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简介

此案例研究描述Cisco IOS双重身份验证设计、实施和故障排除。

先决条件

要求

本文档没有任何特定的要求。

使用的组件

本文档中的信息基于以下软件和硬件版本：

- Cisco IOS网络接入服务器(NAS)AS5x00系列接入服务器运行Cisco IOS软件版本11.3(3a)T。使用调制解调器和综合业务数字网络(ISDN)端口，网络访问通过公共交换电话网(PSTN)提供。
- Unix的CiscoSecure 2.2(2)。在拨号用户、拨号硬件和路由器管理员的控制的Cisco IOS验证、授权和统计(AAA)。
- SecurID ACE/Server实现强认证使用一次性密码(OTP)令牌。
- Oracle数据库- SQL数据库。存储AAA数据库。

本文档中的信息都是基于特定实验室环境中的设备编写的。本文档中使用的所有设备最初均采用原

始(默认)配置。如果您使用的是真实网络,请确保您已经了解所有命令的潜在影响。

规则

有关文档规则的详细信息,请参阅 [Cisco 技术提示规则](#)。

背景信息

为什么要进行双重认证?

参考[支持的ISDN上的一次性密码](#)文档欲知更多信息。

双重身份验证是必要支持安全策略的实施所有外部访问(例如普通旧式电话服务[POTS]/modem和ISDN)验证与强(两部分)验证。要启用此策略,从SecurID的OTP生成令牌提供给用户。用户典型地然后使用一个调制解调器控制会话与网络。因为用户是在控制PPP会话的键盘,他们能输入两部分密码获得网络访问当必要时。

然而,当家庭用户的设备是基于LAN的路由器时,它什么时候典型地使用一种自动化的按需拨号路由(DDR)算法确定建立和发布电路交换连接(电话通过电话网络)。此外,添加的其他呼叫DDR代码提供,如果负载指明。

术语和定义

标记

生成每明显的登录的OTP的最终用户设备

OTP

一次性密码

针

用户的安全代码(第二部分两部分/强认证)

密码

此验证的SecurID ACE/Server要求的密码

双重身份验证是:

- 使用质询握手验证协议(CHAP),硬件验证是路由器到路由器验证。
- 用户认证是登录认证通过Telnet使用OTP并且正在修改虚拟配置文件访问控制表(ACL)用access-profile命令。

虚拟配置文件使用以下两种接口类型:

- 虚拟模板用于克隆虚拟访问接口。
- 虚拟访问每用户(路由器)PPP接口使用。

虚拟配置文件和双重身份验证是Cisco IOS版本11.3功能。本文包括一套配置和调试信息说明这些功能设计和实施进程。

配置 Cisco IOS NAS

为简要起见，被提供的配置信息是仅多数相关信息。

关键配置命令

ISDN接口被捆绑到组支持多链路PPP。

虚拟配置文件和双重身份验证要求使用克隆的虚拟模板到虚拟访问接口。虚拟配置文件是虚拟模板配置和AAA的组合每从终端访问控制器访问控制系统派生的用户授权属性加上(TACACS+)。

要支持多机箱搜索组，请保证用户认证远程登录会话在NAS结果和PPP会话一样。要支持此，请配置在每同样环回IP地址NAS，以便最终用户永远将远程登录到用户认证的同一个地址。

当使用此技术时，请保证您的开放最短路径优先(OSPF)路由器ID是唯一在每NAS (如果使用OSPF)，并且应该禁用此主机路由的传播，因为地址与直接地连接的PPP客户端(它只是相关的是他们的验证IP地址)。

ACL 110阻止对互联网和互联网代理服务器的访问。它应用给验证与OTP的用户(SecurID)标记。

在硬件验证后，ACL 120应用。它阻止对所有设备的访问除了Telnet到本地路由器。

如果ip address-pool local命令在NAS没有配置，AAA代码可能要求TACACS+配置文件包含寻址信息例如“地址池=默认”或“地址= 10.10.39.100”。在TACACS+配置文件的此attribute-value (AV)对能造成双重身份验证发生故障，并且是复杂化为每配置文件配置。为一次实施此命令在Cisco IOS配置和使用TACACS+每个仅用户IP地址(地址= a.b.c.d)。

为使用双重认证的 TACACS+ 配置文件

以下配置在CiscoSecure使用Unix TACACS+配置文件。

硬件配置文件：nw76998-isdn

```
CiscoSecure: DEBUG - Profiles after Resolving Absolute Attributes: Jun 19 21:00:04 rapcs02d
group = hardware { Jun 19 21:00:04 rapcs02d          profile_id = 2850 Jun 19 21:00:04 rapcs02d
profile_cycle = 5 Jun 19 21:00:05 rapcs02d } Jun 19 21:00:05 rapcs02d group = isdn_rtr_blocked {
Jun 19 21:00:05 rapcs02d          service = ppp { Jun 19 21:00:05 rapcs02d          protocol
= lcp { Jun 19 21:00:05 rapcs02d          } Jun 19 21:00:05 rapcs02d
protocol = ip { Jun 19 21:00:05 rapcs02d          set inacl = 120 Jun 19 21:00:05
rapcs02d          } Jun 19 21:00:05 rapcs02d          protocol = multilink { Jun 19
21:00:05 rapcs02d          } Jun 19 21:00:05 rapcs02d          } Jun 19 21:00:05 rapcs02d
profile_id = 2874 Jun 19 21:00:05 rapcs02d          profile_cycle = 6 Jun 19 21:00:05 rapcs02d
member = hardware Jun 19 21:00:05 rapcs02d } Jun 19 21:00:05 rapcs02d user = nw76998-isdn { Jun
19 21:00:05 rapcs02d          profile_id = 1284 Jun 19 21:00:05 rapcs02d          profile_cycle =
122 Jun 19 21:00:05 rapcs02d          member = isdn_rtr_blocked Jun 19 21:00:05 rapcs02d
password = chap "*****" Jun 19 21:00:05 rapcs02d }
```

用户配置文件：nw76998

```
CiscoSecure: DEBUG - Profiles after Resolving Absolute Attributes: Jun 19 21:47:33 rapcs02d
group = dialup_users { Jun 19 21:47:33 rapcs02d          profile_id = 2875 Jun 19 21:47:33
rapcs02d          profile_cycle = 3 Jun 19 21:47:33 rapcs02d          password = pap "*****" Jun
19 21:47:33 rapcs02d          password = sdi Jun 19 21:47:33 rapcs02d } Jun 19 21:47:33 rapcs02d
```

```

group = class110 { Jun 19 21:47:33 rapcs02d      service = ppp { Jun 19 21:47:33 rapcs02d
protocol = multilink { Jun 19 21:47:33 rapcs02d } Jun 19 21:47:33 rapcs02d
protocol = lcp { Jun 19 21:47:33 rapcs02d      } Jun 19 21:47:33 rapcs02d
protocol = ip { Jun 19 21:47:33 rapcs02d      set inacl = 110 Jun 19 21:47:34
rapcs02d      } Jun 19 21:47:34 rapcs02d      protocol = ccp { Jun 19
21:47:34 rapcs02d      } Jun 19 21:47:34 rapcs02d      } Jun 19 21:47:34 rapcs02d
service = shell { Jun 19 21:47:34 rapcs02d      } Jun 19 21:47:34 rapcs02d      profile_id =
2584 Jun 19 21:47:34 rapcs02d      profile_cycle = 3 Jun 19 21:47:34 rapcs02d      member =
dialup_users Jun 19 21:47:34 rapcs02d } Jun 19 21:47:34 rapcs02d user = nw76998 { Jun 19
21:47:34 rapcs02d      service = shell { Jun 19 21:47:34 rapcs02d      } Jun 19 21:47:34
rapcs02d      profile_id = 614 Jun 19 21:47:34 rapcs02d      set server current-failed-
logins = 0 Jun 19 21:47:34 rapcs02d      profile_cycle = 121 Jun 19 21:47:34 rapcs02d
member = class110 Jun 19 21:47:34 rapcs02d }

```

双验证会话示例

硬件认证捕获

首先，使用CHAP，ISDN路由器验证。以下Cisco 700会话设置如用于说明目的手工运行。

```

user-isdn:u2> sh sec      Profile Parameters      PPP Security      PPP
Authentication OUT      NONE<*>      Client      User Name      nw76998-
isdn<*>      PAP Password      NONE      CHAP Secret      EXISTS
Host      PAP Password      NONE      CHAP Secret      EXISTS
Callback      Request      OFF      Reply      OFF
user-isdn:u2>      user-isdn:u2>      user-isdn:u2> sh conn      Connections      01/01/1995
21:55:26      Start Date & Time      # Name      # Ethernet      1 01/01/1995 00:00:00 #
# 00 00 00 00 00 00      3 01/01/1995 10:20:20 # u2      #      8 01/01/1995 21:47:09 #
access-gw1 #      Link: 1 Channel: 1 Phone: 18007735048      user-isdn:u2>
user-isdn:u2> call ch2      L05 0 12105950050      Outgoing Call Initiated      user-isdn:u2>
user-isdn:u2> L08 2 12105950050      Call Connected      user-isdn:u2> Connection 3 Add      Link
1 Channel 2      user-isdn:u2>

```

注意： Cisco 700使用PPP用户名nw76998-isdn。这是用-isdn加字尾的正常user_id表示硬件关联与此用户。

以下输出出现在Cisco IOS调试(用于说明目的附注)。以下调试为此捕获运行。

```

rap523#sh debug      General OS:      AAA Authentication debugging is on      AAA
Authorization debugging is on      AAA Per-user attributes debugging is on      Generic IP:
IP peer address activity debugging is on      PPP:      PPP authentication debugging is on
PPP protocol negotiation debugging is on      VTEMPLATE:      Virtual Template debugging is on
rap523#sh user      Line      User      Host(s)      Idle Location      * 50 vty
0      nw76998r      idle      00:00:00 10.10.34.7      rap523#      *Mar
4 23:22:08.910      cst: %LINK-3-UPDOWN: Interface Serial0:0, changed      state to up
*Mar 4 23:22:08.954      cst: Se0:0 PPP: Treating connection as a callin      *Mar 4
23:22:08.954      cst: Se0:0 PPP: Phase is ESTABLISHING, Passive Open      *Mar 4 23:22:08.958
cst: Se0:0 LCP: State is Listen      *Mar 4 23:22:09.990      cst: Se0:0 LCP: I CONFREQ
[Listen] id 1 len 31      *Mar 4 23:22:09.990      cst: Se0:0 LCP:      MRU 1522 (0x010405F2)
*Mar 4 23:22:09.994      cst: Se0:0 LCP:      MagicNumber 0x00100524      (0x050600100524)
*Mar 4 23:22:09.998      cst: Se0:0 LCP:      MRRU 1800 (0x11040708)      *Mar 4 23:22:10.002
cst: Se0:0 LCP:      EndpointDisc 3 0040.f911.4390      (0x1309030040F9114390)      *Mar
4 23:22:10.006      cst: Se0:0 LCP:      LinkDiscriminator 212 (0x170400D4)      *Mar 4
23:22:10.010      cst: Se0:0 LCP: O CONFREQ [Listen] id 81 len 34      *Mar 4 23:22:10.014      cst:
Se0:0 LCP:      AuthProto CHAP (0x0305C22305)      *Mar 4 23:22:10.018      cst: Se0:0 LCP:
MagicNumber 0x760859AF      (0x0506760859AF)      *Mar 4 23:22:10.022      cst: Se0:0 LCP:
MRRU 1524 (0x110405F4)      *Mar 4 23:22:10.026      cst: Se0:0 LCP:      EndpointDisc 1 Local
(0x130B017261705F64657631)      *Mar 4 23:22:10.026      cst: Se0:0 LCP:      LinkDiscriminator
193 (0x170400C1)      value = 0xD4      *Mar 4 23:22:10.034      cst: Se0:0 LCP: O CONFACK
[Listen] id 1 len 31      *Mar 4 23:22:10.038      cst: Se0:0 LCP:      MRU 1522 (0x010405F2)
*Mar 4 23:22:10.038      cst: Se0:0 LCP:      MagicNumber 0x00100524      (0x050600100524)
*Mar 4 23:22:10.042      cst: Se0:0 LCP:      MRRU 1800 (0x11040708)      *Mar 4 23:22:10.046

```

cst: Se0:0 LCP: EndpointDisc 3 0040.f911.4390 (0x1309030040F9114390) *Mar 4 23:22:10.050
cst: Se0:0 LCP: LinkDiscriminator 212 (0x170400D4) *Mar 4 23:22:10.490
cst: Se0:0 LCP: I CONFNAK [ACKsent] id 81 len 8 *Mar 4 23:22:10.494
cst: Se0:0 LCP: MRU 1522 (0x010405F2) *Mar 4 23:22:10.498
cst: Se0:0 LCP: O CONFREQ [ACKsent] id 82 len 34 *Mar 4 23:22:10.498
cst: Se0:0 LCP: AuthProto CHAP (0x0305C22305) *Mar 4 23:22:10.502
cst: Se0:0 LCP: MagicNumber 0x760859AF (0x0506760859AF) *Mar 4 23:22:10.506
cst: Se0:0 LCP: MRRU 1524 (0x110405F4) *Mar 4 23:22:10.510
cst: Se0:0 LCP: EndpointDisc 1 Local (0x130B017261705F64657631) *Mar 4 23:22:10.514
cst: Se0:0 LCP: LinkDiscriminator 193 (0x170400C1) *Mar 4 23:22:10.594
cst: Se0:0 LCP: I CONFACK [ACKsent] id 82 len 34 *Mar 4 23:22:10.598
cst: Se0:0 LCP: AuthProto CHAP (0x0305C22305) *Mar 4 23:22:10.602
cst: Se0:0 LCP: MagicNumber 0x760859AF (0x0506760859AF) *Mar 4 23:22:10.606
cst: Se0:0 LCP: MRRU 1524 (0x110405F4) *Mar 4 23:22:10.610
cst: Se0:0 LCP: EndpointDisc 1 Local (0x130B017261705F64657631) *Mar 4 23:22:10.614
cst: Se0:0 LCP: LinkDiscriminator 193 (0x170400C1) *Mar 4 23:22:10.614
cst: Se0:0 LCP: State is Open *Mar 4 23:22:10.618
cst: Se0:0 PPP: Phase is AUTHENTICATING, by this end *Mar 4 23:22:10.622
cst: Se0:0 CHAP: O CHALLENGE id 38 len 29 from "rap_dev1" *Mar 4 23:22:10.906
cst: Se0:0 CHAP: I RESPONSE id 38 len 33 from "nw76998-isdn" *Mar 4 23:22:10.910
cst: Se0:0 PPP: Phase is FORWARDING *Mar 4 23:22:11.142
cst: Se0:0 PPP: Phase is AUTHENTICATING *Mar 4 23:22:11.142
cst: Se0:0 CHAP: I RESPONSE id 38 len 33 from "nw76998-isdn" *Mar 4 23:22:11.150
cst: AAA/AUTHEN: create_user (0x50928C) user='nw76998-isdn' ruser='' port='Serial0:0' rem_addr='5123678085/50050' authen_type=CHAP service=PPP priv=1 *Mar 4 23:22:11.158
cst: AAA/AUTHEN/START (286876619): port='Serial0:0' list='' ACTION=LOGIN service=PPP *Mar 4 23:22:11.158
cst: AAA/AUTHEN/START (286876619): using "default" list *Mar 4 23:22:11.162
cst: AAA/AUTHEN (286876619): status = UNKNOWN *Mar 4 23:22:11.166
cst: AAA/AUTHEN/START (286876619): METHOD=TACACS+ *Mar 4 23:22:11.166
cst: TAC+: send AUTHEN/START packet ver=193 id=286876619 *Mar 4 23:22:11.394
cst: TAC+: ver=193 id=286876619 received AUTHEN status = PASS *Mar 4 23:22:11.398
cst: AAA/AUTHEN (286876619): status = PASS *Mar 4 23:22:11.406
cst: AAA/AUTHOR/LCP Se0:0: Authorize LCP *Mar 4 23:22:11.410
cst: AAA/AUTHOR/LCP Se0:0 (1891051227): Port='Serial0:0' list='' service=NET *Mar 4 23:22:11.410
cst: AAA/AUTHOR/LCP: Se0:0 (1891051227) user='nw76998-isdn' *Mar 4 23:22:11.414
cst: AAA/AUTHOR/LCP: Se0:0 (1891051227) send AV service=ppp *Mar 4 23:22:11.418
cst: AAA/AUTHOR/LCP: Se0:0 (1891051227) send AV protocol=lcp *Mar 4 23:22:11.418
cst: AAA/AUTHOR/LCP (1891051227) found list "default" *Mar 4 23:22:11.422
cst: AAA/AUTHOR/LCP: Se0:0 (1891051227) METHOD=TACACS+ *Mar 4 23:22:11.426
cst: AAA/AUTHOR/TAC+: (1891051227): user=nw76998-isdn *Mar 4 23:22:11.430
cst: AAA/AUTHOR/TAC+: (1891051227): send AV service=ppp *Mar 4 23:22:11.430
cst: AAA/AUTHOR/TAC+: (1891051227): send AV protocol=lcp *Mar 4 23:22:12.326
cst: TAC+: (1891051227): received author response status = PASS_ADD *Mar 4 23:22:12.330
cst: AAA/AUTHOR (1891051227): Post authorization status = PASS_ADD *Mar 4 23:22:12.334
cst: Se0:0 CHAP: O SUCCESS id 38 len 4 *Mar 4 23:22:12.342
cst: Se0:0 PPP: Phase is VIRTUALIZED *Mar 4 23:22:12.370
cst: AAA/AUTHOR/MLP Se0:0 (3969993324): Port='Serial0:0' list='' service=NET *Mar 4 23:22:12.370
cst: AAA/AUTHOR/MLP: Se0:0 (3969993324) user='nw76998-isdn' *Mar 4 23:22:12.374
cst: AAA/AUTHOR/MLP: Se0:0 (3969993324) send AV service=ppp *Mar 4 23:22:12.378
cst: AAA/AUTHOR/MLP: Se0:0 (3969993324) send AV protocol=multilink *Mar 4 23:22:12.378
cst: AAA/AUTHOR/MLP (3969993324) found list "default" *Mar 4 23:22:12.382
cst: AAA/AUTHOR/MLP: Se0:0 (3969993324) METHOD=TACACS+ *Mar 4 23:22:12.386
cst: AAA/AUTHOR/TAC+: (3969993324): user=nw76998-isdn *Mar 4 23:22:12.390
cst: AAA/AUTHOR/TAC+: (3969993324): send AV service=ppp *Mar 4 23:22:12.390
cst: AAA/AUTHOR/TAC+: (3969993324): send AV protocol=multilink *Mar 4 23:22:12.594
cst: Se0:0 IPCP: PPP phase is VIRTUALIZED, discarding packet *Mar 4 23:22:12.598
cst: TAC+: (3969993324): received author response status = PASS_ADD *Mar 4 23:22:12.606
cst: AAA/AUTHOR (3969993324): Post authorization status = PASS_ADD *Mar 4 23:22:12.610
cst: Vi2 VTEMPLATE: Reuse Vi2, recycle queue size 1 *Mar 4 23:22:12.614
cst: Vi2 VTEMPLATE: Set default settings with no ip address *Mar 4 23:22:13.030
cst: Se0:0 CCP: PPP phase is VIRTUALIZED, discarding packet *Mar 4 23:22:13.034
cst: Se0:0 BACP: I CONFREQ [Closed] id 1 len 10 *Mar 4 23:22:13.038
cst: Se0:0 BACP: FavoredPeer 0xFFFFFFFF (0x0106FFFFFFFF) *Mar 4 23:22:13.042
cst: Se0:0 BACP: Lower layer not up, discarding packet *Mar 4 23:22:13.074
cst: %LINEPROTO-5-UPDOWN: Line protocol on Interface Serial 0:0, changed state to up *Mar 4 23:22:13.222
cst: Vi2 VTEMPLATE: Hardware address 0060.4780.b3c2

*Mar 4 23:22:13.226 cst: Vi2 PPP: Phase is DOWN, Setup *Mar 4 23:22:13.230 cst: Vi2
VTEMPLATE: Has a new cloneblk vtemplate, now it has vtemplate *Mar 4
23:22:13.234 cst: Vi2 VTEMPLATE: Undo default settings *Mar 4 23:22:14.610 cst: Vi2
VTEMPLATE: ***** CLONE VACCESS2 ***** *Mar 4
23:22:14.610 cst: Vi2 VTEMPLATE: Clone from vtemplatel interface Virtual-Access2
no ip address encap ppp ip unnumb loop 3 ppp authen chap pap
ppp multi compress stac end *Mar 4 23:22:14.994 cst: %ISDN-6-
CONNECT: Interface Serial0:0 is now connected to 5123678085 nw76998-isdn *Mar
4 23:22:15.698 cst: Se0:0 IPCP: PPP phase is VIRTUALIZED, discarding packet
*Mar 4 23:22:15.702 cst: Se0:0 CCP: PPP phase is VIRTUALIZED, discarding packet
*Mar 4 23:22:15.706 cst: Se0:0 BACP: I CONFREQ [Closed] id 2 len 10 *Mar 4
23:22:15.710 cst: Se0:0 BACP: FavoredPeer 0xFFFFFFFF (0x0106FFFFFFFF) *Mar
4 23:22:15.710 cst: Se0:0 BACP: Lower layer not up, discarding packet *Mar 4
23:22:16.006 cst: %LINK-3-UPDOWN: Interface Virtual-Access2, changed state to up
*Mar 4 23:22:16.014 cst: Vi2 PPP: Treating connection as a dedicated line *Mar 4
23:22:16.014 cst: Vi2 PPP: Phase is ESTABLISHING, Active Open *Mar 4 23:22:16.022
cst: Vi2 LCP: O CONFREQ [Closed] id 1 len 30 *Mar 4 23:22:16.026 cst: Vi2 LCP:
AuthProto CHAP (0x0305C22305) *Mar 4 23:22:16.026 cst: Vi2 LCP: MagicNumber
0x7608712A (0x05067608712A) *Mar 4 23:22:16.030 cst: Vi2 LCP: MRRU 1524
(0x110405F4) *Mar 4 23:22:16.034 cst: Vi2 LCP: EndpointDisc 1 Local
(0x130B017261705F64657631) *Mar 4 23:22:16.042 cst: AAA/AUTHEN: dup_user (0x41E248)
user='nw76998-isdn' ruser='' port='Serial0:0' rem_addr='5123678085/50050'
authen_type=CHAP service=PPP priv=1 source='AAA dup mlp' *Mar 4
23:22:16.046 cst: AAA/AUTHOR/MLP Vi2: Processing AV service=ppp *Mar 4 23:22:16.046
cst: AAA/AUTHOR/MLP Vi2: Processing AV protocol=multilink *Mar 4
23:22:16.050 cst: Vi2 PPP: Phase is UP *Mar 4 23:22:16.054 cst: AAA/AUTHOR/FSM Vi2:
(0): Can we start IPCP? *Mar 4 23:22:16.058 cst: AAA/AUTHOR/FSM Vi2 (923557603):
Port='Serial0:0' list='' service=NET *Mar 4 23:22:16.062 cst:
AAA/AUTHOR/FSM: Vi2 (923557603) user='nw76998-isdn' *Mar 4 23:22:16.062 cst:
AAA/AUTHOR/FSM: Vi2 (923557603) send AV service=ppp *Mar 4 23:22:16.066 cst:
AAA/AUTHOR/FSM: Vi2 (923557603) send AV protocol=ip *Mar 4 23:22:16.070 cst:
AAA/AUTHOR/FSM (923557603) found list "default" *Mar 4 23:22:16.070 cst:
AAA/AUTHOR/FSM: Vi2 (923557603) METHOD=TACACS+ *Mar 4 23:22:16.074 cst:
AAA/AUTHOR/TAC+: (923557603): user=nw76998-isdn *Mar 4 23:22:16.078 cst:
AAA/AUTHOR/TAC+: (923557603): send AV service=ppp *Mar 4 23:22:16.078 cst:
AAA/AUTHOR/TAC+: (923557603): send AV protocol=ip *Mar 4 23:22:16.298 cst: TAC+:
(923557603): received author response status = PASS_ADD *Mar 4 23:22:16.306
cst: AAA/AUTHOR (923557603): Post authorization status = PASS_ADD *Mar 4
23:22:16.314 cst: AAA/AUTHOR/FSM Vi2: We can start IPCP *Mar 4 23:22:16.318 cst: Vi2
IPCP: O CONFREQ [Closed] id 1 len 10 *Mar 4 23:22:16.322 cst: Vi2 IPCP: Address
10.10.20.1 (0x03060A0A1401) *Mar 4 23:22:16.326 cst: AAA/AUTHOR/FSM Vi2: (0): Can we
start CCP? *Mar 4 23:22:16.330 cst: AAA/AUTHOR/FSM Vi2 (3515928500): Port='Serial0:0'
list='' service=NET *Mar 4 23:22:16.330 cst: AAA/AUTHOR/FSM: Vi2 (3515928500)
user='nw76998-isdn' *Mar 4 23:22:16.334 cst: AAA/AUTHOR/FSM: Vi2 (3515928500) send AV
service=ppp *Mar 4 23:22:16.338 cst: AAA/AUTHOR/FSM: Vi2 (3515928500) send AV
protocol=ccp *Mar 4 23:22:16.338 cst: AAA/AUTHOR/FSM (3515928500) found list
"default" *Mar 4 23:22:16.342 cst: AAA/AUTHOR/FSM: Vi2 (3515928500) METHOD=TACACS+
*Mar 4 23:22:16.346 cst: AAA/AUTHOR/TAC+: (3515928500): user=nw76998-isdn *Mar 4
23:22:16.346 cst: AAA/AUTHOR/TAC+: (3515928500): send AV service=ppp *Mar 4
23:22:16.350 cst: AAA/AUTHOR/TAC+: (3515928500): send AV protocol=ccp *Mar 4
23:22:16.370 cst: Se0:0 IPCP: PPP phase is VIRTUALIZED, discarding packet
*Mar 4 23:22:16.582 cst: TAC+: (3515928500): received author response status = FAIL
*Mar 4 23:22:16.586 cst: AAA/AUTHOR (3515928500): Post authorization status = FAIL
*Mar 4 23:22:16.590 cst: AAA/AUTHOR/FSM Vi2: We cannot start CCP *Mar 4 23:22:16.594
cst: Vi2 CCP: State is Closed *Mar 4 23:22:17.518 cst: %LINEPROTO-5-UPDOWN: Line
protocol on Interface Virtual-Access2, changed state to up *Mar 4
23:22:19.266 cst: Vi2 IPCP: I CONFREQ [REQsent] id 3 len 10 *Mar 4 23:22:19.270 cst:
Vi2 IPCP: Address 172.20.1.1 (0x0306AC140101) *Mar 4 23:22:19.274 cst:
AAA/AUTHOR/IPCP Vi2: Start. Her address 172.20.1.1, we want 0.0.0.0 *Mar 4
23:22:19.278 cst: AAA/AUTHOR/IPCP Vi2 (3421422059): Port='Serial0:0' list=''
service=NET *Mar 4 23:22:19.282 cst: AAA/AUTHOR/IPCP: Vi2 (3421422059)
user='nw76998-isdn' *Mar 4 23:22:19.286 cst: AAA/AUTHOR/IPCP: Vi2 (3421422059) send
AV service=ppp *Mar 4 23:22:19.286 cst: AAA/AUTHOR/IPCP: Vi2 (3421422059)
send AV protocol=ip *Mar 4 23:22:19.290 cst: AAA/AUTHOR/IPCP: Vi2

(3421422059) send AV addr*172.20.1.1 *Mar 4 23:22:19.294 cst:
AAA/AUTHOR/IPCP (3421422059) found list "default" *Mar 4 23:22:19.294 cst:
AAA/AUTHOR/IPCP: Vi2 (3421422059) METHOD=TACACS+ *Mar 4 23:22:19.298 cst:
AAA/AUTHOR/TAC+: (3421422059): user=nw76998-isdn *Mar 4 23:22:19.302 cst:
AAA/AUTHOR/TAC+: (3421422059): send AV service=ppp *Mar 4 23:22:19.302 cst:
AAA/AUTHOR/TAC+: (3421422059): send AV protocol=ip *Mar 4 23:22:19.306 cst:
AAA/AUTHOR/TAC+: (3421422059): send AV addr*172.20.1.1 *Mar 4 23:22:19.362
cst: Vi2 IPCP: TIMEOUT: Time 0x15C08D5C State REQsent *Mar 4 23:22:19.366 cst: Vi2
IPCP: O CONFREQ [REQsent] id 2 len 10 *Mar 4 23:22:19.370 cst: Vi2 IPCP: Address
10.10.20.1 (0x03060A0A1401) *Mar 4 23:22:19.550 cst: Vi2 PPP: Unsupported or un-
negotiated protocol. Link ip *Mar 4 23:22:19.746 cst: TAC+: (3421422059):
received author response status = PASS_REPL *Mar 4 23:22:19.754 cst:
AAA/AUTHOR (3421422059): Post authorization status = PASS_REPL *Mar 4
23:22:19.762 cst: AAA/AUTHOR/IPCP Vi2: Reject 172.20.1.1, using 0.0.0.0 *Mar
4 23:22:19.766 cst: AAA/AUTHOR/IPCP Vi2: Processing AV service=ppp *Mar 4
23:22:19.766 cst: AAA/AUTHOR/IPCP Vi2: Processing AV protocol=ip *Mar 4 23:22:19.770
cst: AAA/AUTHOR/IPCP Vi2: Processing AV inacl=120 *Mar 4 23:22:19.774 cst: Vi2
VTEMPLATE: Has a new cloneblk AAA, now it has vtem plate/AAA *Mar 4
23:22:19.778 cst: Vi2 VTEMPLATE: ***** CLONE VACCESS2 *****
*Mar 4 23:22:19.782 cst: Vi2 VTEMPLATE: Clone from AAA interface Virtual-Access2
IP access-group 120 in end *Mar 4 23:22:20.070 cst: Vi2 AAA/AUTHOR: Vaccess
parse 'interface Virtual-Access2 IP access-group 120 in ' ok (0)
*Mar 4 23:22:20.074 cst: AAA/AUTHOR/IPCP Vi2: Processing AV addr*0.0.0.0 *Mar 4
23:22:20.074 cst: AAA/AUTHOR/IPCP Vi2: Authorization succeeded *Mar 4 23:22:20.078
cst: AAA/AUTHOR/IPCP Vi2: Done. Her address 172.20.1.1, we want 0.0.0.0 *Mar
4 23:22:20.082 cst: ip_get_pool: Vi2: validate address = 172.20.1.1 *Mar 4
23:22:20.086 cst: ip_get_pool: Vi2: returning address = 10.10.42.132 *Mar 4
23:22:20.086 cst: set_ip_peer_addr: Vi2: address = 10.10.42.132 (3) is redundant
*Mar 4 23:22:20.090 cst: Vi2 IPCP: O CONFNAK [REQsent] id 3 len 10 *Mar 4
23:22:20.094 cst: Vi2 IPCP: Address 10.10.42.132 (0x03060A0A2A84) *Mar 4
23:22:20.098 cst: Vi2 CCP: I CONFREQ [Closed] id 3 len 9 *Mar 4 23:22:20.102 cst: Vi2
CCP: Stacker history 1 check mode LCB (0x1105000101) *Mar 4 23:22:20.106
cst: Vi2 CCP: Lower layer not up, discarding packet *Mar 4 23:22:20.110 cst: Vi2
BACP: I CONFREQ [Not negotiated] id 3 len 10 *Mar 4 23:22:20.114 cst: Vi2 BACP:
FavoredPeer 0xFFFFFFFF (0x0106FFFFFFFF) *Mar 4 23:22:20.118 cst: Vi2 LCP: O
PROTREJ [Open] id 2 len 16 protocol BACP (0xC02B0103000A0106FFFFFFFF) *Mar 4
23:22:20.122 cst: Vi2 IPCP: I CONFACK [REQsent] id 2 len 10 *Mar 4 23:22:20.126 cst:
Vi2 IPCP: Address 10.10.20.1 (0x03060A0A1401) *Mar 4 23:22:20.318 cst: Vi2 IPCP: I
CONFREQ [ACKrcvd] id 4 len 10 *Mar 4 23:22:20.322 cst: Vi2 IPCP: Address
10.10.42.132 (0x03060A0A2A84) *Mar 4 23:22:20.326 cst: AAA/AUTHOR/IPCP Vi2:
Start. Her address 10.10.42.132, we want 10.10.42.132 *Mar 4 23:22:21.174
cst: AAA/AUTHOR/IPCP Vi2 (2513491870): Port='Serial0:0' list='' service=NET
*Mar 4 23:22:21.178 cst: AAA/AUTHOR/IPCP: Vi2 (2513491870) user='nw76998-isdn'
*Mar 4 23:22:21.182 cst: AAA/AUTHOR/IPCP: Vi2 (2513491870) send AV service=ppp
*Mar 4 23:22:21.182 cst: AAA/AUTHOR/IPCP: Vi2 (2513491870) send AV protocol=ip
*Mar 4 23:22:21.186 cst: AAA/AUTHOR/IPCP: Vi2 (2513491870) send AV addr*10.10.42.132
*Mar 4 23:22:21.190 cst: AAA/AUTHOR/IPCP (2513491870) found list "default" *Mar 4
23:22:21.190 cst: AAA/AUTHOR/IPCP: Vi2 (2513491870) METHOD=TACACS+ *Mar 4
23:22:21.194 cst: AAA/AUTHOR/TAC+: (2513491870): user=nw76998-isdn *Mar 4
23:22:21.198 cst: AAA/AUTHOR/TAC+: (2513491870): send AV service=ppp *Mar 4
23:22:21.198 cst: AAA/AUTHOR/TAC+: (2513491870): send AV protocol=ip *Mar 4
23:22:21.202 cst: AAA/AUTHOR/TAC+: (2513491870): send AV addr*10.10.42.132
*Mar 4 23:22:21.538 cst: TAC+: (2513491870): received author response status =
PASS_REPL *Mar 4 23:22:21.546 cst: AAA/AUTHOR (2513491870): Post authorization
status = PASS_REPL *Mar 4 23:22:21.554 cst: AAA/AUTHOR/IPCP Vi2: Reject 10.10.42.132,
using 10.10.42.132 *Mar 4 23:22:21.558 cst: AAA/AUTHOR/IPCP Vi2: Processing
AV service=ppp *Mar 4 23:22:21.562 cst: AAA/AUTHOR/IPCP Vi2: Processing AV
protocol=ip *Mar 4 23:22:21.562 cst: AAA/AUTHOR/IPCP Vi2: Processing AV inacl=120
*Mar 4 23:22:21.566 cst: Vi2 VTEMPLATE: Has a new cloneblk AAA, now it has vtem
plate/AAA *Mar 4 23:22:21.570 cst: Vi2 VTEMPLATE: ***** CLONE VACCESS2

*Mar 4 23:22:21.574 cst: Vi2 VTEMPLATE: Clone from AAA
interface Virtual-Access2 IP access-group 120 in end *Mar 4
23:22:21.866 cst: Vi2 AAA/AUTHOR: Vaccess parse 'interface Virtual-Access 2 IP access-
group 120 in ' ok (0) *Mar 4 23:22:21.870 cst: AAA/AUTHOR/IPCP Vi2: Processing AV

```

addr*10.10.42.132          *Mar  4 23:22:21.874 cst: AAA/AUTHOR/IPCP Vi2: Authorization
succeeded                *Mar  4 23:22:21.878 cst: AAA/AUTHOR/IPCP Vi2: Done.  Her address
10.10.42.132, we want 10.10.42.132          *Mar  4 23:22:21.878 cst: ip_get_pool: Vi2:
validate address = 10.10.42.132          *Mar  4 23:22:21.882 cst: ip_get_pool: Vi2: returning
address = 10.10.42.132          *Mar  4 23:22:21.886 cst: set_ip_peer_addr: Vi2:
address = 10.10.42.132 (3)          is redundant          *Mar  4 23:22:21.890 cst: Vi2 IPCP: O
CONFACK [ACKrcvd] id 4 len 10          *Mar  4 23:22:21.894 cst: Vi2 IPCP: Address
10.10.42.132          (0x03060A0A2A84)          *Mar  4 23:22:21.894 cst: Vi2 IPCP: State is
Open          *Mar  4 23:22:21.902 cst: Vi2 CCP: I CONFREQ [Closed] id 4 len 9          *Mar
4 23:22:21.906 cst: Vi2 CCP: Stacker history 1 check mode LCB          (0x1105000101)
*Mar  4 23:22:21.906 cst: Vi2 CCP: Lower layer not up, discarding packet          *Mar  4
23:22:21.914 cst: Vi2 AAA/AUTHOR: IP_UP          *Mar  4 23:22:21.914 cst: Vi2 AAA/PER-USER:
processing author params.          *Mar  4 23:22:21.922 cst: Vi2 IPCP: Install route to
10.10.42.132

```

在硬件验证以后，nw76998-isdn是的用户PPP会话由Virtual-access2掌握了。接口Serial0:0是Virtual-access2多链路PPP捆绑的成员。

```

rap523#sh user          Line      User      Host(s)          Idle Location          * 50
vty 0  nw76998r  idle          00:00:00 10.10.34.7          Vi2          nw76998-i Virtual
PPP (Bundle) 00:02:13          Se0:0          nw76998-i Sync PPP          00:00:01

```

请使用show interface virx命令保证适当网络控制协议(NCP)是开放的(例如，IP Control Protocol (IPCP))。双重身份验证失败能造成NCP关闭。

```

rap523#sh int vir2          Virtual-Access2 is up, line protocol is up          Hardware is Virtual
Access interface          Interface is unnumbered. Using address of Loopback3 (10.10.20.1)
LCP Open, multilink Open          Closed: CCP          Open: IPCP          rap523#sh int vi2 conf
Virtual-Access2 is a MLP bundle interface          Building configuration...          interface Virtual-
Access2 configuration...          ip unnumbered Loopback3          ip access-group 120 in          no ip
mroute-cache          no fair-queue          compress stac          ppp max-bad-auth 3          ppp
authentication chap pap          ppp multilink          rap523#sh access-list          Extended IP access
list 100          deny ip any 10.25.16.0 0.0.15.255          deny ip any host 10.25.2.4          permit
ip any 10.0.0.0 0.255.255.255          deny ip any any          Extended IP access list 110          deny
ip any 10.25.16.0 0.0.15.255          permit ip any 10.0.0.0 0.255.255.255 (9503 matches)
deny ip any any (43 matches)          Extended IP access list 120          permit tcp any host
10.10.20.1 eq telnet (427 matches)          deny ip any any (16 matches)          rap523#

```

其次，用户从他的PC远程登录到在NAS的防火墙IP地址。在此设计，int环回3地址是10.10.20.1。

[用户认证捕捉](#)

[用户操作](#)

用户注册与他们的用户ID和OTP。

```

rap523#sh int vi2 conf          Virtual-Access2 is a MLP bundle interface          Building
configuration...          interface Virtual-Access2 configuration...          ip unnumbered Loopback3
ip access-group 120 in          no ip mroute-cache          no fair-queue          compress stac          ppp
max-bad-auth 3          ppp authentication chap pap          ppp multilink          rap523#sh access-list
Extended IP access list 100          deny ip any 10.25.16.0 0.0.15.255          deny ip any host
10.25.2.4          permit ip any 10.0.0.0 0.255.255.255          deny ip any any          Extended IP
access list 110          deny ip any 10.25.16.0 0.0.15.255          permit ip any 10.0.0.0
0.255.255.255 (9503 matches)          deny ip any any (43 matches)          Extended IP access list 120
permit tcp any host 10.10.20.1 eq telnet (427 matches)          deny ip any any (16 matches)
rap523#

```

access-profile merge命令用于更改活动配置。如果有与双重身份验证的一个错误，将看起来，在下一台路由器提示符前。

```

rap523>access-profile merge          rap523>

```


用户认证Cisco IOS调试

此第二验证和access-profile命令在附注的Cisco IOS调试捕获。查询TACACS+的新的远程登录会话原因AAA用户名提示符。

```
rap523>access-profile merge rap523>
```

TACACS+验证用户nw76998。

```
*Mar 4 23:39:01.716 cst: TAC+: ver=192 id=2461152058 received AUTHEN status = GETUSER
*Mar 4 23:39:01.720 cst: AAA/AUTHEN (2461152058): status = GETUSER *Mar 4 23:39:05.596
cst: AAA/AUTHEN/CONT (2461152058): continue_login (user='(undef)') *Mar 4 23:39:05.600
cst: AAA/AUTHEN (2461152058): status = GETUSER *Mar 4 23:39:05.600 cst: AAA/AUTHEN
(2461152058): METHOD=TACACS+ *Mar 4 23:39:05.604 cst: TAC+: send AUTHEN/CONT packet
id=2461152058 *Mar 4 23:39:05.808 cst: TAC+: ver=192 id=2461152058 received AUTHEN status
= GETPASS *Mar 4 23:39:05.812 cst: AAA/AUTHEN (2461152058): status = GETPASS *Mar
4 23:39:15.316 cst: AAA/AUTHEN/CONT (2461152058): continue_login (user='nw76998') *Mar
4 23:39:15.320 cst: AAA/AUTHEN (2461152058): status = GETPASS *Mar 4 23:39:15.320 cst:
AAA/AUTHEN (2461152058): METHOD=TACACS+ *Mar 4 23:39:15.324 cst: TAC+: send AUTHEN/CONT
packet id=2461152058 *Mar 4 23:39:16.632 cst: TAC+: ver=192 id=2461152058 received AUTHEN
status = PASS *Mar 4 23:39:16.632 cst: AAA/AUTHEN (2461152058): status = PASS
```

TACACS+授权用户nw76998的“service=shell” AV对。

```
*Mar 4 23:39:01.716 cst: TAC+: ver=192 id=2461152058 received AUTHEN status = GETUSER
*Mar 4 23:39:01.720 cst: AAA/AUTHEN (2461152058): status = GETUSER *Mar 4 23:39:05.596
cst: AAA/AUTHEN/CONT (2461152058): continue_login (user='(undef)') *Mar 4 23:39:05.600
cst: AAA/AUTHEN (2461152058): status = GETUSER *Mar 4 23:39:05.600 cst: AAA/AUTHEN
(2461152058): METHOD=TACACS+ *Mar 4 23:39:05.604 cst: TAC+: send AUTHEN/CONT packet
id=2461152058 *Mar 4 23:39:05.808 cst: TAC+: ver=192 id=2461152058 received AUTHEN status
= GETPASS *Mar 4 23:39:05.812 cst: AAA/AUTHEN (2461152058): status = GETPASS *Mar
4 23:39:15.316 cst: AAA/AUTHEN/CONT (2461152058): continue_login (user='nw76998') *Mar
4 23:39:15.320 cst: AAA/AUTHEN (2461152058): status = GETPASS *Mar 4 23:39:15.320 cst:
AAA/AUTHEN (2461152058): METHOD=TACACS+ *Mar 4 23:39:15.324 cst: TAC+: send AUTHEN/CONT
packet id=2461152058 *Mar 4 23:39:16.632 cst: TAC+: ver=192 id=2461152058 received AUTHEN
status = PASS *Mar 4 23:39:16.632 cst: AAA/AUTHEN (2461152058): status = PASS
```

当用户执行access-profile命令在他们的远程登录会话上时，造成Cisco IOS双重身份验证执行关联Chap用户nw76998-isdn与login-user nw76998。

```
*Mar 4 23:39:26.568 cst: ACCESS-PROFILE/10.10.42.132: Started *Mar 4 23:39:26.568
cst: Vi2 ACCESS-PROFILE: Chap-user nw76998-isdn login-user nw76998 src-addr
10.10.42.132 *Mar 4 23:39:26.576 cst: Vi2 ACCESS-PROFILE/IPCP: Attempting to re-
authorize. user nw76998 src-addr 10.10.42.132 *Mar 4 23:39:26.580 cst: AAA/AUTHOR/FSM Vi2:
(0): Can we start IPCP? *Mar 4 23:39:26.580 cst: AAA/AUTHOR/FSM Vi2 (2696786804):
Port='Serial0:0' list '=' service=NET *Mar 4 23:39:26.584 cst: AAA/AUTHOR/FSM: Vi2
(2696786804) user='nw76998' *Mar 4 23:39:26.588 cst: AAA/AUTHOR/FSM: Vi2 (2696786804) send
AV service=ppp *Mar 4 23:39:26.588 cst: AAA/AUTHOR/FSM: Vi2 (2696786804) send AV
protocol=ip *Mar 4 23:39:26.592 cst: AAA/AUTHOR/FSM (2696786804) found list "default"
*Mar 4 23:39:26.596 cst: AAA/AUTHOR/FSM: Vi2 (2696786804) METHOD=TACACS+ *Mar 4
23:39:26.600 cst: AAA/AUTHOR/TAC+: (2696786804): user=nw76998 *Mar 4 23:39:26.600 cst:
AAA/AUTHOR/TAC+: (2696786804): send AV service=ppp *Mar 4 23:39:26.604 cst:
AAA/AUTHOR/TAC+: (2696786804): send AV protocol=ip *Mar 4 23:39:26.816 cst: TAC+:
(2696786804): received author response status = PASS_ADD *Mar 4 23:39:26.824 cst:
AAA/AUTHOR (2696786804): Post authorization status = PASS_ADD *Mar 4 23:39:26.832 cst:
AAA/AUTHOR/FSM Vi2: We can start IPCP *Mar 4 23:39:26.836 cst: Vi2 ACCESS-PROFILE/IPCP:
AV: service=ppp *Mar 4 23:39:26.836 cst: Vi2 ACCESS-PROFILE/IPCP: AV: protocol=ip
*Mar 4 23:39:26.840 cst: Vi2 ACCESS-PROFILE/IPCP: AV: inacl=110 *Mar 4 23:39:26.844 cst:
Vi2 ACCESS-PROFILE/ACL: Interface has input access list: 120 *Mar 4 23:39:26.848 cst:
Vi2 VTEMPLATE: Has a new cloneblk AAA, now it has vtem plate/AAA *Mar 4 23:39:26.852
cst: Vi2 VTEMPLATE: ***** CLONE VACCESS2 ***** *Mar 4 23:39:26.856 cst: Vi2
VTEMPLATE: Clone from AAA interface Virtual-Access2 no ip access-group 120 in end
*Mar 4 23:39:27.196 cst: Vi2 AAA/AUTHOR: Vaccess parse 'interface Virtual-Access2 no
```

```

ip access-group 120 in' ok (0) *Mar 4 23:39:27.200 cst: Vi2 ACCESS-PROFILE/IPCP:
Reauthorization success! user nw76998 src-addr 10.10.42.132 *Mar 4 23:39:27.204 cst: Vi2
ACCESS-PROFILE/CCP: Attempting to re-authorize. user nw76998 src-addr 10.10.42.132
*Mar 4 23:39:27.208 cst: AAA/AUTHOR/FSM Vi2: (0): Can we start CCP? *Mar 4 23:39:27.212
cst: AAA/AUTHOR/FSM Vi2 (107142084): Port='Serial0:0' list= '' service=NET *Mar 4
23:39:27.216 cst: AAA/AUTHOR/FSM: Vi2 (107142084) user='nw76998' *Mar 4 23:39:27.216 cst:
AAA/AUTHOR/FSM: Vi2 (107142084) send AV service=ppp *Mar 4 23:39:27.220 cst:
AAA/AUTHOR/FSM: Vi2 (107142084) send AV protocol=ccp *Mar 4 23:39:27.224 cst:
AAA/AUTHOR/FSM (107142084) found list "default" *Mar 4 23:39:27.224 cst: AAA/AUTHOR/FSM:
Vi2 (107142084) METHOD=TACACS+ *Mar 4 23:39:27.228 cst: AAA/AUTHOR/TAC+: (107142084):
user=nw76998 *Mar 4 23:39:27.232 cst: AAA/AUTHOR/TAC+: (107142084): send AV service=ppp
*Mar 4 23:39:27.232 cst: AAA/AUTHOR/TAC+: (107142084): send AV protocol=ccp *Mar 4
23:39:28.140 cst: TAC+: (107142084): received author response status = PASS_ADD *Mar 4
23:39:28.148 cst: AAA/AUTHOR (107142084): Post authorization status = PASS_ADD *Mar 4
23:39:28.152 cst: AAA/AUTHOR/FSM Vi2: We can start CCP *Mar 4 23:39:28.156 cst: Vi2
ACCESS-PROFILE/CCP: AV: service=ppp *Mar 4 23:39:28.156 cst: Vi2 ACCESS-PROFILE/CCP: AV:
protocol=ccp *Mar 4 23:39:28.160 cst: Vi2 ACCESS-PROFILE/CCP: Protocol not yet
implemented. user nw76998 src-addr 10.10.42.132 *Mar 4 23:39:28.164 cst: Vi2 ACCESS-
PROFILE/CCP: Reauthorization success! user nw76998 src-addr 10.10.42.132 *Mar 4
23:39:28.168 cst: Vi2 ACCESS-PROFILE: Done

```

新的配置show interface virtual-access2命令下面被确认。注意access-list 110未应用。还是需要解决这。

```

rap523>sh int virtual-access 2 conf Virtual-Access2 is a MLP bundle interface Building
configuration... interface Virtual-Access2 configuration... ip unnumbered Loopback3
no ip mroute-cache no fair-queue compress stac ppp max-bad-auth 3 ppp
authentication chap pap ppp multilink rap523>sh int virtual-access2 Virtual-
Access2 is up, line protocol is up Hardware is Virtual Access interface Interface
is unnumbered. Using address of Loopback3 (10.10.20.1) MTU 1500 bytes, BW 56 Kbit, DLY
100000 usec, rely 255/255, load 4/255 Encapsulation PPP, loopback not set, keepalive set
(10 sec) DTR is pulsed for 5 seconds on reset LCP Open, multilink Open
Closed: CCP Open: IPCP Last input 00:00:00, output never, output hang never
Last clearing of "show interface" counters 00:32:14 Queueing strategy: fifo Output
queue 0/40, 0 drops; input queue 1/75, 0 drops 5 minute input rate 1000 bits/sec, 4
packets/sec 5 minute output rate 1000 bits/sec, 3 packets/sec 153 packets
input, 6508 bytes, 0 no buffer Received 141 broadcasts, 0 runts, 0 giants, 0 throttles
0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored, 0 abort 129 packets output,
10336 bytes, 0 underruns 0 output errors, 0 collisions, 0 interface resets 0
output buffer failures, 0 output buffers swapped out 0 carrier transitions
rap523>

```

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