

[Huawei]telnet server enable //开启telnet服务

Error: TELNET server has been enabled

[Huawei]user-interface vty 0 4 //进入vty接口配置

[Huawei-ui-vty0-4]authentication-mode password //验证模式为仅密码

Please configure the login password (maximum length 16):12xx56 //如果是路由器，则

//要求立即输入密码，交换机则没有这一步

[Huawei-ui-vty0-4]user privilege level 15

[Huawei-ui-vty0-4]set authentication password cipher 12xx56 //如果是交换机要配这条

[Huawei-ui-vty0-4]

②**Telnet用户名和密码登录**

[Huawei-ui-vty0-4]user-interface vty 0 4

[Huawei-ui-vty0-4]authentication-mode aaa

[Huawei-ui-vty0-4]protocol inbound telnet //允许telnet登录

[Huawei-ui-vty0-4]

③**SSH用户名和密码登录**

[Huawei]rsa local-key-pair create //创建rsa密钥

The key name will be: Host

% RSA keys defined for Host already exist.

Confirm to replace them? (y/n)[n]:y //输入y确定

The range of public key size is (512 ~ 2048).

NOTES: If the key modulus is greater than 512,

It will take a few minutes.

Input the bits in the modulus[default = 512]:2048 //推荐用2048位的密钥

Generating keys...

.........................+++

.........+++

.................++++++++

....................++++++++

[Huawei]user-interface vty 0 4

[Huawei-ui-vty0-4]authentication-mode aaa

[Huawei-ui-vty0-4]protocol inbound ssh //允许ssh登录如果要允许telnet和ssh都能

//登录，则只能设置为protocol inbound all

[Huawei-ui-vty0-4]quit

[Huawei]ssh user admin authentication-type password //指定ssh用户，但该用户还未创建

Error: Username does not exist

先到下一章节创建一个帐号吧

创建好了再回来：

[Huawei]ssh user admin authentication-type password //指定ssh登录用户为admin

Authentication type setted, and will be in effect next time

[Huawei]stelnet server enable //开启ssh服务

Info: Succeeded in starting the STELNET server.

[Huawei]

**2.保存配置**

[Huawei]

[Huawei]quit

<Huawei>save //配置完毕一定要记得保存配置，在一般模式下保存

The current configuration will be written to the device.

Are you sure to continue? (y/n)[n]:y //输入y确定

It will take several minutes to save configuration file, please wait.......

Configuration file had been saved successfully

Note: The configuration file will take effect after being activated

<Huawei>

**3.创建用户**

[Huawei]aaa //进入aaa配置界面

[Huawei-aaa]local-user admin password cipher xxx //创建用户admin密码为xxx

[Huawei-aaa]local-user admin privilege level 15 //用户权限级别为15,管理员级别

[Huawei-aaa]local-user admin service-type telnet terminal ssh //用户的服务类型

//telnet, terminal, ssh登录用户

[Huawei-aaa]

[Huawei]aaa

[Huawei-aaa]undo local-user cof //删除帐号

[Huawei-aaa]

[Huawei-aaa]local-user cof state block //锁定帐号，锁定后该帐号无法再使用

[Huawei-aaa]

[Huawei-aaa]local-user cof state active //解锁帐号，解锁后该帐号又可以使用了

[Huawei-aaa]

**4.设置系统时间**

[Huawei]undo ntp-service enable //不使用ntp

Info:Stop the NTP service successfully

[Huawei]quit

<Huawei>clock timezone **cst** add 08:00:00 //先配置时区，时区名称可自定义

<Huawei>clock datetime 17:55:00 2019-11-29 //配置时间

<Huawei>

<Huawei>dis clock //查看时间

2019-11-29 17:55:04

Friday

Time Zone(cst) : UTC+08:00

<Huawei>

**5.登录超时设置**

[Huawei]

[Huawei]user-interface vty 0 4

[Huawei-ui-vty0-4]idle-timeout 15 //空闲15分钟则自动登出

[Huawei-ui-vty0-4]

**6.关闭终端console信息输出**

<Huawei>undo terminal monitor

Info: Current terminal monitor is off.

<Huawei>

**7.启动文件选择**

<Huawei>startup saved-configuration vrpcfg.zip //指定启动时使用的配置文件

This operation will take several minutes, please wait....

Info: Succeeded in setting the file for booting system

<Huawei>startup system-software xxxxxx.cc //指定启动时使用的系统镜像文件

**8.SSH客户端**

[Huawei]

[Huawei]ssh client first-time enable //初次使用stelnet客户端要初始化客户端的密钥

[Huawei]stelnet 10.1.1.1 //使用stelnet远程登录到10.1.1.1

Please input the username:admin //输入用户名

Trying 10.1.1.1 ...

Press CTRL+K to abort

Connected to 10.1.1.1 ...

The server is not authenticated. Continue to access it? [Y/N] :y //确认

Save the server's public key? [Y/N] :y //确认

The server's public key will be saved with the name 10.1.1.1. Please wait...

Enter password: //输入密码

Info: The max number of VTY users is 5, and the number

of current VTY users on line is 1.

The current login time is 2019-12-03 09:41:47.

<S5700> //远程登录成功

<S5700>

**9.查看接口状态**

<Huawei>dis ip int brief //查看接口的up/down状态及接口上的ip

\*down: administratively down

^down: standby

(l): loopback

(s): spoofing

The number of interface that is UP in Physical is 2

The number of interface that is DOWN in Physical is 2

The number of interface that is UP in Protocol is 2

The number of interface that is DOWN in Protocol is 2

Interface IP Address/Mask Physical Protocol

GigabitEthernet0/0/0 unassigned down down

GigabitEthernet0/0/1 10.1.1.2/24 up up

GigabitEthernet0/0/2 unassigned down down

NULL0 unassigned up up(s)

<Huawei>

**10.恢复出厂**

<Huawei>reset saved-configuration //重置配置文件

Warning: The action will delete the saved configuration in the device.

The configuration will be erased to reconfigure. Continue? [Y/N]:y //确定清除配置

Warning: Now clearing the configuration in the device.

Info: Succeeded in clearing the configuration in the device.

<Huawei>reboot //配置文件重置后，得重启系统才恢复出厂的运行状态

Info: The system is now comparing the configuration, please wait.

Warning: All the configuration will be saved to the configuration file for the n

ext startup:, Continue?[Y/N]:n //这里问是否要保存配置，不保存

Info: If want to reboot with saving diagnostic information, input 'N' and then e

xecute 'reboot save diagnostic-information'.

System will reboot! Continue?[Y/N]:y //确定要重启

<Huawei>#######

**11. TFTP客户端**

[Huawei]tftp client-source -a 10.1.1.1 //指定tftp客户端的源ip

Info: Succeeded in setting the source address of the TFTP client to 10.1.1.1.

[Huawei]quit

<Huawei>tftp 10.1.1.254 put vrpcfg.zip s5700\_cfg.zip //上传配置文件vrpcfg.zip到tftp

//服务器10.1.1.254，存储文件名为s5700\_cfg.zip

Info: Transfer file in binary mode.

Uploading the file to the remote TFTP server. Please wait...

**12. FTP服务器**

把交换机或路由器当作FTP服务器

[Huawei]ftp server enable //开启ftp服务器

Info: Succeeded in starting the FTP server.

[Huawei]aaa //进入aaa配置模式

[Huawei-aaa]local-user cof password cipher 12xx56 //创建用户cof作为ftp用户

Info: Add a new user.

[Huawei-aaa]local-user cof service-type ftp //用户仅用户ftp服务

[Huawei-aaa]local-user cof ftp-directory flash:/ //用户的ftp家目录为flash:/

[Huawei-aaa]quit

[Huawei]

**13. FTP客户端**

<Huawei>ftp -a 10.1.1.2 10.1.1.1 //指定源ip为10.1.1.2,服务器ip为10.1.1.1

Trying 10.1.1.1 ...

Press CTRL+K to abort

Connected to 10.1.1.1.

220 FTP service ready.

User(10.1.1.1:(none)):cof //输入ftp用户名

331 Password required for cof.

Enter password: //输入密码

230 User logged in. //成功登录

[Huawei-ftp]dir //查看文件列表

200 Port command okay.

150 Opening ASCII mode data connection for \*.

drwxrwxrwx 1 noone nogroup 0 Aug 06 2015 src

drwxrwxrwx 1 noone nogroup 0 Dec 03 09:22 compatible

-rwxrwxrwx 1 noone nogroup 538 Dec 03 09:31 vrpcfg.zip

226 Transfer complete.

FTP: 194 byte(s) received in 0.160 second(s) 1.21Kbyte(s)/sec.

[Huawei-ftp]get vrpcfg.zip s5700.zip //下载文件，上传为put xx xxx

200 Port command okay.

150 Opening ASCII mode data connection for vrpcfg.zip.

226 Transfer complete.

FTP: 538 byte(s) received in 0.150 second(s) 3.58Kbyte(s)/sec.

[Huawei-ftp]quit

221 Server closing.

**14. VLAN操作**

[Huawei]vlan 10 //创建vlan 10

[Huawei-vlan10]description kefu //描述

[Huawei-vlan10]quit

[Huawei]

[Huawei]vlan batch 100 101 102 //批量创建vlan

Info: This operation may take a few seconds. Please wait for a moment...done.

[Huawei]

[Huawei]vlan batch 20 to 30 //批量创建vlan

Info: This operation may take a few seconds. Please wait for a moment...done.

[Huawei]

[Huawei]dis vlan summary //查看vlan汇总情况

static vlan:

Total 16 static vlan.

1 10 20 to 30 100 to 102

[Huawei]vlan 10

[Huawei-vlan10]management-vlan //设置vlan10为管理vlan，

//管理vlan不能添加端口

[Huawei-vlan10]quit

[Huawei]int vlanif 10 //创建SVI接口

[Huawei-Vlanif10]ip address 10.18.1.1 255.255.255.0 //配置ip

[Huawei-Vlanif10]quit

[Huawei]int GigabitEthernet 0/0/5

[Huawei-GigabitEthernet0/0/5]port link-type access //设置端口类型为access

[Huawei-GigabitEthernet0/0/5]port default vlan 20 //将端口加入vlan20

[Huawei-GigabitEthernet0/0/5]quit

[Huawei]

[Huawei]interface GigabitEthernet 0/0/1

[Huawei-GigabitEthernet0/0/1]port link-type trunk //设置端口为trunk口

[Huawei-GigabitEthernet0/0/1]port trunk pvid vlan 1 //native vlan为1

[Huawei-GigabitEthernet0/0/1]port trunk allow-pass vlan all //华为的trunk口默认

//只允许vlan1通过，

[Huawei-GigabitEthernet0/0/1]quit

[Huawei]

**15. 端口操作**

[Huawei]int g0/0/3

[Huawei-GigabitEthernet0/0/3]undo negotiation auto //手动指定端口参数时要先

//关闭自协商

[Huawei-GigabitEthernet0/0/3]duplex full //信道模式为全双工

[Huawei-GigabitEthernet0/0/3]speed 1000 //速率为1000M

[Huawei-GigabitEthernet0/0/3]combo-port copper //光电复用口指定为电口

**16. DDM检测**

[Huawei]dis transceiver interface g0/0/1 //显示电口的光功率等信息

**17.端口聚合**

[Huawei]int Eth-Trunk 1 //创建聚合口1

[Huawei-Eth-Trunk1]quit

[Huawei]int g0/0/20

[Huawei-GigabitEthernet0/0/20]eth-trunk 1 //将g0/0/20指定为聚合口1的成员端口

Info: This operation may take a few seconds. Please wait for a moment...done.

[Huawei-GigabitEthernet0/0/20]quit

[Huawei]int g0/0/21

[Huawei-GigabitEthernet0/0/21]eth-trunk 1 //将g0/0/21指定为聚合口1的成员端口

Info: This operation may take a few seconds. Please wait for a moment...done.

[Huawei-GigabitEthernet0/0/21]quit

[Huawei]

[Huawei]int eth-trunk 1

[Huawei-Eth-Trunk1]port link-type trunk //聚合口指定为trunk，也可为access

[Huawei-Eth-Trunk1]port trunk allow-pass vlan all

[Huawei-Eth-Trunk1]load-balance src-dst-ip //负载均衡模式

[Huawei-Eth-Trunk1]

**18.端口安全**

端口安全是对进入端口的mac地址进行过滤

[Huawei]int g0/0/9

[Huawei-GigabitEthernet0/0/9]port-security enable //开启端口安全

[Huawei-GigabitEthernet0/0/9]port-security protect-action protect //保护模式

[Huawei-GigabitEthernet0/0/9]port-security max-mac-num 10 //最多允许10个mac地址

[Huawei-GigabitEthernet0/0/9]port-security mac-address sticky //sticky模式

[Huawei-GigabitEthernet0/0/9]port-security mac-address sticky 0026-ab03-9f04 vlan 1

//手工添加一条mac地址

[Huawei-GigabitEthernet0/0/9]

**19.端口环路检测**

[Huawei]loopback-detect packet-interval 20 //检测周期，20秒检测一次

[Huawei]int g0/0/10

[Huawei-GigabitEthernet0/0/10]loopback-detect recovery-time 180 //恢复时间180秒

[Huawei-GigabitEthernet0/0/10]loopback-detect enable //在端口上开启

[Huawei-GigabitEthernet0/0/10]loopback-detect action shutdown //惩戒动作

[Huawei-GigabitEthernet0/0/10]quit

[Huawei]

[Huawei]loopback-detect enable //在全局上开启，所有端口都开启

**20. STP/RSTP**

[Huawei]stp enable

[Huawei]stp mode stp //stp模式为STP，也可为rstp,mstp

Info: This operation may take a few seconds. Please wait for a moment...done.

[Huawei]stp root primary //指定为根桥

[Huawei]stp priority 4096 //设置桥优先级，必须为4096的倍数

[Huawei]dis stp brief //查看stp基本情况

MSTID Port Role STP State Protection

0 GigabitEthernet0/0/1 DESI FORWARDING NONE

0 GigabitEthernet0/0/3 DESI FORWARDING NONE

[Huawei]int g0/0/3

[Huawei-GigabitEthernet0/0/3]stp port priority 16 //设置端口的优先级，16的倍数

[Huawei-GigabitEthernet0/0/3]stp cost 20000 //端口开销

[Huawei-GigabitEthernet0/0/3]

**STP端口开销表**：

|  |  |  |  |
| --- | --- | --- | --- |
| 端口速率 | 802.1D旧版 | 802.1D/1998开销 | 802.1T/2001开销 |
| 10M | 100 | 100 | 2,000,000 |
| 100M | 10 | 19 | 200,000 |
| 1G | 1 | 4 | 20,000 |
| 10G | 1 | 2 | 2,000 |

**21. MSTP**

[Huawei]stp enable

[Huawei]stp mode mstp

[Huawei]stp region-configuration //进入mstp配置模式

[Huawei-mst-region]region-name mstp1 //设置mstp域名为mstp1

[Huawei-mst-region]revision-level 1 //设置修定级别为1

[Huawei-mst-region]instance 1 vlan 1 to 3 //实例与vlan绑定

[Huawei-mst-region]instance 2 vlan 9 to 11

[Huawei-mst-region]active region-configuration //激活mstp域配置

Info: This operation may take a few seconds. Please wait for a moment...done.

[Huawei-mst-region]

[Huawei]stp instance 1 priority 4096 //设置本交换机的实例1的桥优先级

[Huawei]stp instance 0 root primary //将本交换机指定为实例0的根

[Huawei]dis stp region-configuration //查看mstp域配置

Oper configuration

Format selector :0

Region name :mstp1

Revision level :1

Instance VLANs Mapped

0 4 to 8, 12 to 4094

1 1 to 3

2 9 to 11

[Huawei]

[Huawei]int g0/0/2

[Huawei-GigabitEthernet0/0/2]stp edged-port enable //设置为边缘端口

[Huawei-GigabitEthernet0/0/2]quit

[Huawei]int g0/0/3

[Huawei-GigabitEthernet0/0/3]stp loop-protection //非根桥的上联口开启环路保护

[Huawei-GigabitEthernet0/0/3]quit

[Huawei]int g0/0/4

[Huawei-GigabitEthernet0/0/4]stp root-protection //根桥上指定端口保护

[Huawei-GigabitEthernet0/0/4]quit

[Huawei]stp bpdu-protection //全局下所有边缘端口开启BPDU防护

**22. DHCP**

[Huawei]dhcp enable //开启dhcp服务

Info: The operation may take a few seconds. Please wait for a moment.done.

[Huawei]int vlanif 1

[Huawei-Vlanif1]ip addr 10.1.1.1 255.255.255.0 //先配置vlanif的IP

[Huawei-Vlanif1]dhcp select global //dhcp使用本地全局的

[Huawei-Vlanif1]quit

[Huawei]ip pool vlan1 //创建地址池vlan1

Info:It's successful to create an IP address pool.

[Huawei-ip-pool-vlan1]gateway-list 10.1.1.1 //网关为10.1.1.1

[Huawei-ip-pool-vlan1]network 10.1.1.0 mask 255.255.255.0 //配置网络

[Huawei-ip-pool-vlan1]excluded-ip-address 10.1.1.2 10.1.1.10 //排除地址，不分配10.1.1.2~10

[Huawei-ip-pool-vlan1]lease day 5 hour 4 minute 0 //租期为5天4小时0分钟

[Huawei-ip-pool-vlan1]dns-list 10.1.1.20 114.114.114.114 //dns列表

[Huawei-ip-pool-vlan1]static-bind ip-address 10.1.1.99 mac-address 1418-7709-2fd8

//给目标mac分配固定的IP地址

[Huawei-ip-pool-vlan1]quit

[Huawei]dis dhcp statistics //查看dhcp报文收发情况

[Huawei]dis ip pool name vlan1 //查看地址池vlan1的信息，IP分配情况等

Pool-name : vlan1

... ...

VPN instance : --

-----------------------------------------------------------------------------

Start End Total Used Idle(Expired) Conflict Disable

-----------------------------------------------------------------------------

10.1.1.1 10.1.1.254 253 1 243(0) 0 9

-----------------------------------------------------------------------------

[Huawei]

<Huawei>reset ip pool name vlan1 ? //收回分配的IP地址，可以是某个范围，也可

X.X.X.X Start IP address //以是全部收回

all All IP address

conflict Conflict IP address

expired Expired IP address

used Used IP address

**23. DHCP中继**

[Huawei]int vlan1

[Huawei-Vlanif1]dhcp select relay //配置DHCP模式为中继

[Huawei-Vlanif1]dhcp relay server-ip 10.2.2.33 //配置中继服务器

**24. DHCP保存地址分配信息**

[Huawei]dhcp server database enable //开启保存地址分配信息的服务

Info: The operation may take a few seconds, please wait.

done.

[Huawei]dhcp server database recover //使用单一文件保存

[Huawei]dhcp server database write-delay 300 //每分配一个地址后延迟300秒再保存

[Huawei]dis dhcp server database //查看database信息

Status: enable

Recover from files after reboot: enable

File saving lease items: flash:/dhcp/lease.txt //分配信息保存的文件

File saving conflict items: flash:/dhcp/conflict.txt //地址冲突信息保存的文件

Save Interval: 300 (seconds)

[Huawei]

**25. DHCP Snooping**

[Huawei]dhcp snooping enable //开启dhcp snooping

[Huawei]int g0/0/1

[Huawei-GigabitEthernet0/0/1]dhcp snooping enable //接口上开启

[Huawei-GigabitEthernet0/0/1]dhcp snooping trusted //上联口一定要设置为信任口

[Huawei-GigabitEthernet0/0/1]quit

[Huawei]int g0/0/xxx //所有下联口，接终端机的，都要开启dhcp snooping

[Huawei-GigabitEthernet0/0/3]dhcp snooping enable

[Huawei-GigabitEthernet0/0/3]quit

[Huawei]vlan 1

[Huawei-vlan1]ip source check user-bind enable //在vlan上应用ip-mac绑定过滤策略

//只有由交换机分配的ip和对应的mac包才允许进入

Info: Add permit rule for dynamic snooping bind-table, please wait a minute!done.

[Huawei-vlan1]

**26. ARP相关命令**

<Huawei>dis arp //查看ARP表

//IP地址 MAC地址 过期时间（分钟）类型 接口 vpn实例 vlan

IP ADDRESS MAC ADDRESS EXPIRE(M) TYPE INTERFACE VPN-INSTANCE

VLAN

------------------------------------------------------------------------------

10.1.1.1 4c1f-ccb2-5fd9 I - Vlanif1

10.1.1.3 4c1f-cc28-6616 20 D-0 GE0/0/1

1

10.1.1.2 4c1f-cc6f-0dba 20 D-0 GE0/0/2

1

------------------------------------------------------------------------------

Total:3 Dynamic:2 Static:0 Interface:1

<Huawei>

[Huawei]arp static 10.1.1.3 4c1f-cc28-6616 //添加静态arp条目

[Huawei]

[Huawei]int vlan 1

[Huawei-Vlanif1]arp-proxy enable //在vlan接口上开启arp代理

[Huawei-Vlanif1]

[Huawei]arp gratuitous-arp send enable //开启免费arp功能

[Huawei]arp gratuitous-arp send interval 20 //免费arp发包周期为20秒

[Huawei]

[Huawei]arp speed-limit source-mac maximum 50 //限制arp发包速率为50个每秒

[Huawei]arp speed-limit source-mac 4c1f-cc28-6616 maximum 5 //限制指定源mac的

//arp发包速率

[Huawei]

[Huawei]int vlan 1

[Huawei-Vlanif1]arp expire-time 180 //设置arp老化时间为180秒，默认是20分钟

[Huawei-Vlanif1]

**27. MAC相关命令**

[Huawei]dis mac-address //查看mac地址表

MAC address table of slot 0:

-------------------------------------------------------------------------------

MAC Address VLAN/ PEVLAN CEVLAN Port Type LSP/LSR-ID

VSI/SI MAC-Tunnel

-------------------------------------------------------------------------------

4c1f-cc28-6616 1 - - GE0/0/3 dynamic 0/-

4c1f-cc6f-0dba 1 - - GE0/0/2 dynamic 0/-

-------------------------------------------------------------------------------

Total matching items on slot 0 displayed = 2

[Huawei]

[Huawei]mac-address aging-time 300 //设置mac老化时间，默认为300秒

[Huawei]mac-address static 4c1f-cc28-6616 g0/0/3 vlan 1 //添加静态mac条目

[Huawei]

[Huawei]mac-address blackhole 4c1f-cc28-992f vlan 1 //黑洞mac

[Huawei]

**28.广播抑制**

[Huawei]int g0/0/3

[Huawei-GigabitEthernet0/0/3]storm-control interval 180 //惩戒时间180秒

[Huawei-GigabitEthernet0/0/3]storm-control action block //惩戒动作为阻塞

[Huawei-GigabitEthernet0/0/3]storm-control enable log //开启日志

[Huawei-GigabitEthernet0/0/3]storm-control broadcast min-rate 1000 max-rate 1200

//广播包速率限制为1000 pts最大允许1200 包每秒

[Huawei-GigabitEthernet0/0/3]

**29. Qos限速策略**

[Huawei]traffic classifier class1 //定义流类

[Huawei-classifier-class1]if-match any //匹配数据，可以是所有数据，也可用acl限定

[Huawei-classifier-class1]quit

[Huawei]traffic behavior behav1 //定义流行为

[Huawei-behavior-behav1]car cir 1000 cbs 150000 pbs 200000 //单位:Kbit/s, byte/s,byte/s

[Huawei-behavior-behav1]quit

[Huawei]traffic policy policy1 //定义流策略

[Huawei-trafficpolicy-policy1]classifier class1 behavior behav1 //策略使用的流类及流行为

[Huawei-trafficpolicy-policy1]quit

[Huawei]

[Huawei]int g0/0/3

[Huawei-GigabitEthernet0/0/3]traffic-policy policy1 inbound //在接口上使用策略

[Huawei-GigabitEthernet0/0/3]traffic-policy policy1 outbound //2个方向上都可应用

[Huawei-GigabitEthernet0/0/3]quit

<Huawei>dis traffic-policy applied-record policy1 //查看策略的应用情况

-------------------------------------------------

Policy Name: policy1

Policy Index: 2

Classifier:class1 Behavior:behav1

-------------------------------------------------

\*interface GigabitEthernet0/0/3

traffic-policy policy1 inbound

slot 0 : success

\*interface GigabitEthernet0/0/3

traffic-policy policy1 outbound

slot 0 : success

-------------------------------------------------

Policy total applied times: 2.

<Huawei>

**30. ACL访问控制列表**

|  |  |  |
| --- | --- | --- |
| acl number | 类型 | 匹配对象 |
| 2000~2999 | 基本acl | 源ip |
| 3000~3999 | 扩展acl | 源ip，目的ip，tcp/udp的源port，目的port，IP上层协议号 |
| 4000~4999 | 二层acl | mac地址，vlanID |

默认最后有一条permit any，记得必要时请在末尾一条rule添加deny any

[Huawei]acl number 2000 //创建基本acl

[Huawei-acl-basic-2000]rule 1 permit source 10.1.1.0 0.0.0.255 //匹配源网段，反掩码

[Huawei-acl-basic-2000]rule 10 permit source 10.1.2.22 0 //匹配源ip，掩码为0

[Huawei-acl-basic-2000]quit

[Huawei]acl number 3000 //创建扩展 acl

[Huawei-acl-adv-3000]rule 1 permit ip source 10.1.1.0 0.0.0.255 destination

10.18.0.0 0.0.255.255 //ip地址只能用反掩码

[Huawei-acl-adv-3000]rule 5 permit tcp source 10.0.0.0 0.255.255.255 source-port

eq 40 destination any destination-port range 10 99

[Huawei-acl-adv-3000]quit

[Huawei]acl number 4000 //创建二层acl

[Huawei-acl-L2-4000]rule 1 permit source-mac 4c1f-cc28-6616 ffff-ffff-ffff //匹配mac

destination-mac 4c1f-cc28-6617 ffff-ffff-ffff //使用正掩码

[Huawei-acl-L2-4000]quit

[Huawei]int g0/0/9

[Huawei-GigabitEthernet0/0/9]traffic-filter inbound acl 2000 //应用acl到接口上

[Huawei-GigabitEthernet0/0/9]quit

**ACL时间**

[Huawei]time-range time1 from 18:00 2019/12/04 to 23:00 2019/12/06 //匹配一段时间

[Huawei]time-range time2 10:00 to 15:30 daily //匹配一个周期，每天的某个时段

[Huawei]time-range time3 15:00 to 19:30 ? //也可以是指定的星期几

<0-6> Day of the week(0 is Sunday)

Fri Friday

Mon Monday

Sat Saturday

Sun Sunday

Thu Thursday

Tue Tuesday

Wed Wednesday

daily Every day of the week

off-day Saturday and Sunday

working-day Monday to Friday

**31.端口镜像**

[Huawei]observe-port 1 int g0/0/3 //观察口，被镜像的数据流向此端口

[Huawei]int g0/0/2

[Huawei-GigabitEthernet0/0/2]port-mirroring to observe-port 1 both

//设置端口为被镜像口，镜像的数据为both（包含inbound和outbound）

[Huawei-GigabitEthernet0/0/2]quit

[Huawei]

[Huawei]dis port-mirroring //查看端口镜像情况

Port-mirror:

----------------------------------------------------------------------

Mirror-port Direction Observe-port

----------------------------------------------------------------------

GigabitEthernet0/0/2 Both GigabitEthernet0/0/3

----------------------------------------------------------------------

[Huawei]

**32. IP和MAC绑定（可绑定到端口上）**

[Huawei]user-bind static ip-address 10.1.1.92 mac-address 4c1f-cc6f-0f33 [int g0/0/3]

Info: 1 static user-bind item(s) added. //添加一条静态的ip和mac绑定条目

[Huawei]vlan 1

[Huawei-vlan1]ip source check user-bind enable //在相应vlan上开启ip-mac检查

[Huawei-vlan1]quit

**33. SNMP**

[Huawei]snmp-agent //开启snmp代理功能

[Huawei]snmp-agent community read public123 acl 2002 //可用acl指定允许的管理站

[Huawei]snmp-agent sys-info version all //指定snmp版本，v1, v2c, v3, all

[Huawei]snmp-agent sys-info location XXbuilding

[Huawei]snmp-agent sys-info contact coflee-18912345678

[Huawei]snmp-agent trap enable //开启trap功能

Warning: All switches of SNMP trap/notification will be open. Continue? [Y/N]:y

[Huawei]snmp-agent target-host trap address udp-domain 10.1.1.252 udp-port 162

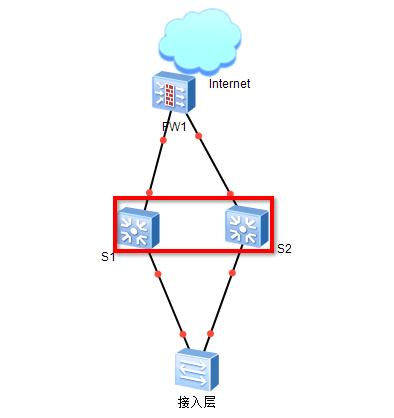
params securityname prtgxx v2c

//设置trap参数，管理主机ip,trap端口号，团体字及版本

**34. VRRP（要配合mstp）**

VRRP只有advertisment报文，报文传播使用组播地址224.0.0.18，报文封装在IP报文中，上层协议号为118，Virtual Router的mac地址为0000-5E00-01-vrid

优先级默认为100，越大越优先



拓扑如上图

S1（10.10.1.1）和S2（10.10.1.2）虚拟成一个网关（10.10.1.254）vlan10

S1上的配置如下（S2上的配置省略）

[Huawei]vrrp virtual-ip ping enable //允许ping虚拟网关，必须在配置vrrp之前开启

[Huawei]int vlan 10

[Huawei-Vlanif10]ip add 10.10.1.1 255.255.255.0

[Huawei-Vlanif10]vrrp vrid 10 virtual-ip 10.10.1.254 //虚拟网关ip

[Huawei-Vlanif10]vrrp vrid 10 priority 120 //优先级为120，目的是让其成为master

[Huawei-Vlanif10]vrrp vrid 10 track int g0/0/24 reduced 30

//如果上联口断了则降低优先级，减30，变成备份的

[Huawei-Vlanif10]vrrp vrid 10 preempt-mode timer delay 5 //抢占延迟时间设为5秒

[Huawei-Vlanif10]vrrp vrid 10 preempt-mode disable //或者 关闭抢占模式

[Huawei-Vlanif10]quit

[Huawei]vrrp gratuitous-arp timeout 30 //设置vrrp的免费arp发送周期，30秒

[Huawei]dis vrrp brief //查看vrrp信息

VRID State Interface Type Virtual IP

----------------------------------------------------------------

10 Initialize Vlanif10 Normal 10.10.1.254

----------------------------------------------------------------

Total:1 Master:0 Backup:0 Non-active:1

[Huawei]

**35.静态路由配置**

[Huawei]ip route-static 10.19.0.0 255.255.0.0 10.1.1.2 preference 30 //配置静态路由

[Huawei]

[Huawei]dis ip routing-table //查看路由表

Route Flags: R - relay, D - download to fib

------------------------------------------------------------------------------

Routing Tables: Public

Destinations : 5 Routes : 5

Destination/Mask Proto Pre Cost Flags NextHop Interface

10.1.1.0/24 Direct 0 0 D 10.1.1.1 Vlanif1

10.1.1.1/32 Direct 0 0 D 127.0.0.1 Vlanif1

**10.19.0.0/16** Static 30 0 RD 10.1.1.2 Vlanif1

127.0.0.0/8 Direct 0 0 D 127.0.0.1 InLoopBack0

127.0.0.1/32 Direct 0 0 D 127.0.0.1 InLoopBack0

**36.单臂路由**

[Huawei]int g0/0/2.10

[Huawei-GigabitEthernet0/0/2.10]dot1q termination vid 10

[Huawei-GigabitEthernet0/0/2.10]ip add 192.168.10.254 255.255.255.0

[Huawei-GigabitEthernet0/0/2.10]arp broadcast enable

[Huawei-GigabitEthernet0/0/2.10]quit

[Huawei]int g0/0/2.20

[Huawei-GigabitEthernet0/0/2.20]dot1q termination vid 20

[Huawei-GigabitEthernet0/0/2.20]ip add 192.168.20.254 255.255.255.0

[Huawei-GigabitEthernet0/0/2.20]arp broadcast enable

[Huawei-GigabitEthernet0/0/2.20]quit

[Huawei]

**37.黑洞路由**

[Huawei]ip route-static 10.0.0.0 255.0.0.0 NULL 0

**38. RIP**

[Huawei]rip 1 //开启rip进程1

[Huawei-rip-1]version 2 //版本为v2

[Huawei-rip-1]undo summary //关闭路由自动汇总

[Huawei-rip-1]preference 50 //设置路由优先级

[Huawei-rip-1]network 10.0.0.0 //宣告网段

[Huawei-rip-1]import-route ospf 1 cost 5 //路由引入（重分布）

[Huawei-rip-1]default-route originate cost 2 //引入默认路由（0.0.0.0）

[Huawei-rip-1]silent-interface g0/0/2 //rip进程里指定 静默接口

[Huawei-rip-1]quit

[Huawei]int g0/0/1

[Huawei-GigabitEthernet0/0/1]rip authentication-mode md5 nonstandard plain xxxx 1

//设置rip端口验证

**39. OSPF**

[Huawei]ospf router-id 10.1.1.252 1 //开启ospf进程1，同时指定router-id

Info: The configuration succeeded. You need to restart the OSPF process to valid

ate the new router ID.

[Huawei-ospf-1]

[Huawei-ospf-1]area 0

[Huawei-ospf-1-area-0.0.0.0]network 10.1.1.0 0.0.0.255 //在区域0宣告网段

[Huawei-ospf-1-area-0.0.0.0]quit

[Huawei-ospf-1]area 1

[Huawei-ospf-1-area-0.0.0.1]network 10.2.2.0 0.0.0.255 //在区域1宣告网段

[Huawei-ospf-1-area-0.0.0.1]quit

[Huawei-ospf-1]area 0

[Huawei-ospf-1-area-0.0.0.0]authentication-mode md5 1 cipher xxxx //区域0开启区域验证

[Huawei-ospf-1-area-0.0.0.0]quit

[Huawei-ospf-1]import-route rip 1 cost 20000 //路由引入（重分布）

[Huawei-ospf-1]default-route-advertise cost 20000 //引入默认路由（0.0.0.0）

[Huawei-ospf-1]area 1

[Huawei-ospf-1-area-0.0.0.1]vlink-peer 10.2.2.33 //虚链路对端

[Huawei-ospf-1-area-0.0.0.1]quit

[Huawei]dis ospf peer brief //查看ospf邻居及相关信息

[Huawei]dis ospf lsdb //查看ospf链路状态数据库

**40.策略路由**

[Huawei]traffic classifier class2 //定义流类

[Huawei-classifier-class2]if-match acl 2000 //匹配acl，该acl匹配目标流量

[Huawei-classifier-class2]quit

[Huawei]traffic behavior behav2 //定义流行为

[Huawei-behavior-behav2]redirect ip-nexthop 10.1.1.1 //指定下一跳

[Huawei-behavior-behav2]quit

[Huawei]traffic policy policy2 //定义流策略

[Huawei-trafficpolicy-policy2]classifier class2 behavior behav2 //匹配相应的类和行为

[Huawei-trafficpolicy-policy2]quit

[Huawei]int g0/0/1

[Huawei-GigabitEthernet0/0/1]traffic-policy policy2 inbound //在接口上应用策略

[Huawei-GigabitEthernet0/0/1]quit

[Huawei]dis traffic-policy applied-record //查看策略应用情况

-------------------------------------------------

Policy Name: policy2

Policy Index: 0

Classifier:class2 Behavior:behav2

-------------------------------------------------

\*interface GigabitEthernet0/0/1

traffic-policy policy2 inbound

slot 0 : success

-------------------------------------------------

**41. PPP**

[Huawei]int s4/0/1

[Huawei-Serial4/0/1]virtualbaudrate 2048000 //设置串口波特率

[Huawei-Serial4/0/1]physical-mode async //串口传输模式设为异步的

[Huawei-Serial4/0/1]physical-mode sync //也可设为同步的（默认是同步的）

[Huawei-Serial4/0/1]link-protocol ppp //封装协议为ppp

[Huawei-Serial4/0/1]ppp authentication-mode chap //ppp使用chap

[Huawei-Serial4/0/1]ppp chap user cof //ppp用户名

[Huawei-Serial4/0/1]ppp chap password cipher xxxxx //ppp用户密码

[Huawei-Serial4/0/1]quit

[Huawei-Serial4/0/1]ppp authentication-mode pap //ppp使用pap

[Huawei-Serial4/0/1]ppp pap local-user cof password cipher xxxx

[Huawei-Serial4/0/1]quit

**42. DNS**

[Huawei]dns resolve //开启dns解析

[Huawei]dns server 8.8.8.8 //设置dns服务器

[Huawei]dns proxy enable //开启dns代理

[Huawei]ip host xx.com 10.1.1.33 //添加本地解析项

[Huawei]ip host ff.com 10.1.1.22

[Huawei]

[Huawei]ping xx.com //测试

PING xx.com (10.1.1.33): 56 data bytes, press CTRL\_C to break

**43. NAT**

**①静态NAT：**一对一映射，映射的公网IP不可与出接口的ip相同

[Huawei]int g0/0/1

[Huawei-GigabitEthernet0/0/1]ip add 100.1.1.1 255.255.255.0 //接口配置公网ip

[Huawei-GigabitEthernet0/0/1]nat server global 100.1.1.2 inside 10.1.1.45 //配置ip转换

[Huawei-GigabitEthernet0/0/1]nat static enable //开启静态NAT

[Huawei-GigabitEthernet0/0/1]quit

**②端口复用PAT**

[Huawei]acl number 2009

[Huawei-acl-basic-2009]rule 1 permit source 10.1.1.0 0.0.0.255 //acl匹配内网网段

[Huawei-acl-basic-2009]quit

[Huawei]int g0/0/1

[Huawei-GigabitEthernet0/0/1]nat outbound 2009 //出接口上应用nat，

//内网ip转换为出接口的ip

[Huawei-GigabitEthernet0/0/1]quit

[Huawei]

**③端口映射**

[Huawei]int g0/0/1

[Huawei-GigabitEthernet0/0/1]nat static protocol tcp global current-interface 8888

inside 10.1.1.22 80

//将外网的接口ip:8888转为内网的10.1.1.22:80

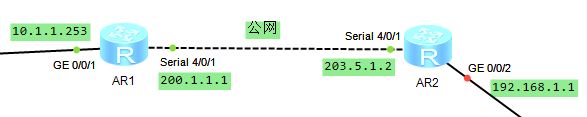
[Huawei-GigabitEthernet0/0/1]nat static protocol tcp global 100.1.1.5 9999 inside 10.1.1.35 443

//将外网的100.1.1.5:9999转为内网的10.1.1.35:443

[Huawei]dis nat session all //查看nat会话情况

**44. IPsec VPN（站到站）**

前提：2端的路由器都要有去往对端内网网段的路由，且要有缺省路由指向网关。



拓扑图如上，AR1的内网为10.1.1.0/24，出接口ip为200.1.1.1，网关200.1.1.2

AR2的内网为192.168.1.0/24，出接口ip203.5.1.2，网关203.5.1.3

**AR1上的配置如下：（AR2的类似）**

**0.配置出接口ip及路由**

[Huawei]int s4/0/1

[Huawei-Serial4/0/1]ip add 200.1.1.1 255.255.255.0

[Huawei-Serial4/0/1]quit

[Huawei]ip route-static 0.0.0.0 0.0.0.0 200.1.1.2

[Huawei]

**1.配置acl匹配目标流**

[Huawei]acl num 3000

[Huawei-acl-adv-3000]rule 1 permit ip source 10.1.1.0 0.0.0.255 destination

192.168.1.0 0.0.0.255

[Huawei-acl-adv-3000]quit

**2.配置ipsec提议**

[Huawei]ipsec proposal pro1 //创建ipsec安全提议

[Huawei-ipsec-proposal-pro1]esp authentication-algorithm sha1 //消息摘要算法

[Huawei-ipsec-proposal-pro1]esp encryption-algorithm aes-128 //数据加密算法

[Huawei-ipsec-proposal-pro1]encapsulation-mode tunnel //使用隧道模式

[Huawei-ipsec-proposal-pro1]quit

**3.配置ike提议**

[Huawei]ike proposal 5

[Huawei-ike-proposal-5]authentication-algorithm sha1

[Huawei-ike-proposal-5]encryption-algorithm aes-cbc-128

[Huawei-ike-proposal-5]authentication-method pre-share

**4.配置ike对端**

[Huawei]ike peer peer1 v1

[Huawei-ike-peer-peer1]pre-shared-key cipher xxxx

[Huawei-ike-peer-peer1]remote-address 203.5.1.2

[Huawei-ike-peer-peer1]ike-proposal 5

[Huawei-ike-peer-peer1]quit

**5.配置ipsec策略**

[Huawei]ipsec policy ipsecp1 10 isakmp

[Huawei-ipsec-policy-isakmp-ipsecp1-10]ike-peer peer1

[Huawei-ipsec-policy-isakmp-ipsecp1-10]proposal pro1

[Huawei-ipsec-policy-isakmp-ipsecp1-10]security acl 3000

**6.出接口上应用ipsec策略**

[Huawei]int s4/0/1

[Huawei-Serial4/0/1]ipsec policy ipsecp1

[Huawei-Serial4/0/1]quit

[Huawei]dis ike proposal //查看ike提议

[Huawei]dis ipsec proposal //查看ipsec提议

[Huawei]dis ike peer //查看ike对端

[Huawei]dis ipsec statistics esp //查看ipsec统计情况

**45. L2TP VPN**

**1.先添加一个用户，用于l2tp拨号的（也可用radius验证）**

[Huawei]aaa

[Huawei-aaa]local-user coflee password cipher xxxx

Info: Add a new user.

[Huawei-aaa]local-user coflee service-type ppp

[Huawei-aaa]quit

**2.配置拨号后的地址池**

[Huawei]ip pool lns

Info: It's successful to create an IP address pool.

[Huawei-ip-pool-lns]network 192.168.33.0 mask 255.255.255.0

[Huawei-ip-pool-lns]gateway-list 192.168.33.1

[Huawei-ip-pool-lns]dns-list 8.8.8.8

[Huawei-ip-pool-lns]quit

**3.配置虚拟接口模板**

[Huawei]int Virtual-Template 1

Dec 5 2019 11:22:41-08:00 Huawei %%01IFPDT/4/IF\_STATE(l)[0]:Interface Virtual-T

emplate1 has turned into UP state.

[Huawei-Virtual-Template1]ip add 192.168.33.1 255.255.255.0

[Huawei-Virtual-Template1]ppp authentication chap

[Huawei-Virtual-Template1]remote address pool lns

[Huawei-Virtual-Template1]quit

[Huawei]

**4.配置l2tp vpn**

[Huawei]l2tp enable

[Huawei]l2tp-group 1

[Huawei-l2tp1]tunnel name LNS

[Huawei-l2tp1]undo tunnel authentication

[Huawei-l2tp1]allow l2tp Virtual-Template 1

[Huawei-l2tp1]quit

**46. PPPoe服务器**

**1.配置虚拟接口模板**

[Huawei]int Virtual-Template 2

Dec 5 2019 11:30:10-08:00 Huawei %%01IFPDT/4/IF\_STATE(l)[1]:Interface Virtual-T

emplate2 has turned into UP state.

[Huawei-Virtual-Template2]ppp authentication-mode chap call-in domain xxx.com

[Huawei-Virtual-Template2]remote address pool pppoe1

[Huawei-Virtual-Template2]ip address unnumbered interface g0/0/2

[Huawei-Virtual-Template2]quit

**2.配置ip地址池**

[Huawei]ip pool pppoe1

Info: It's successful to create an IP address pool.

[Huawei-ip-pool-pppoe1]network 10.1.1.0 mask 255.255.255.0

[Huawei-ip-pool-pppoe1]gateway-list 10.1.1.1

[Huawei-ip-pool-pppoe1]dns-list 8.8.8.8

[Huawei-ip-pool-pppoe1]quit

**3.配置用户认证（使用radius）**

[Huawei]radius-server template rds //创建radius-server模板

Info: Create a new server template.

[Huawei-radius-rds]radius-server shared-key cipher xxxx

[Huawei-radius-rds]radius-server authentication 10.1.1.99 1645 //指定验证服务器及端口

[Huawei-radius-rds]radius-server accounting 10.1.1.99 1645 //指定计费服务器及端口

[Huawei-radius-rds]quit

[Huawei]aaa

[Huawei-aaa]authentication-scheme rdsAuth //创建验证方案

Info: Create a new authentication scheme.

[Huawei-aaa-authen-rdsAuth]authentication-mode radius //验证模式用radius

[Huawei-aaa-authen-rdsAuth]quit

[Huawei-aaa]accounting-scheme rdsAcct //创建计费方案

Info: Create a new accounting scheme.

[Huawei-aaa-accounting-rdsAcct]accounting-mode radius

[Huawei-aaa-accounting-rdsAcct]quit

[Huawei-aaa]domain xxx.com //创建域

Info: Success to create a new domain.

[Huawei-aaa-domain-xxx.com]authentication-scheme rdsAuth

[Huawei-aaa-domain-xxx.com]accounting-scheme rdsAcct

[Huawei-aaa-domain-xxx.com]radius-server rds

[Huawei-aaa-domain-xxx.com]quit

[Huawei-aaa]quit

[Huawei]

[Huawei]domain xxx.com admin //指定该域为默认的，缺省的域，当用户拨号时若

//不指定域名，则缺省为该域，然后使用该域的验证方案和计费方案，即radius

**4.接口上应用**

[Huawei]int g0/0/2

[Huawei-GigabitEthernet0/0/2]pppoe-server bind virtual-template 2

[Huawei-GigabitEthernet0/0/2]mtu 1492 //因为pppoe报文占8字节开销

[Huawei-GigabitEthernet0/0/2]quit

[Huawei]dis pppoe-server session all //查看pppoe会话情况

**47. PPPoe客户端**

[Huawei]int Dialer 1 //创建拨号接口1

Dec 5 2019 11:46:45-08:00 Huawei %%01IFPDT/4/IF\_STATE(l)[2]:Interface Dialer1 h

as turned into UP state.

[Huawei-Dialer1]link-potocol ppp

[Huawei-Dialer1]ppp chap user cof

[Huawei-Dialer1]ppp chap password cipher xxx

[Huawei-Dialer1]ip address ppp-negotiate

[Huawei-Dialer1]dialer user cof //该用户名同ppp用户

[Huawei-Dialer1]dialer bundle 1

[Huawei-Dialer1]dialer timer idle 300

INFO: The configuration will become effective after link reset.

[Huawei-Dialer1]dialer-group 1

[Huawei-Dialer1]quit

[Huawei]int g0/0/1

[Huawei-GigabitEthernet0/0/1]pppoe-client dial-bundle-number 1

//出接口上配置为pppoe拨号

[Huawei-GigabitEthernet0/0/1]quit

[Huawei]ip route-static 0.0.0.0 0.0.0.0 Dialer 1 //缺省路由下一跳指向拨号接口1

**48. NQA（network quality analysis）**

[Huawei]nqa test-instance admin isp1 //创建nqa探测实例isp1

[Huawei-nqa-admin-isp1]test-type icmp

[Huawei-nqa-admin-isp1]destination-address ipv4 200.1.1.2 //探测目标ip

[Huawei-nqa-admin-isp1]frequency 20 //每20秒探测一次

[Huawei-nqa-admin-isp1]probe-count 2 //每次发2个icmp包

[Huawei-nqa-admin-isp1]interval seconds 4 //每个icmp包时间间隔为4秒

[Huawei-nqa-admin-isp1]timeout 2 //ping超时2秒

[Huawei-nqa-admin-isp1]start now //立即启动nqa探测

[Huawei-nqa-admin-isp1]undo start //关闭nqa

[Huawei-nqa-admin-isp1]start now

[Huawei-nqa-admin-isp1]quit

[Huawei]dis nqa results //查看nqa结果

[Huawei]dis nqa history //查看nqa历史情况

**nqa一般可以应用在缺省路由和路由策略上**，相关的命令如下：

[Huawei]ip route-static 0.0.0.0 0.0.0.0 10.1.1.2 track nqa admin isp1 //isp1为nqa实例

[Huawei]ip route-static 0.0.0.0 0.0.0.0 20.1.1.2 track nqa admin isp2 //isp2为nqa实例

//当nqa检测到某个网关ping不通时，就会联动通知路由器取消某条路由或策略

[Huawei]traffic behavior be1

[Huawei-behavior-be1]redirect ip-nexthop 10.1.1.2 track nqa admin isp1

[Huawei-behavior-be1]quit

[Huawei]traffic behavior be2

[Huawei-behavior-be2]redirect ip-nexthop 20.1.1.2 track nqa admin isp2

[Huawei-behavior-be2]quit

**49.恢复密码（保留原配置）**

1.开机或重启设备时，出现字符提示时立即按下 Ctrl键和B键，进入BootRom模式

2.输入BootRom密码：

一般为 Admin@huawei.com ,或者是 huawei 或者是 9300

3.进入BootRom后，根据提示输入 7 （清除console密码），yes确定。

4.再输入1（以默认模式进入系统），不要选择8（重启），不然还是要密码。

5.以默认模式进入系统后，不要求输入密码，这时我们可以重新配置管理员密码，保存即可。

end