VPDN(L2TP,PPTP,PPPoE) Configuration

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1.1   Overview

VPDN sub-module is a sub-module to deal with VPDN group in L2TP or PPTP module, whose major function is to create and manage VPDN group information. Both NAC (Network Access Concentrator) and NS (Network Server) need to get related information from VPDN to create the channel and the session. When VPDN is bound to the L2TP protocol, NAC is called LAC (L2TP Access Concentrator) and NS is called LNS (L2TP Network Server); when VPDN is bound to the PPTP protocol, NAC is then called PAC (PPTP Access Concentrator) and NS is then called PNS (PPTP Network Server).

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1.3   VPDN Configuration Tast

1.3.1   Encapsulating the VPDN Module

During the encapsulation of the VPDN module, the client sends the LCP OPEN packet to NAC. The VPDN is forbidden by default. After VPDN is enabled, VPDN opens.

To enable the VPDN module, run the command in the following table.

command	purpose
vpdn enable	encapsulation VPDN module.

1.3.2   Creating the VPDN Group

The information about the channel control module is obtained from the VPDN group. You can create 300 VPDN groups at most currently. To create the VPDN group, run the following command:

command	purpose

vpdn-group group *number*	Creates the VPDN group.

The VPDN group can be NAC or NS.

1. Setting the VPDN group to NAC dialing-in

The command to set VPDN group to NS in a dialing-in way is shown in the following table:

command	purpose
accept-dialin	Set VPDN group to NS dialing-in.

2. Setting the VPDN group to NAC dialing-in

The VPDN group can be NAC or NS. The command to set VPDN group to NAC is shown in the following table:

command	purpose
request-dialin	Set VPDN group to NAC dialing-in.

3. Protocol negotiating

The VPDN group must negotiate with related protocols. Currently our routers only support L2TP. The related commands are shown in the following table:

command	purpose
protocol *L2TP*	Negotiate VPDN group with L2TP.
protocol *PPTP*	Negotiate VPDN group with PPTP.

1.3.3 Setting the PPP-related Port on the VPDN Group

This command is used to specify a PPP port to connect the VPDN group. If it is NAC, the virtual-tunnel port or the synchronous/asynchronous serial port can be configured. If it is NS, the virtual-template port can be configured. The created VPDN connection will use the virtual-access port cloned by the virtual-template port for communications. If this command is configured in the NAC VPDN group, the domain command is invisible and the VPDN group functions at the VPDN connection which is triggered by the specified port.：

command	purpose
port *ppp-port-name*	Sets the PPP-related port on the VPDN group.

1.3.4 Setting Domain Name of NAC

Only when apply for user name which is in a domain of a VPDN group, NAC will response, send "sccrq",

User name must include the symbols "-@_". The characters behind "-@_" stand for the domain name the user belongs to.

To set NAC, run the following command:

Command	Purpose
domain domain *name*	Sets the NAC's domain name.

1.3.5 Setting the IP Address of Remote NS According to NAC

When NAC responses to the LCP OPEN request from CLIENT and send SCCRQ, it should has a target NS, so you need to set IP address of remote NS corresponding to NAC. You can specify IP address directly with "Initiate-to ip" command, you can also specify the domain name of NS, with command "Initiate-to host-name" indirectly. Now, NAC can response to at most 5 NS's. When it is sent, it turns by PRI from small to big, if PRI is the same ,turns by IP address from small to big .If without response ,send to next IP address NS. You can define 5 different NS with different IP addresses or domain names, PRI valued from 0 to 4, the value is smaller, PRI is higher, the related command is shown in the following table:

Command	Purpose
Initiate-to ip *ipaddr* **priority** *priority-num*	Set IP address of remote NS corresponding to NAC.

1.3.6 Setting the Domain Name of Remote NS According to NAC

When NAC responses to the LCP OPEN request from CLIENT to SCCRQ, it should has a target NS, so you need to set the IP address of remote NS accordnding to NAC. Aside from the way of specifing IP address directly with the **Initiate-to ip** command,you can also specify the domain name of NS by running the **Initiate-to host-name** command indirectly. The VPDN module can translate the domain name of NS into the IP address with the aid of the DNS module. Now, NAC can response to up to 5 NSs. When sent, it turns by PRI from small to big ,if PRI is the same ,turns by IP address from small to big .If no response exists, it is sent to the next IP address. You can define 5 different NSs with different IP addresses or domain names. PRI's value ranges from 0 to 4. The smaller the value is , the higher PRI is. Related commands are shown in the following table:

Command	Purpose
Initiate-to host-name *name* **priority** *priority-num*	Sets the domain name of remote NS according to NAC.

1.3.7 Setting Local Channel Name of VPDN Group

When NAC sends "SCCRQ", it must send local channel name together, so NS can find corresponding local VDPN group according to channel name. The name of local channel name includes 244 characters at most, This command is shown in the following table:

command	purpose
Local-name *local_name*	Set local channel name of VPDN group.

1.3.8 Setting the Channel Name of Remote NS According to NAC

After receive SCCRQ, according to channel name of NAC, NS look for remote channel name and VPDN group matching to NAC channel name, so, as a NS VPDN group can set a remote channel name corresponding to NS in order to match after receiving SCCRQ. If a VPDN group does not set remote channel name, that it is default VPDN group, if there is no other matching VPDN group, you need to adopt its information.

command	purpose
Terminate-from *remote_nac_ name*	Set channel name of remote NS corresponding to NAC.

1.3.9 Setting NS and CLIENT Terminal to Re-Authentication

After successfully creating session, and NS replacing NAC to authenticate CLIENT, you can choose NS and CLIENT to re-authentication. Only L2TP protocol surports such function. This command is shown in the following table:

command	purpose
Force-local-chap	Set NS and Client terminal to re-authentication

1.3.10 Setting NS and CLIENT Terminal to Re-Arranging LCP

After successfully create session, NS can choose to re-arrange the whole PPP protocol with CLIENT. when binding with PPTP protocols, PPP LCP protocol is always renegotiated, no matter whether such command is configured. This command is shown in the following table:

Command	Purpose
Lcp-renegotiation	Set NS and Client terminal to re-arrange LCP

1.3.11 Setting the Timeout Time for Free Link on the Client Terminal

After the session is created, you can configure the timeout time for the free links on the client terminal to be disconnected. This configuration functions only when the client and NAC are combined. The related command is shown in the following table:

Command	Purpose
idle-timeout	Sets the timeout time for the free link on the client terminal.

1.3.12 Setting L2TP Channel Authentication

You can authenticate between NAC and NS using courses like CHAP, only after this, you can create channel, This command is shown in the following table:

Command	Purpose
l2tp tunnel anthenticate	Set channel authentications.

1.3.13   Setting L2TP Channel Password

If you have configured channel authentications on both LNS and NAC, you should set the same password on both channels, thus , authentication will be successful, the character number of password can not pass 254. This command is shown in the following table:

Command	Purpose
l2tp tunnel password *password*	Set channel password.

1.3.14   Setting Time Interval to Send the Hello Request for the L2TP Tunnel

After successfully create session between NAC and LNS , it will send "hello" each other time to check whether the connecting is ok. You can set time interval to send "hello', its value is from "5" to "100",and its unit is second, This command is shown in the following table:

Command	Purpose
l2tp tunnel hello *hellointerval*	Set time interval to send "hello".

1.3.15   Setting Sizes of Channel Reception Window for L2TP Tunnel

This command uses to define sizes of BUFFER of local receiving. And tell corresponding terminal in L2TP channel negotiating, and the corresponding terminal set size of sliding window . The value of sliding window is from "1" to "100", This command is shown in the following table:

Command	Purpose
l2tp tunnel receive-window *receive-window-size*	Set sizes of channel receive windows.

1.3.16   Setting L2TP Attribute Hiding

Change instructions to hide sensitivity information , only when configure channel password on local, this command will work. The default is not hide, This command is shown in the following table:

Command	Purpose
l2tp hidden	Set L2TP attribute hiding

1.3.17   Enabling the Sequence of the L2TP Packet

This command is used to enable the sequence of the packet to cushion the packet's disorder. The sequence is not enabled by default. This command is a specific command for L2TP. The related command is shown in the following table:

Command	Purpose
L2tp sequencing	Enables the sequence of the L2TP packet.

1.3.18 Setting L2TP to Drop the Disordered Packet

If the sequence of the packet is enabled, the disordered packets will be directly dropped without waiting for retransmission. By default, the disordered packets are not dropped and the queque cushion will be carried out to these disordered packets. This command is a specific command for L2TP. The related command is shown in the following table:

Command	Purpose
L2tp drop out-of-order	Sets L2TP to drop the disordered packets.

1.3.19 Setting the Time Interval of Sending the Echo Request for PPTP tunnel

After creating the tunnel between PAC and PNS, both sides of the tunnel have to send "echo request" packet to check integration of the link. This command set the time interval of sending such "echo request" packet.The range is 5-1000 seconds. Only when VPDN group binded with PPTP, this command can be configured. This command is shown in the following table:

Command	Purpose
pptp tunnel echo *echointerval*	set time interval of sending "echo request" packet.

1.3.20 Enabling the PPTP Flow Control

Only when enable the function of flow controlling, the function of flow controlling will work. The default is disabled. Because such function will bring about extra cost to CPU of router, such function is recommended to be disabled. Only when VPDN group binded with PPTP, this command can be configured. This command is shown in the following table:

Command	Purpose
pptp flow-control enable	Enable the function of flow controlling

1.3.21 Setting the Round Trip Time of Data Packet for PPTP Session

This command is used to set the round-trip time of the packet. The default value is 300 milli-seconds. The time interval is used to initialize the timeout time. Only when VPDN group is bound to PPTP, this command can be configured. This command is shown in the following table:

Command	Purpose
pptp flow-control static-rtt *rtt*	Set the round-trip time.

1.3.22 Setting the Size of Reception Window for PPTP Session

This command set size of receive windows for PPTP session.The default is 4. The size will be notified to peer when is session creating so that peer can initialize the size of sliding sending window. Only when VPDN group binded with PPTP, this command can be configured. This command is shown in the following table:

Command	Purpose
pptp flow-control receive-window *recv-wins*	Set size of receive window of session.

1.3.23   Setting the PPPOE-Bound Ethernet Port

This command is used to decide which Ethernet port the VPDN group of the PPPOE protocol is bound to. The Ethernet port is needed when PPPOE creates a link. One Ethernet port can be bound to only one VPDN group. The related command is shown in the following table:

Command	Purpose
Pppoe bind *ether-port-name*	Decides which Ethernet port the VPDN group of the PPPOE protocol is bound to.

1.3.24   Showing the VPDN Group

show current VPDN group information, This command is shown in the following table:

Command	Purpose
show vpdn group	Show VPDN group.

1.3.25   Showing L2TP Event Information

To show control information in the courses of creating L2TP,This command is shown in the following table:

Command	Purpose
debug l2tp event	Show L2TP event information.

1.3.26   Showing L2TP Packet Information

Show content information in the courses of creating L2TP channel and session, This command is shown in the following table:

Command	Purpose
debug l2tp packet	show L2TP packet information.

1.3.27   Show mistakes in L2TP mutual courses

Show mistake information in the courses of creating L2TP channel and session, This command is shown in the following table:

command	purpose
debug l2tp error	show mistakes in L2TP mutual courses

1.3.28   Showing L2TP Tunnel Statistics Information

ShowL2TPtunnel statistics information, This command is shown in the following table：

Command	Purpose
show l2tp tunnel	Show L2TP tunnel statistics information.

1.3.29   Showing L2TP Session Statistics Information

Show L2TP session statistics information, This command is shown in the following table：

Command	Purpose
show l2tp session	Show L2TP session statistics information.

1.3.30   Showing PPTP Event Information

show control information in the courses of creating L2TP,This command is shown in the following table:

Command	Purpose
debug pptp event	Show PPTP event information

1.3.31   Showing PPTP Packet Information

Show content information in the courses of creating PPTP channel and session, This command is shown in the following table:

Command	Purpose
Debug pptp packet	Show PPTP packet information.

1.3.32   Showing Mistakes in PPTP Mutual Courses

Show content information in the courses of creating PPTP channel and session, This command is shown in the following table:

Command	Purpose
debug pptp error	show PPTP error information.

1.3.33   Showing PPTP Tunnel Statistics Information

Show L2TP tunnel statistics information, This command is shown in the following table

Command	Purpose
show pptp tunnel	Show PPTP tunnel statistics information.

1.3.34   Showing PPTP Session Statistics Information

Show PPTP session statistics information, This command is shown in the following table：

Command	Purpose
show pptp session	Show PPTP session statistics information

1.3.35 Showing PPTP Traffic Statistics Information

Show PPTP traffic statistics information, This command is shown in the following table：

Command	Purpose
show pptp traffic	Show PPTP traffic statistics information

1.3.36 Displaying the Information About the PPPOE Event

To display the information about the PPPOE channel and session establishment, run the following command:

Command	Purpose
Debug pppoe event	Displays the information about the pppoe event.

1.3.37 Displaying the Information About PPPOE Packets

To display the packet's content during PPPOE session establishment, run the following command:

Command	Purpose
Debug pppoe packet	Displays the information about PPPOE packets.

1.3.38 Displaying Errors During PPPOE Interaction

To display errors occured in the PPPOE channel and session establishment, run the following command:

Command	Purpose
Debug pppoe error	Displays errors during PPPOE interaction.

1.3.39 Displaying the Statistics Information About PPPOE Session

To displays the statistics information about the PPPOE session, run the following command:

Command	Purpose
show pppoe session	Displays the statistics information about PPPOE session.

1.3.40 Clearing L2TP Tunnel

Clear L2TP designated tunnel. This command is shown in the following table：

Command	Purpose
clear l2tp tunnel *tunlID*	Clear L2TP designated tunnel

1.3.41   Clearing L2TP Session

Clear L2TP designated session. Relate command is follow：

command	purpose
clear l2tp session tunnelid *tunlid* **sesionid** *sessionid*	Clear L2TP designated session .

1.3.42   Clearing PPTP Tunnel

Clear PPTP designated tunnel, This command is shown in the following table：

Command	Purpose
clear pptp tunnel *tunlid*	Clear PPTP designated tunnel .

1.3.43   Clearing PPTP Session

Clear PPTP designated session. This command is shown in the following table：

Command	Purpose
clear pptp session tunlid *tunlID* **sesionid** *sessionid*	Clear PPTP designated session.

1.3.44   Clearing the PPPOE Session

To clear the PPPOE session, run the following command:

| Command	Purpose
clear pppoe session ID *sessionID*	Clears the PPPOE-designated session.

1.4   Example of VPDN Configuration

1．Example1

one common example is below. L2tp Protocol is adopt:

Serial 0/1 of router RouterB-Client and RouterB -NAC take PPP protocol, L2tp Protocol is adopt. LAC adopt CHAP authentication; the input user name of CHAP authentication must be the user name in "prompt"

Of corresponding router; the passwords must be the same to authentication of CHAP of two routers, router RouterB -NAC is connected with router RouterB -LNS by Ethernet card .For an example：
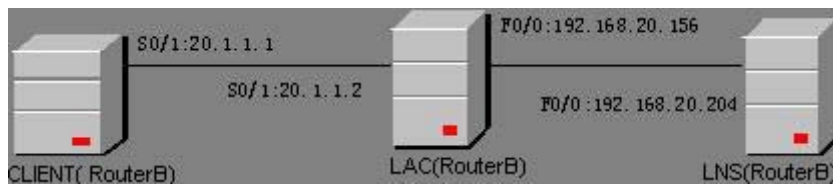
Figuer 1-1

Client configurations :

```
username ht1@admin.com.cn password 123
interface Serial0/0
  ip address 11.9.9.1 255.255.255.0
  no ip directed-broadcast
  encapsulation ppp
  ppp chap hostname ht1@admin.com.cn
```

LAC configurations:

```
username ht1@admin.com.cn password 123
interface Serial0/0
  ip address 11.9.9.2 255.255.255.0
  no ip directed-broadcast
  encapsulation ppp
  ppp authentication chap
  ppp chap hostname ht1@admin.com.cn
  physical-layer speed 115200
vpdn-group 1
  request-dialin
  domain admin.com.cn
    protocol l2tp
 initiate-to ip 192.168.20.204 priority 1
  no l2tp tunnel authentication
  local-name lac
```

LNS configurations:

```
username ht1@admin.com.cn password 123
vpdn-group 1
  accept-dialin
  protocol l2tp
  terninate-from lac
  no l2tp tunnel authentication
  virtual-template 1
   interface Virtual-Template1
  ip address 11.9.9.3 255.255.255.0
  ppp authentication chap
```
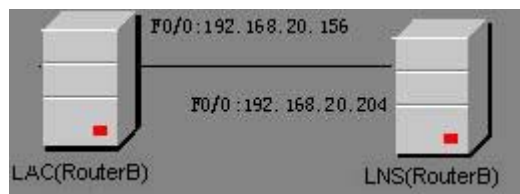
ppp chap hostname ht1@admin.com.cn

2. Example2

Router supports Virtual-tunnel interface, which can replace the function of client when configured on the router that is configured as NAC. In such a way, Client and NAC are combined together on a route and hence LANs that localized in different places can be logically connected by L2TP tunnel or PPTP tunnel as a VPN.

one example is below. PPTP protocol is adopt.

NAC adopt CHAP authentication; the input user name of CHAP authentication must be the user name in "prompt" Of corresponding router; the passwords must be the same to authentication of CHAP of two routers, router NAC is connected with router LNS by Ethernet card .see figure 2：

Figuer 1-2

PAC configuration

username ht1@domain.com.cn password 123
interface virtual-tunnel 1
ip address 11.9.9.1 255.255.255.0
no ip directed-broadcast
ppp chap hostname ht1@domain.com.cn
vpdn-group 1
request-dialin
protocol pptp
domain domain.com.cn
initiate-to ip 192.168.20.204 priority 1
local-name pac

PNS configuration

username ht1@domain.com.cn password 123
vpdn-group 1
accept-dialin
protocol pptp
terninate-from pac
virtual-template 1
interface Virtual-Template1
ip address 11.9.9.3 255.255.255.0
ppp authentication chap

ppp chap hostname ht1@domain.com.cn