在自治AP上配置SSID和VLAN

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简介

本文档说明如何为以下对象配置自主接入点(AP):

- 虚拟局域网 (VLAN)
- 开放式身份验证
- •802.1x,带内部远程身份验证拨入用户服务(RADIUS)
- 802.1x,带外部RADIUS
- 预共享密钥(PSK)
- MAC 地址身份验证
- •Web身份验证(内部RADIUS)
- Web直通

先决条件

要求

思科建议您对以下主题有基本的了解:

- 802.1x
- PSK
- RADIUS
- Web 身份验证

使用的组件

本文档中的信息基于AP 3700版本15.3(3)JBB。

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。如果您的网络处于活动状态,请确保您了解所有命令的潜在影响。

提示:这些示例也适用于ASA 5506内自治模式下的AP,其区别在于,不配置AP连接的交换机 端口,而是将配置应用于ASA的Gig 1/9。

配置

注:属于同一VLAN的服务集标识符(SSID)不能同时应用于无线电。具有相同VLAN的SSID的 配置示例未在同一AP上同时启用。

配置VLAN-Switch和AP

在AP和交换机上配置所需的VLAN。以下是本示例中使用的VLAN:

- VLAN 2401 (本征)
- VLAN 2402
- VLAN 2403

配置AP和VLAN

配置接口千兆以太网

conf t

```
# interface gig 0.2401
# encapsulation dotlq 2401 native
```

interface gig 0.2402
encapsulation dot1q 2402
bridge-group 242

interface gig 0.2403
encapsulation dot1g 2403
bridge-group 243
配置接口无线电802.11a

interface dot11radio 1.2401
encapsulation dot1q 2401 native

interface dotllradio 1.2402
encapsulation dotlq 2402
bridge-group 242

interface dot11radio 1.2403
encapsulation dot1q 2403

bridge-group 243

注意: 802.11b无线电(interface dot11radio 0)未配置,因为它使用AP的本征VLAN。

配置交换机VLAN

conf t # vlan 2401-2403

配置AP所连接的接口:

conf t
interface <port-id-where-AP-is-connected>
switchport trunk encapsulation dotlq
switchport mode trunk
switchport trunk native vlan 2401
switchport trunk allowed vlan 2401-2403
spanning-tree portfast trunk

SSID开放式身份验证 — AP的本征VLAN

此SSID没有安全性,它被广播(对客户端可见),加入WLAN的无线客户端被分配到本征VLAN。

步骤 1. 配置 SSID。

dot11 ssid OPEN
authentication open
guest-mode

步骤2.将SSID分配给802.11b无线电。

interface dot11radio 0
ssid OPEN

SSID 802.1x — 内部RADIUS

此SSID将AP用作RADIUS服务器。请注意,AP作为RADIUS服务器仅支持LEAP、EAP-FAST和 MAC身份验证。

步骤1.启用AP作为RADIUS服务器。

网络接入服务器(NAS)IP地址是AP的BVI,因为此IP地址是向自身发送身份验证请求的IP地址。此外

,创建用户名和密码。

aaa new-model
radius-server local
nas <a.b.c.d> key 0 <shared-key>
user <username> password 0 <password>

步骤2.配置AP向其发送身份验证请求的RADIUS服务器,因为AP是本地RADIUS,所以IP地址是分 配给AP的网桥虚拟接口(BVI)的IP地址。

radius server <radius-server-name>
address ipv4 <a.b.c.d> auth-port 1812 acct-port 1813
timeout 10
retransmit 3
key 0 <shared-key>

步骤3.将此RADIUS服务器分配给RADIUS组。

aaa group server radius <radius-group>

server name <radius-server-name>

步骤4.将此RADIUS组分配给身份验证方法。

aaa authentication login <eap-method-name> group <radius-group>

步骤5.创建SSID,将其分配给VLAN 2402。

dot11 ssid internal-radius

- # vlan 2402
- # authentication open eap <eap-method-name>
- # authentication network-eap <eap-method-name>
- # authentication key-management wpa version 2
- # mbssid guest-mode

步骤6.将ssid分配给接口802.11a并指定密码模式。

interface dotllradio 1
mbssid
encryption vlan 2402 mode ciphers aes-ccm
ssid internal-radius

SSID 802.1x — 外部RADIUS

配置与内部RADIUS几乎相同。

步骤1.配置aaa new-model。

第2步使用外部RADIUS IP地址,而不是AP的IP地址。

SSID - PSK

此SSID使用安全WPA2/PSK,并且此SSID上的用户被分配到VLAN 2402。

步骤 1. 配置 SSID。

```
# conf t
# dot11 ssid PSK-ex
# authentication open
# authentication key-management wpa version 2
# wpa-psk ascii 0 <password>
# mbssid guest-mode
# vlan 2402
```

步骤2.将SSID分配给无线电接口并配置密码模式。

```
# interface dotllradio 1
# encryption vlan 2402 mode ciphers aes-ccm
# ssid PSK-ex
```

SSID - MAC地址身份验证

此SSID根据无线客户端的MAC地址对其进行身份验证。它使用MAC地址作为用户名/密码。在本示 例中,AP充当本地RADIUS,因此AP存储MAC地址列表。同样的配置可应用于外部RADIUS服务器 。

步骤1.启用AP作为RADIUS服务器。NAS IP地址是AP的BVI。为MAC地址为aaabbbbcccc的客户端 创建条目。

aaa new-model
radius-server local
nas <a.b.c.d> key 0 <shared-key>
user aaaabbbbcccc password 0 aaaabbbbcccc mac-auth-only

步骤2.配置AP向其发送身份验证请求的RADIUS服务器(它是AP本身)。

radius server <radius-server-name>
address ipv4 <a.b.c.d> auth-port 1812 acct-port 1813
timeout 10
retransmit 3
key 0 <shared-key>
步骤3.将此RADIUS服务器分配给RADIUS组。

aaa group server radius <radius-group>

server name <radius-server-name>

步骤4.将此RADIUS组分配给身份验证方法。

aaa authentication login <mac-method> group <radius-group>
步骤5.创建SSID,本示例将其分配给VLAN 2402。

dot11 ssid mac-auth

vlan 2402

authentication open mac-address <mac-method>

mbssid guest-mode

步骤6.将SSID分配给接口802.11a。

interface dot11radio 1
mbssid

ssid mac-auth

SSID — 内部Web身份验证

连接到此SSID的用户被重定向到Web身份验证门户以输入有效的用户名/密码,如果身份验证成功 ,则他们有权访问网络。在本例中,用户存储在本地RADIUS服务器上。

在本例中,SSID被分配给VLAN 2403。

步骤1.启用AP作为RADIUS服务器。NAS IP地址是AP的BVI。

```
# aaa new-model
# radius-server local
# nas <a.b.c.d> key 0 <shared-key>
```

步骤2.配置AP向其发送身份验证请求的RADIUS服务器(它是AP本身)。

radius server <radius-name>
address ipv4 <a.b.c.d> auth-port 1812 acct-port 1813
timeout 10
retransmit 3
key 0 <shared-key>

步骤3.将此RADIUS服务器分配给RADIUS组。

aaa group server radius <radius-group>
server name <radius-name>

步骤4.将此RADIUS组分配给身份验证方法。

步骤5.创建准入策略。

ip admission name webauth-pol proxy http
ip admission name webauth-pol method-list authentication <web-method>

步骤6.配置SSID。

conf t
dot11 ssid webauth-autonomous
authentication open
web-auth
vlan 2403
mbssid guest-mode

步骤7.将SSID分配给接口。

conf t
int dotllradio 1
ssid webauth-autonomous

步骤8.将策略分配到正确的子接口。

```
# conf t
# int dot11radio 1.2403
# ip admission webauth-pol
```

注意:**如果SSID在本地上工作,则策略将直接应用到接口,而不是子接口**(dot11radio 0或 dot11radio 1)。

步骤9.为访客用户创建用户名/密码。

conf t
dot11 guest
username <username> lifetime 35000 password <password>

SSID - Web直通

当客户端通过Web直通配置连接到SSID时,它将重定向到Web门户以接受网络使用的条款和条件 ,如果不是,用户将无法使用该服务。

本示例将SSID分配给本征VLAN。

步骤1.创建准入策略。

config t # ip admission name web-passth consent

步骤2.指定客户端连接到此SSID时要显示的消息。

ip admission consent-banner text %

====== WELCOME ======

Message to be displayed to clients

[。] 步骤3.创建SSID。

dot11 ssid webpassth-autonomous

web-auth

- # authentication open
- # guest-mode

步骤4.将SSID和准入策略分配给无线电

interface dotllradio { 0 | 1 }
ssid webpassth-autonomous
ip admission web-passth

验证

使用本部分可确认配置能否正常运行。

show dot11 associations

这显示所连接的无线客户端的MAC地址、IPv4和IPv6地址、SSID名称。

ap# show dot11 associations

802.11 Client Stations on Dot11Radio0:

SSID [webpassth-autonomous] :

MAC Address	IP address	IPV6 address	Device	Name
Parent	State			
c4b3.01d8.5c9d	172.16.0.122	::	unknown	-
self	Assoc			

show dot11 associations aaaa.bbbb.cccc

这显示了MAC地址中指定的无线客户端的更多详细信息,如RSSI、SNR、支持的数据速率等。

ap# show dot11 associations c4b3.01d8.5c9d

Address : c4b3.01d8.5c9d Name : NONE IP Address : 172.16.0.122 IPv6 Address : :: Gateway Address : 0.0.0.0 Netmask Address : 0.0.0.0 Interface : Dot11Radio 0 Bridge-group : 1 reap_flags_1 : 0x0 ip_learn_type : 0x0 transient_static_ip : 0x0 Device : unknown Software Version : NONE CCX Version : NONE Client MFP : Off State : Assoc Parent : self SSID : webpassth-autonomous VLAN : 0 Hops to Infra : 1 Association Id : 1 Clients Associated: 0 Repeaters associated: 0 Tunnel Address : 0.0.0.0 Key Mgmt type : NONE Encryption : Off Current Rate : m15b2 Capability : WMM ShortHdr ShortSlot Supported Rates : 1.0 2.0 5.5 11.0 6.0 9.0 12.0 18.0 24.0 36.0 48.0 54.0 m0-2 m1-2 m2-2 m3-2 m4-2 m5-2 m6-2 m7-2 m8-2 m9-2 m10-2 m11-2 m12-2 m13-2 m14-2 m15-2 Voice Rates : disabled Bandwidth : 20 MHz Signal Strength : -30 dBm Connected for : 447 seconds Signal to Noise : 56 dB Activity Timeout : 56 seconds Power-save : On Last Activity : 4 seconds ago Apsd DE AC(s) : NONE Packets Input : 1035 Packets Output : 893 Bytes Input : 151853 Bytes Output : 661627 Duplicates Rcvd : 1 Data Retries : 93

Duplicates RCVd : 1 Data Retries : 93 Decrypt Failed : 0 RTS Retries : 0 MIC Failed : 0 MIC Missing : 0 Packets Redirected: 0 Redirect Filtered: 0 IP source guard failed : 0 PPPoE passthrough failed : 0 DAI failed : IP mismatch : 0 src MAC mismatch : 0 target MAC mismatch : 0 Existing IP failed : 0 New IP failed : 0 11w Status : Off

show dot11 webauth-sessions

这将显示MAC地址、用于Web身份验证或Web传递的IPv4地址,以及如果SSID配置为Web身份验 证的用户名。

ap# show dot11 webauth-sessions c4b3.01d8.5c9d 172.16.0.122 connected

show dot11 bssid

这显示了与每个无线电接口的WLAN关联的BSSID。

ap# show dot11 bssid

InterfaceBSSIDGuestSSIDDot11Radio000c8.8blb.49f0Yeswebpassth-autonomousDot11Radio100c8.8b04.ffb0YesPSK-exDot11Radio100c8.8b04.ffb1Yesmac-auth

bridge verbose

这显示了子接口和网桥组之间的关系。

ap# show bridge verbose

Total of 300 station blocks, 297 free Codes: P - permanent, S - self

Flood ports (BG 1)	RX count	TX count
Dot11Radio0	0	0
Dot11Radio1.2401	0	7
GigabitEthernet0.2401	31	225
Flood ports (BG 242)	RX count	TX count
DOLLIRADIOL.2402	0	0
GigabitEthernet0.2402	0	0
Flood ports (BG 243)	RX count	TX count
Dot11Radio1.2403	0	0
GigabitEthernet0.2403	0	0

故障排除

本部分提供了可用于对配置进行故障排除的信息。

clear dot11 client aaa.bbbb.cccc

此命令有助于断开无线客户端与网络的连接。

clear dot11 webauth webauth-user username

此命令有助于删除指定用户的Web身份验证会话。

运行以下debug命令以验证客户端的身份验证过程:

```
# debug condition mac-address <H.H.H>
# debug dot11 client
# debug radius authentication
# debug dot11 mgmt ssid
# debug dot11 mgmt interface
```

PSK

*Apr 16 02:06:47.885: (6c94.f871.3b73): SM: ---Open Authentication 0x9630924: AuthReq (0)SM: Init (0) --> Auth_not_Assoc (1) *Apr 16 02:06:47.885: dot11_mgmt: [2A937303] send auth=0, status[0] to dst=6c94.f871.3b73, src=f07f.06f4.4430, bssid=f07f.06f4.4430, seq=2, if=Dot11Radio1 *Apr 16 02:06:47.885: (6c94.f871.3b73): SM: ---Open Authentication 0x9630924: AssocReq (1)SM: Auth_not_Assoc (1) --> DONT CHANGE STATE (255) *Apr 16 02:06:47.889: (0000.0000.0000): dot11_mgmt: insert mac 6c94.f871.3b73 into ssid[PSK-ex] tree !---- Authentication frame received from the client and response

*Apr 16 02:06:47.889: (6c94.f871.3b73): SM: ---Open Authentication 0x9630924: IAPP-Resp (3)SM: IAPP_get (5) --> DONT CHANGE STATE (255) *Apr 16 02:06:47.889: (6c94.f871.3b73): SM: ---Open Authentication 0x9630924: Drv Add Resp (8)SM: Drv_Add_InProg (8) --> DONT CHANGE STATE (255) *Apr 16 02:06:47.889: (0000.0000.0000): dot11_mgmt: [2A937B59] send assoc resp, status[0] to dst=6c94.f871.3b73, aid[1] on Dot11Radio1

!----- Association frame received from client and response

*Apr 16 02:06:47.889: (0000.0000.0000): dot11_aaa: Starting wpav2 4-way handshake for PSK or pmk
cache supplicant 6c94.f871.3b73
*Apr 16 02:06:47.889: (0000.0000.0000): dot11_aaa: sending eapol to client on BSSID
f07f.06f4.4430
*Apr 16 02:06:47.889: (0000.0000.0000): dot11_aaa: [count = 1] Sent PTK msg 1 to client, no
timer set
*Apr 16 02:06:47.893: (0000.0000.0000): dot11_aaa: Received wpav2 ptk msg2
*Apr 16 02:06:47.901: (0000.0000.0000): dot11_aaa: sending eapol to client on BSSID
f07f.06f4.4430
*Apr 16 02:06:47.901: (0000.0000.0000): dot11_aaa: [count = 1] Sent PTK msg 3 to client, no
timer set
*Apr 16 02:06:47.901: (0000.0000.0000): dot11_aaa: [count = 1] Sent PTK msg 3 to client, no
timer set
*Apr 16 02:06:47.901: (0000.0000.0000): dot11_aaa: Received EAPOL packet from client
*Apr 16 02:06:47.901: (0000.0000.0000): dot11_aaa: wpav2 recv PTK MSG4
*Apr 16 02:06:47.901: (0000.0000.0000): dot11_aaa: wpav2 recv PTK MSG4
*Apr 16 02:06:47.901: (0000.0000.0000): dot11_aaa: wpav2 recv PTK MSG4
*Apr 16 02:06:47.901: (0000.0000.0000): dot11_aaa: wpav2 recv PTK MSG4
*Apr 16 02:06:47.901: (0000.0000.0000): dot11_aaa: wpav2 recv PTK MSG4
*Apr 16 02:06:47.901: (0000.0000.0000): dot11_aaa: 4-way Handshake pass for client

!----- Successfull 4-way-handshake

*Apr 16 02:06:47.901: (0000.0000.0000): dot11_aaa: Sending auth response: 2 for client
*Apr 16 02:06:47.901: (6c94.f871.3b73): SM: ---Open Authentication 0x9630924: AAA Auth OK (5)SM:
AAA_Auth (6) --> Assoc (2)
*Apr 16 02:06:47.901: %DOT11-6-ASSOC: Interface Dot11Radio1, Station 6c94.f871.3b73 Associated
KEY_MGMT[WPAv2 PSK]
*Apr 16 02:06:47.901: (0000.0000.0000): dot11_aaa: client Associated

!---- Authentication completed

*Apr 16 02:06:50.981: (0000.0000.0000): dot11_mgmt: Updating the client IP (172.16.0.91) to the controller

!-----Client's IP address updated on the AP database

802.1x

*Apr 14 09:54:03.083: (38b1.db54.26ff): SM: ---Open Authentication 0x9630924: AuthReq (0)SM: Init (0) --> Auth_not_Assoc (1) *Apr 14 09:54:03.083: dot11_mgmt: [75F0D029] send auth=0, status[0] to dst=38b1.db54.26ff, src=f07f.06f4.4430, bssid=f07f.06f4.4430, seq=2, if=Dot11Radio1

!---- Authentication frame received from the client and response

*Apr 14 09:54:03.091: (38b1.db54.26ff): SM: ---Open Authentication 0x9630924: AssocReq (1)SM: Auth_not_Assoc (1) --> DONT CHANGE STATE (255) *Apr 14 09:54:03.091: (0000.0000.0000): dot11_mgmt: insert mac 38b1.db54.26ff into ssid[internal-radius] tree *Apr 14 09:54:03.091: (0000.0000.0000): dot11_mgmt: [75F0F8AE] send assoc resp, status[0] to dst=38b1.db54.26ff, aid[1] on Dot11Radio1

!----- Association frame received from client and response

*Apr 14 09:54:03.091: (0000.0000.0000): dot11_aaa: Received dot11_aaa_auth_request for clientSSID: internal-radius, auth_algorithm 0, key_mgmt 1027073 *Apr 14 09:54:03.095: (0000.0000.0000): dot11_aaa: eap list name: eap-method *Apr 14 09:54:03.095: (0000.0000.0000): dot11_aaa: Send auth request for this client to local Authenticator *Apr 14 09:54:03.095: (0000.0000.0000): dot11_auth: Sending EAPOL to requestor *Apr 14 09:54:03.095: (0000.0000.0000): dot11_aaa: Received DOT11_AAA_EAP from Local Authenticator *Apr 14 09:54:03.095: (0000.0000.0000): dot11_aaa: sending eapol to client on BSSID f07f.06f4.4430 *Apr 14 09:54:05.103: (0000.0000.0000): dot11_aaa: Received EAPOL packet from client *Apr 14 09:54:05.107: RADIUS(0000003B): Send Access-Request to 172.16.0.48:1812 id 1645/12, len 194 *Apr 14 09:54:05.107: RADIUS: User-Name [1] 7 "userl" *Apr 14 09:54:05.119: RADIUS: Received from id 1645/14 172.16.0.48:1812, Access-Accept, len 214 *Apr 14 09:54:05.119: RADIUS: User-Name [1] 28 "user1 !----- 802.1x Authentication success *Apr 14 09:54:05.119: (0000.0000.0000): dot11_auth: Checking for Airespace-Vlan-Name in server attributes *Apr 14 09:54:05.119: (0000.0000.0000): dot11_auth: Checking for VLAN ID in server attributes *Apr 14 09:54:05.119: (0000.0000.0000): dot11_auth: Checking for Airespace-Acl-Name in server attributes *Apr 14 09:54:05.119: (0000.0000.0000): dot11_auth: client authenticated, node_type 64 for application 0x1 !----- AP verifies if there is any attribute pushed by the RADIUS server *Apr 14 09:54:05.119: (0000.0000.0000): dot11_aaa: [count = 1] Sent PTK msg 1 to client, no timer set *Apr 14 09:54:05.123: (0000.0000.0000): dot11_aaa: Received wpav2 ptk msg2 *Apr 14 09:54:05.131: (0000.0000.0000): dot11_aaa: [count = 1] Sent PTK msg 3 to client, no timer set *Apr 14 09:54:05.131: (0000.0000.0000): dot11_aaa: wpav2 recv PTK MSG4 *Apr 14 09:54:05.131: (0000.0000.0000): dot11_aaa: 4-way Handshake pass for client *Apr 14 09:54:05.131: (38b1.db54.26ff): SM: ---Open Authentication 0x9630924: AAA Auth OK (5)SM: AAA_Auth (6) --> Assoc (2)!----- 4-way-handshake process completed *Apr 14 09:54:05.131: %DOT11-6-ASSOC: Interface Dot11Radio1, Station 38b1.db54.26ff Associated KEY_MGMT[WPAv2] *Apr 14 09:54:05.131: (0000.0000.0000): dot11_aaa: client Associated !---- Authentication completed

*Apr 14 09:54:05.611: (0000.0000.0000): dot11_mgmt: Updating the client IP (172.16.0.90) to the controller

!-----Client's IP address updated on the AP database

MAC 验证

*Apr 16 03:42:14.819: (2477.033a.e00c): SM: ---Open Authentication 0x947A804: AuthReq (0)SM: Init (0) --> Auth_not_Assoc (1) *Apr 16 03:42:14.819: dot11_mgmt: [EE8DFCD2] send auth=0, status[0] to dst=2477.033a.e00c, src=f07f.06f4.4430, bssid=f07f.06f4.4430, seq=2, if=Dot11Radio1 !---- Authentication frame received from the client and response *Apr 16 03:42:14.823: (2477.033a.e00c): SM: ---Open Authentication 0x947A804: AssocReq (1)SM: Auth_not_Assoc (1) --> DONT CHANGE STATE (255) *Apr 16 03:42:14.823: (0000.0000.0000): dot11_mgmt: insert mac 2477.033a.e00c into ssid[macauthl tree *Apr 16 03:42:14.823: (0000.0000.0000): dot11_mgmt: [EE8E12C4] send assoc resp, status[0] to dst=2477.033a.e00c, aid[1] on Dot11Radio1 !----- Association frame received from client and response *Apr 16 03:42:14.823: (0000.0000.0000): dot11_aaa: Received dot11_aaa_auth_request for clientSSID: mac-auth, auth_algorithm 0, key_mgmt 0 *Apr 16 03:42:14.823: (0000.0000.0000): dot11_aaa: Start local Authenticator request *Apr 16 03:42:14.823: (0000.0000.0000): dot11_auth: Start auth method MAC *Apr 16 03:42:14.827: RADIUS(00000050): Send Access-Request to 172.16.0.48:1812 id 1645/81, len 169 *Apr 16 03:42:14.827: RADIUS: User-Name [1] 14 "2477033ae00c" *Apr 16 03:42:14.827: RADIUS: Calling-Station-Id [31] 16 "2477.033a.e00c" *Apr 16 03:42:14.827: RADIUS: Received from id 1645/81 172.16.0.48:1812, Access-Accept, len 116 *Apr 16 03:42:14.827: RADIUS: User-Name [1] 28 "2477033ae00c !----- MAC Authentication success *Apr 16 03:42:14.827: (0000.0000.0000): dot11_auth: Checking for SSID in server attributes *Apr 16 03:42:14.827: (0000.0000.0000): dot11_auth: Checking for Airespace-Vlan-Name in server attributes *Apr 16 03:42:14.827: (0000.0000.0000): dot11 auth: Checking for VLAN ID in server attributes *Apr 16 03:42:14.827: (0000.0000.0000): dot11_auth: Checking for Airespace-Acl-Name in server attributes !----- AP verifies if there is any attribute pushed by the RADIUS server *Apr 16 03:42:14.827: (0000.0000.0000): dot11_auth: client authenticated, node_type 64 for application 0x1 *Apr 16 03:42:14.827: (0000.0000.0000): dot11_aaa: Received DOT11_AAA_SUCCESS from Local Authenticator *Apr 16 03:42:14.827: (2477.033a.e00c): SM: ---Open Authentication 0x947A804: AAA Auth OK (5)SM: AAA_Auth (6) --> Assoc (2) *Apr 16 03:42:14.827: %DOT11-6-ASSOC: Interface Dot11Radio1, Station 2477.033a.e00c Associated KEY_MGMT[NONE]

!---- Authentication completed

*Apr 16 03:42:16.895: (0000.0000.0000): dot11_mgmt: Updating the client IP (172.16.0.92) to the controller

!-----Client's IP address updated on the AP database