

了解在无线局域网控制器(WLC)上的调试客户端

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简介

本文档提供了有关无线 LAN 控制器上的 `debug client` 命令输出的详细信息。

本文档涉及以下主题：

- 如何处理无线客户端
- 基本关联和认证问题故障排除

所分析的输出涉及 WPA 预共享密钥 (WPA-PSK) 网络方案。

先决条件

要求

Cisco 建议您了解以下主题：

- 如何针对基本运行来配置无线 LAN 控制器 (WLC) 和轻量接入点 (LAP)

- 轻量接入点协议 (LWAPP) 和无线安全方法
- 802.11 认证和关联过程的工作方式

[使用的组件](#)

本文档中的信息基于以下软件和硬件版本：

- 运行固件 4.1 或 4.2 的 Cisco 2000/2100/4400 系列 WLC
- 基于 LWAPP 的接入点

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](#)。

[Debug Client](#)

命令 **debug client <MACADDRESS>** 是一个可启用 8 个 debug 命令的宏，此外还提供了一个 MAC 地址过滤器，以便仅显示包含指定 MAC 地址的消息。8 个 debug 命令显示了关于客户端关联和认证的最重要详细信息。在有多个无线客户端的情况下，该过滤器十分有用。例如，如果未使用该过滤器，在启用调试后可能会生成过多输出或使控制器超载。

所收集的信息涉及关于客户端关联和认证的重要详细信息（有两个例外情况，本文后面会进行介绍）。

已启用的命令显示在以下输出中：

```
(Cisco Controller) >show debug MAC address ..... 00:00:00:00:00:00
Debug Flags Enabled: dhcp packet enabled. dot11 mobile enabled. dot11 state enabled. dot1x
events enabled. dot1x states enabled. pem events enabled. pem state enabled.
```

这些命令涉及地址协商、802.11 客户端状态机、802.1x 认证、策略执行模块 (PEM) 和地址协商 (DHCP)。

[Debug Client 的变化形式](#)

对于大多数情况，使用 **debug client <MACAddress>** 便足以获取所需信息。不过，有两种需要其他调试的重要情况：

- [移动性](#)（客户端在控制器之间漫游）
- [EAP 认证故障排除](#)

[移动性](#)

在这种情况下，需要在引入 **debug client <MACAddress>** 命令之后启用移动调试，以便获取有关控制器之间的移动协议交互的附加信息。

注意：以后会有文档介绍此输出的详细信息。

为了启用移动调试，可使用 `debug client <MACAddress>`，然后使用 `debug mobility handoff enable` 命令：

```
(Cisco Controller) >debug client 00:00:00:00:00:00 (Cisco Controller) >debug mobility handoff enable (Cisco Controller) >show debug MAC address .....  
00:00:00:00:00:00 Debug Flags Enabled: dhcp packet enabled. dot11 mobile enabled. dot11 state enabled dot1x events enabled. dot1x states enabled. mobility handoff enabled. pem events enabled. pem state enabled.
```

[EAP 认证故障排除](#)

为了对 WLC 与认证服务器（外部 RADIUS 或内部 EAP 服务器）之间的交互进行故障排除，可使用命令 `debug AAA all enable`，此命令将显示所需的详细信息。此命令应在 `debug client <MACAddress>` 命令的后面使用，并且可根据需要与其他 debug 命令（例如，`handoff`）结合使用。

```
(Cisco Controller) >debug client 00:00:00:00:00:00 (Cisco Controller) >debug aaa all enable (Cisco Controller) >show debug MAC address ..... 00:00:00:00:00:00  
Debug Flags Enabled: aaa detail enabled. aaa events enabled. aaa packet enabled. aaa packet enabled. aaa ldap enabled. aaa local-auth db enabled. aaa local-auth eap framework errors enabled. aaa local-auth eap framework events enabled. aaa local-auth eap framework packets enabled. aaa local-auth eap framework state machine enabled. aaa local-auth eap method errors enabled. aaa local-auth eap method events enabled. aaa local-auth eap method packets enabled. aaa local-auth eap method state machine enabled. aaa local-auth shim enabled. aaa tacacs enabled. dhcp packet enabled. dot11 mobile enabled. dot11 state enabled dot1x events enabled dot1x states enabled. mobility handoff enabled. pem events enabled. pem state enabled.
```

[客户端连接](#)

在本文档中，客户端连接就是无线客户端完成以下步骤的过程：

802.11 部分

1. 探测以发现要关联的有效 AP。
2. 验证：可以是 Open (null) 或 Shared。通常选择 Open。
3. 关联：向 AP 请求数据服务。

L2 策略部分

1. 无;根据具体配置，进行 PSK 或 EAP 认证。
2. 密钥协商，如果选择了加密方法。

L3 策略部分

1. 地址识别。
2. Web 认证，如果已选择。

注意：这些步骤代表完整过程的一个子集或摘要。本文档介绍了一个涉及 802.11 和 L2 策略并使用 WPA-PSK 和地址识别的简化情况。未使用外部 AAA 或 L3 认证策略。

[控制器进程](#)

在每个部分中，控制器都使用多个分隔的进程，以便跟踪客户端在每个时刻的状态。各个进程相互进行交互，以确保将客户端添加到连接表中（根据配置的安全策略）。为了了解客户端到控制器的连接步骤，下面提供了最相关过程的简短摘要：

- **策略执行模块 (PEM)** — 控制客户端状态，并强制客户端根据 WLAN 配置执行每个安全策略。
- **接入点功能 (APF)** — 基本上是 802.11 状态机。
- **Dot1x** — 实现 802.1x 的状态机、PSK 认证和无线客户端的密钥处理。
- **移动性** — 跟踪与同一移动组中其他控制器的交互。
- **数据转换层 (DTL)** — 位于软件组件与网络硬件加速 (NPU) 之间；控制 ARP 信息。

策略执行模块 (PEM)

基于 WLAN 配置，客户端执行一系列步骤。PEM 确保按顺序执行这一过程，以便符合必需的 L2 和 L3 安全策略。

下面是与客户端调试分析相关的 PEM 状态的一个子集：

- **开始**—新的客户端条目的最初的状态。
- **AUTHCHECK** — WLAN 具有要强制执行的 L2 认证策略。
- **8021X_REQD** —客户端必须完成802.1x验证。
- **L2AUTHCOMPLETE** —客户端顺利地完成L2策略。该进程现在可继续执行 L3 策略（地址识别、Web 认证等）。此时，控制器发送移动声明以从其他控制器获得 L3 信息（如果这是位于同一移动组中的漫游客户端）。
- **WEP_REQD** —客户端必须完成WEP身份验证。
- **DHCP_REQD** —控制器需要了解从客户端的L3地址，由ARP请求完成，DHCP请求或由从在移动组的其他控制器了解的信息更新，或者。如果 WLAN 上标记有 DHCP Required，则仅使用 DHCP 或移动信息。
- **WEBAUTH_REQD** —客户端必须完成Web验证。（L3 策略）
- **RAN** —客户端顺利地完成的L2和L3策略，并且能当前传输流量到网络。

下图显示了一个简化的 PEM 状态机，它带有客户端转换，直到达到 RUN 状态，在此状态下，客户端可向网络发送流量：

注意：此图未包括所有可能的转换和状态。为清楚起见，某些中间步骤已删除。

客户端流量转发

在 START 状态和最终 RUN 状态之间，客户端流量不会转发到网络，而是传递到控制器上的主 CPU 以进行分析。所转发的信息取决于状态和现有策略；例如，如果启用了 802.1x，则将 EAPOL 流量转发到 CPU。另一个例子是，如果使用了 Web 认证，则 HTTP 和 DNS 将被允许，并由 CPU 拦截以执行 Web 重定向并获取客户端认证凭证。

当客户端达到 RUN 状态时，客户端信息将发送到 NPU，以便启用 FastPath 交换，这会用户流量以线速转发到客户端 VLAN，并解除中央 CPU 的用户数据转发任务。

所转发的流量取决于应用于 NPU 的客户端类型。下表描述了最相关的类型：

类型	说明
1	正常客户端流量转发。
9	IP 识别状态。为了识别所使用的 IP 地址，将从此客户端向 CPU 发送一个数据包。
2	ACL 直通。当 WLAN 是一个已配置为通知 NPU 的 ACL 时使用。

接入点功能 (APF)

此进程通过 802.11 状态机来处理客户端的状态，并与移动代码交互以验证不同的漫游方案。本文档不涉及移动性详细情况或其状态。

下表显示了在客户端与控制器关联期间进入的更多相关客户端状态：

名称	说明
空闲	新客户端，或某些情况下的临时状态。
AAA 挂起	客户端正在等待 MAC 地址认证。
已验证	开放式认证成功，或某些情况下的中间状态。
已关联	客户端成功通过 MAC 认证和开放式认证进程。
不相关	客户端发送了解除关联/取消认证，或关联计时器已过期。
删除	已将客户端标记为删除（通常在排除计时器过期之后）。
探测器	已收到新客户端的探测请求。
已排除/列入黑名单	已将客户端标记为排除。通常与 WPS 策略有关。
无效	客户端状态存在错误。

下图表示一个状态机转换，它仅显示出最相关的状态和转换：

802.1x 认证 (Dot1x)

Dot1x 进程负责 802.1x 认证以及客户端的密钥管理。这意味着，即使在不具有需要 802.1x 的 EAP 策略的 WLAN 上，Dot1x 也会参与处理密钥创建和与客户端的协商，并且还进行缓存密钥处理（PMK 或 CCKM）。

此状态机显示完整 802.1x 转换：

Debug Client 分析

```
APF Process Wed Oct 31 10:46:13 2007: 00:1b:77:42:07:69 Adding mobile on LWAPP AP
00:1c:0j:ca:5f:c0(0) !--- A new station is received. After validating type, it is added to the
!--- AP that received it. This can happen both on processing association !--- request or probe
requests Wed Oct 31 10:46:13 2007: 00:1b:77:42:07:69 Scheduling deletion of Mobile Station:
(callerId: 23) in 5 seconds !--- Sets an expiration timer for this entry in case it does not
progress !--- beyond probe status. 5 Seconds corresponds to Probe Timeout. This message !---
might appear with other time values since, during client processing, !--- other functions might
set different timeouts depending on state. Wed Oct 31 10:46:13 2007: 00:1b:77:42:07:69
apfProcessProbeReq (apf_80211.c:4057) Changing state for mobile 00:1b:77:42:07:69 on AP
00:1c:0j:ca:5f:c0 from Idle to Probe !--- APF state machine is updated. Wed Oct 31 10:46:13
2007: 00:1b:77:42:07:69 Scheduling deletion of Mobile Station: (callerId: 24) in 5 seconds !---
New Probe request update sent AP about client. IMPORTANT: !--- Access points do not forward all
probe requests to the controller; they !--- summarize per time interval (by default 500 msec).
This information is !--- used later by location and load balancing processes. Wed Oct 31
10:46:14 2007: 00:1b:77:42:07:69 Scheduling deletion of Mobile Station: (callerId: 24) in 5
```

seconds !--- New Probe request update sent AP about client. Wed Oct 31 10:46:14 2007:
00:1b:77:42:07:69 Scheduling deletion of Mobile Station: (callerId: 24) in 5 seconds !--- New
Probe request update sent AP about client. Wed Oct 31 10:46:15 2007: 00:1b:77:42:07:69
Scheduling deletion of Mobile Station: (callerId: 24) in 5 seconds !--- New Probe request update
sent AP about client. Wed Oct 31 10:46:15 2007: 00:1b:77:42:07:69 Association received from
mobile on AP 00:1c:0j:ca:5f:c0 !--- Access point reports an association request from the client.
!--- When the process reaches this point, the client is not excluded and not !--- in mobility
intermediate state Wed Oct 31 10:46:15 2007: 00:1b:77:42:07:69 STA - rates (8): 140 18 152 36
176 72 96 108 0 0 0 0 0 0 0 0 !--- Controller saves the client supported rates into its
connection table. !--- Units are values of 500 kbps, basic (mandatory) rates have the Most
Significant bit (MSb) set. !--- The above would be 6mbps basic, 9, 12 basic, 18, 24 basic, 36,
48, 54 Wed Oct 31 10:46:15 2007: 00:1b:77:42:07:69 Processing WPA IE type 221, length 24 for
mobile 00:1b:77:42:07:69 !--- Controller validates the 802.11i security information element. **PEM**
Process Wed Oct 31 10:46:15 2007: 00:1b:77:42:07:69 0.0.0.0 START (0) Deleted mobile LWAPP rule
on AP [00:1c:0j:ca:5f:c0] !--- As the client requests new association, APF requests to PEM to
delete the !--- client state and remove any traffic forwarding rules that it could have. **APF**
Process Wed Oct 31 10:46:15 2007: 00:1b:77:42:07:69 Updated location for station old AP
00:00:00:00:00:00-0, new AP 00:1c:0j:ca:5f:c0-1 !--- APF updates where this client is located.
For example, this client is !--- a new addition; therefore, no value exists for the old
location. Wed Oct 31 10:46:15 2007: 00:1b:77:42:07:69 0.0.0.0 START (0) Initializing policy !---
PEM notifies that this is a new user. Security policies are checked !--- for enforcement. **PEM**
Process Wed Oct 31 10:46:15 2007: 00:1b:77:42:07:69 0.0.0.0 START (0) Change state to AUTHCHECK
(2) last state AUTHCHECK (2) !--- PEM marks as authentication check needed. Wed Oct 31 10:46:15
2007: 00:1b:77:42:07:69 0.0.0.0 AUTHCHECK (2) Change state to 8021X_REQD (3) last state
8021X_REQD !--- After the WLAN configuration is checked, the client will need either !--- 802.1x
or PSK authentication Wed Oct 31 10:46:15 2007: 00:1b:77:42:07:69 0.0.0.0 8021X_REQD (3) Plumbed
mobile LWAPP rule on AP 00:1c:0j:ca:5f:c0 !--- PEM notifies the LWAPP component to add the new
client on the AP with !--- a list of negotiated capabilities, rates, Qos, etc. **APF Process** Wed
Oct 31 10:46:15 2007: 00:1b:77:42:07:69 apfPemAddUser2 (apf_policy.c:209) Changing state for
mobile 00:1b:77:42:07:69 on AP 00:1c:0j:ca:5f:c0 from Probe to Associated !--- APF notifies that
client has been moved successfully into associated !--- state. Wed Oct 31 10:46:15 2007:
00:1b:77:42:07:69 Stopping deletion of Mobile Station: (callerId: 48) !--- The expiration timer
for client is removed, as now the session timeout !--- is taking place. This is also part of the
above notification !--- (internal code callerId: 48). Wed Oct 31 10:46:15 2007:
00:1b:77:42:07:69 Sending Assoc Response to station on BSSID 00:1c:0j:ca:5f:c0 (status 0) !---
APF builds and sends the association response to client. Wed Oct 31 10:46:15 2007:
00:1b:77:42:07:69 apfProcessAssocReq (apf_80211.c:3838) Changing state for mobile
00:1b:77:42:07:69 on AP 00:1c:0j:ca:5f:c0 from Associated to Associated !--- The association
response was sent successfully; now APF keeps the !--- client in associated state and sets the
association timestamp on this point. **Dot1x Process** Wed Oct 31 10:46:15 2007: 00:1b:77:42:07:69
Creating a new PMK Cache Entry for station 00:1b:77:42:07:69 (RSN 0) !--- APF calls Dot1x to
allocate a new PMK cached entry for the client. !--- RSN is disabled (zero value). Wed Oct 31
10:46:15 2007: 00:1b:77:42:07:69 Initiating WPA PSK to mobile 00:1b:77:42:07:69 !--- Dot1x
signals a new WPA or WPA2 PSK exchange with mobile. Wed Oct 31 10:46:15 2007: 00:1b:77:42:07:69
dot1x - moving mobile 00:1b:77:42:07:69 into Force Auth state !--- As no EAPOL authentication
takes place, the client port is marked as !--- forced Auth. Dot1x performs key negotiation with
PSK clients only. Wed Oct 31 10:46:15 2007: 00:1b:77:42:07:69 Skipping EAP-Success to mobile
00:1b:77:42:07:69 !--- For PSK, CCKM or RSN, the EAP success is not sent to client, as there !---
- was no EAPOL authentication taking place. Wed Oct 31 10:46:15 2007: 00:1b:77:42:07:69 Sending
EAPOL-Key Message to mobile 00:1b:77:42:07:69 state INITPMK (message 1), replay counter
00.00.00.00.00.00.00 !--- Dot1x starts the exchange to arrive into PTK. PMK is known, as this
!--- is PSK auth. First message is ANonce. Wed Oct 31 10:46:15 2007: 00:1b:77:42:07:69 Received
EAPOL-Key from mobile 00:1b:77:42:07:69 !--- Message received from client. Wed Oct 31 10:46:15
2007: 00:1b:77:42:07:69 Received EAPOL-key in PKT_START state (message 2) from mobile
00:1b:77:42:07:69 !--- This signals the start of the validation of the second message !--- from
client (SNonce+MIC). No errors are shown, so process continues. !--- Potential errors at this
point could be: deflection attack (ACK bit !--- not set on key), MIC errors, invalid key type,
invalid key length, etc. Wed Oct 31 10:46:15 2007: 00:1b:77:42:07:69 Stopping retransmission
timer for mobile 00:1b:77:42:07:69 !--- Dot1x got an answer for message 1, so retransmission
timeout is stopped. Wed Oct 31 10:46:15 2007: 00:1b:77:42:07:69 Sending EAPOL-Key Message to
mobile 00:1b:77:42:07:69 state PTKINITNEGOTIATING (message 3), replay counter
00.00.00.00.00.00.00.01 !--- Derive PTK; send GTK + MIC. Wed Oct 31 10:46:15 2007:
00:1b:77:42:07:69 Received EAPOL-Key from mobile 00:1b:77:42:07:69 !--- Message received from
client. Wed Oct 31 10:46:15 2007: 00:1b:77:42:07:69 Received EAPOL-key in PTKINITNEGOTIATING

state (message 4) from mobile 00:1b:77:42:07:69 !--- This signals the start of validation of message 4 (MIC), which !--- means client installed the keys. Potential errors after this message !--- are MIC validation errors, invalid key types, etc. **PEM Process** Wed Oct 31 10:46:15 2007: 00:1b:77:42:07:69 0.0.0.0 8021X_REQD (3) Change state to L2AUTHCOMPLETE (4) last state L2AUTHCOMPLETE (4) !--- PEM receives notification and signals the state machine to change to L2 !--- authentication completed. Wed Oct 31 10:46:15 2007: 00:1b:77:42:07:69 0.0.0.0 L2AUTHCOMPLETE (4) Plumbed mobile LWAPP rule on AP 00:1c:0j:ca:5f:c0 !--- PEM pushes client status and keys to AP through LWAPP component. Wed Oct 31 10:46:15 2007: 00:1b:77:42:07:69 0.0.0.0 L2AUTHCOMPLETE (4) Change state to DHCP_REQD (7) last state DHCP_REQD (7) !--- PEM sets the client on address learning status. Wed Oct 31 10:46:15 2007: 00:1b:77:42:07:69 0.0.0.0 DHCP_REQD (7) pemAdvanceState2 4238, Adding TMP rule !--- PEM signals NPU to allow DHCP/ARP traffic to be inspected by controller !--- for the address learning. Wed Oct 31 10:46:15 2007: 00:1b:77:42:07:69 0.0.0.0 DHCP_REQD (7) Adding Fast Path rule type = Airespace AP - Learn IP address on AP 00:1c:0j:ca:5f:c0, slot 1, interface = 1, QOS = 0 ACL Id = 255, Jumbo Frames = NO, 802.1P = 0, DSCP = 0, TokenID = 5006 !--- Entry is built for client and prepared to be forwarded to NPU. !--- Type is 9 (see the table in the [Client Traffic Forwarding](#) section of !--- this document) to allow controller to learn the IP address. Wed Oct 31 10:46:19 2007: 00:1b:77:42:07:69 0.0.0.0 DHCP_REQD (7) Successfully plumbed mobile rule (ACL ID 255) !--- A new rule is successfully sent to internal queue to add the client !--- to the NPU. **Dot1x Process** Wed Oct 31 10:46:19 2007: 00:1b:77:42:07:69 Stopping retransmission timer for mobile 00:1b:77:42:07:69 !--- Dot1x received message from client. Wed Oct 31 10:46:19 2007: 00:1b:77:42:07:69 Sending EAPOL-Key Message to mobile 00:1b:77:42:07:69 state PTKINITDONE (message 5 - group), replay counter 00.00.00.00.00.00.02 !--- Group key update prepared for client. **PEM Process** Wed Oct 31 10:46:19 2007: 00:1b:77:42:07:69 0.0.0.0 Added NPU entry of type 9 !--- NPU reports that entry of type 9 is added (learning address state). !--- See the table in the [Client Traffic Forwarding](#) section of this document. Wed Oct 31 10:46:19 2007: 00:1b:77:42:07:69 Sent an XID frame !--- No address known yet, so the controller sends only XID frame !--- (destination broadcast, source client address, control 0xAF). **Dot1x Process** Wed Oct 31 10:46:19 2007: 00:1b:77:42:07:69 Sent EAPOL-Key M5 for mobile 00:1b:77:42:07:69 !--- Key update sent. Wed Oct 31 10:46:19 2007: 00:1b:77:42:07:69 Received EAPOL-Key from mobile 00:1b:77:42:07:69 !--- Key received. Wed Oct 31 10:46:19 2007: 00:1b:77:42:07:69 Received EAPOL-key in REKEYNEGOTIATING state (message 6) from mobile 00:1b:77:42:07:69 !--- Successfully received group key update. Wed Oct 31 10:46:19 2007: 00:1b:77:42:07:69 Stopping retransmission timer for mobile 00:1b:77:42:07:69 !--- Group key timeout is removed. **DHCP Process** Wed Oct 31 10:46:19 2007: 00:1b:77:42:07:69 DHCP received op BOOTREQUEST (1) (len 308, port 1, encap 0xec03) !--- First DHCP message received from client. Wed Oct 31 10:46:19 2007: 00:1b:77:42:07:69 DHCP dropping packet due to ongoing mobility handshake exchange, (siaddr 0.0.0.0, mobility state = 'apfMsMmQueryRequested' **PEM Process** Wed Oct 31 10:46:19 2007: 00:1b:77:42:07:69 0.0.0.0 DHCP_REQD (7) mobility role update request from Unassociated to Local Peer = 0.0.0.0, Old Anchor = 0.0.0.0, New Anchor = 192.168.100.11 !--- NPU is notified that this controller is the local anchor, so to !--- terminate any previous mobility tunnel. As this is a new client, !--- old address is empty. Wed Oct 31 10:46:19 2007: 00:1b:77:42:07:69 0.0.0.0 DHCP_REQD (7) State Update from Mobility-Incomplete to Mobility-Complete, mobility role=Local !--- Role change was successful. Wed Oct 31 10:46:19 2007: 00:1b:77:42:07:69 0.0.0.0 DHCP_REQD (7) pemAdvanceState2 3934, Adding TMP rule !--- Adding temporary rule to NPU for address learning now with new mobility !--- role as local controller. Wed Oct 31 10:46:19 2007: 00:1b:77:42:07:69 0.0.0.0 DHCP_REQD (7) Replacing Fast Path rule type = Airespace AP - Learn IP address on AP 00:1c:0j:ca:5f:c0, slot 1, interface = 1, QOS = 0 ACL Id = 255, Jumbo Frames = NO, 802.1P = 0, DSCP = 0, TokenID = 5006 !--- Entry is built. Wed Oct 31 10:46:19 2007: 00:1b:77:42:07:69 0.0.0.0 DHCP_REQD (7) Successfully plumbed mobile rule (ACL ID 255) !--- A new rule is successfully sent to internal queue to add the !--- client to the NPU. Wed Oct 31 10:46:19 2007: 00:1b:77:42:07:69 0.0.0.0 Added NPU entry of type 9 !--- Client is on address learning state; see the table in the !--- [Client Traffic Forwarding](#) section of this document. Now mobility !--- has finished. Wed Oct 31 10:46:19 2007: 00:1b:77:42:07:69 Sent an XID frame !--- No address known yet, so controller sends only XID frame (destination !--- broadcast, source client address, control 0xAF). **DHCP Process** Wed Oct 31 10:46:21 2007: 00:1b:77:42:07:69 DHCP received op BOOTREQUEST (1) (len 308, port 1, encap 0xec03) !--- DHCP request from client. Wed Oct 31 10:46:21 2007: 00:1b:77:42:07:69 DHCP selecting relay 1 - control block settings: dhcpServer: 0.0.0.0, dhcpNetmask: 0.0.0.0, dhcpGateway: 0.0.0.0, dhcpRelay: 0.0.0.0 VLAN: 0 !--- Based on the WLAN configuration, the controller selects the identity to !--- use to relay the DHCP messages. Wed Oct 31 10:46:21 2007: 00:1b:77:42:07:69 DHCP selected relay 1 - 192.168.100.254 (local address 192.168.100.11, gateway 192.168.100.254, VLAN 100, port 1) !--- Interface selected. Wed Oct 31 10:46:21 2007: 00:1b:77:42:07:69 DHCP transmitting DHCP DISCOVER (1) Wed Oct 31 10:46:21 2007: 00:1b:77:42:07:69 DHCP op: BOOTREQUEST, htype: Ethernet, hlen: 6, hops: 1

Wed Oct 31 10:46:21 2007: 00:1b:77:42:07:69 DHCP xid: 0xd3d3b6e9 (3553867497), secs: 1024, flags: 0 Wed Oct 31 10:46:21 2007: 00:1b:77:42:07:69 DHCP chaddr: 00:1b:77:42:07:69 Wed Oct 31 10:46:21 2007: 00:1b:77:42:07:69 DHCP ciaddr: 0.0.0.0, yiaddr: 0.0.0.0 Wed Oct 31 10:46:21 2007: 00:1b:77:42:07:69 DHCP siaddr: 0.0.0.0, giaddr: 192.168.100.11 *!--- Debug parsing of the frame sent. The most important fields are included.* Wed Oct 31 10:46:21 2007: 00:1b:77:42:07:69 DHCP sending REQUEST to 192.168.100.254 (len 350, port 1, vlan 100) *!--- DHCP request forwarded.* Wed Oct 31 10:46:21 2007: 00:1b:77:42:07:69 DHCP selecting relay 2 - control block settings: dhcpServer: 0.0.0.0, dhcpNetmask: 0.0.0.0, dhcpGateway: 0.0.0.0, dhcpRelay: 192.168.100.11 VLAN: 100 Wed Oct 31 10:46:21 2007: 00:1b:77:42:07:69 DHCP selected relay 2 ? NONE *!--- No secondary server configured, so no additional DHCP request are !--- prepared (configuration dependant).* Wed Oct 31 10:46:21 2007: 00:1b:77:42:07:69 DHCP received op BOOTREPLY (2) (len 308, port 1, encap 0xec00) Wed Oct 31 10:46:21 2007: 00:1b:77:42:07:69 DHCP setting server from OFFER (server 192.168.100.254, yiaddr 192.168.100.105) *!--- DHCP received for a known server. Controller discards any offer not on !--- the DHCP server list for the WLAN/Interface.* Wed Oct 31 10:46:21 2007: 00:1b:77:42:07:69 DHCP sending REPLY to STA (len 416, port 1, vlan 100) *!--- After building the DHCP reply for client, it is sent to AP for forwarding.* Wed Oct 31 10:46:21 2007: 00:1b:77:42:07:69 DHCP transmitting DHCP OFFER (2) Wed Oct 31 10:46:21 2007: 00:1b:77:42:07:69 DHCP op: BOOTREPLY, htype: Ethernet, hlen: 6, hops: 0 Wed Oct 31 10:46:21 2007: 00:1b:77:42:07:69 DHCP xid: 0xd3d3b6e9 (3553867497), secs: 0, flags: 0 Wed Oct 31 10:46:21 2007: 00:1b:77:42:07:69 DHCP chaddr: 00:1b:77:42:07:69 Wed Oct 31 10:46:21 2007: 00:1b:77:42:07:69 DHCP ciaddr: 0.0.0.0, yiaddr: 192.168.100.105 Wed Oct 31 10:46:21 2007: 00:1b:77:42:07:69 DHCP siaddr: 0.0.0.0, giaddr: 0.0.0.0 Wed Oct 31 10:46:21 2007: 00:1b:77:42:07:69 DHCP server id: 1.1.1.1 rcvd server id: 192.168.100.254 *!--- Debug parsing of the frame sent. The most important fields are included.* Wed Oct 31 10:46:21 2007: 00:1b:77:42:07:69 DHCP received op BOOTREQUEST (1) (len 316, port 1, encap 0xec03) *!--- Client answers* Wed Oct 31 10:46:25 2007: 00:1b:77:42:07:69 DHCP selecting relay 1 - control block settings: dhcpServer: 192.168.100.254, dhcpNetmask: 0.0.0.0, dhcpGateway: 0.0.0.0, dhcpRelay: 192.168.100.11 VLAN: 100 Wed Oct 31 10:46:25 2007: 00:1b:77:42:07:69 DHCP selected relay 1 - 192.168.100.254 (local address 192.168.100.11, gateway 192.168.100.254, VLAN 100, port 1) *!--- DHCP relay selected per WLAN config* Wed Oct 31 10:46:25 2007: 00:1b:77:42:07:69 DHCP transmitting DHCP REQUEST (3) Wed Oct 31 10:46:25 2007: 00:1b:77:42:07:69 DHCP op: BOOTREQUEST, htype: Ethernet, hlen: 6, hops: 1 Wed Oct 31 10:46:25 2007: 00:1b:77:42:07:69 DHCP xid: 0xd3d3b6e9 (3553867497), secs: 1024, flags: 0 Wed Oct 31 10:46:25 2007: 00:1b:77:42:07:69 DHCP chaddr: 00:1b:77:42:07:69 Wed Oct 31 10:46:25 2007: 00:1b:77:42:07:69 DHCP ciaddr: 0.0.0.0, yiaddr: 0.0.0.0 Wed Oct 31 10:46:25 2007: 00:1b:77:42:07:69 DHCP siaddr: 0.0.0.0, giaddr: 192.168.100.11 Wed Oct 31 10:46:25 2007: 00:1b:77:42:07:69 DHCP requested ip: 192.168.100.105 Wed Oct 31 10:46:25 2007: 00:1b:77:42:07:69 DHCP server id: 192.168.100.254 rcvd server id: 1.1.1.1 *!--- Debug parsing of the frame sent. The most important fields are included.* Wed Oct 31 10:46:25 2007: 00:1b:77:42:07:69 DHCP sending REQUEST to 192.168.100.254 (len 358, port 1, vlan 100) *!--- Request sent to server.* Wed Oct 31 10:46:25 2007: 00:1b:77:42:07:69 DHCP selecting relay 2 - control block settings: dhcpServer: 192.168.100.254, dhcpNetmask: 0.0.0.0, dhcpGateway: 0.0.0.0, dhcpRelay: 192.168.100.11 VLAN: 100 Wed Oct 31 10:46:25 2007: 00:1b:77:42:07:69 DHCP selected relay 2 ? NONE *!--- No other DHCP server configured.* Wed Oct 31 10:46:25 2007: 00:1b:77:42:07:69 DHCP received op BOOTREPLY (2) (len 308, port 1, encap 0xec00) *!--- Server sends a DHCP reply, most probably an ACK (see below). PEM Process* Wed Oct 31 10:46:25 2007: 00:1b:77:42:07:69 192.168.100.105 DHCP_REQD (7) Change state to RUN (20) last state RUN (20) *!--- DHCP negotiation successful, address is now known, and client !--- is moved to RUN status.* Wed Oct 31 10:46:25 2007: 00:1b:77:42:07:69 192.168.100.105 RUN (20) Reached PLUMBFASTPATH: from line 4699 *!--- No L3 security; client entry is sent to NPU.* Wed Oct 31 10:46:25 2007: 00:1b:77:42:07:69 192.168.100.105 RUN (20) Replacing Fast Path rule type = Airespace AP Client on AP 00:1c:0j:ca:5f:c0, slot 1, interface = 1, QOS = 0 ACL Id = 255, Jumbo Frames = NO, 802.1P = 0, DSCP = 0, TokenID = 5006 Wed Oct 31 10:46:25 2007: 00:1b:77:42:07:69 192.168.100.105 RUN (20) Successfully plumbed mobile rule (ACL ID 255) **DHCP Process** Wed Oct 31 10:46:25 2007: 00:1b:77:42:07:69 Assigning Address 192.168.100.105 to mobile Wed Oct 31 10:46:25 2007: 00:1b:77:42:07:69 DHCP sending REPLY to STA (len 416, port 1, vlan 100) Wed Oct 31 10:46:25 2007: 00:1b:77:42:07:69 DHCP transmitting DHCP ACK (5) Wed Oct 31 10:46:25 2007: 00:1b:77:42:07:69 DHCP op: BOOTREPLY, htype: Ethernet, hlen: 6, hops: 0 Wed Oct 31 10:46:25 2007: 00:1b:77:42:07:69 DHCP xid: 0xd3d3b6e9 (3553867497), secs: 0, flags: 0 Wed Oct 31 10:46:25 2007: 00:1b:77:42:07:69 DHCP chaddr: 00:1b:77:42:07:69 Wed Oct 31 10:46:25 2007: 00:1b:77:42:07:69 DHCP ciaddr: 0.0.0.0, yiaddr: 192.168.100.105 Wed Oct 31 10:46:25 2007: 00:1b:77:42:07:69 DHCP siaddr: 0.0.0.0, giaddr: 0.0.0.0 Wed Oct 31 10:46:25 2007: 00:1b:77:42:07:69 DHCP server id: 1.1.1.1 rcvd server id: 192.168.100.254 **PEM Process** Wed Oct 31 10:46:25 2007: 00:1b:77:42:07:69 192.168.100.105 Added NPU entry of type 1 *!--- Client is now successfully associated to controller. !--- Type is 1; see the table in the [Client Traffic Forwarding](#) !--- section of this document.* Wed Oct 31 10:46:25 2007: 00:1b:77:42:07:69 Sending a

gratuitous ARP for 192.168.100.105, VLAN Id 100 !--- As address is known, gratuitous ARP is sent to notify.

故障排除示例

客户端密码配置错误

此示例显示了一个具有不同 AP 功能的客户端。该客户端正在探测 SSID，但由于探测请求显示了一些不受支持的参数，该客户端不会进入到认证/关联阶段。具体而言，所产生的问题是使用 WPA 的客户端与通告仅支持 WPA2 的 AP 之间存在不匹配：

```
Wed Oct 31 10:51:37 2007: 00:1b:77:42:07:69 Scheduling deletion of Mobile
Station: (callerId: 23) in 5 seconds
Wed Oct 31 10:51:37 2007: 00:1b:77:42:07:69 apfProcessProbeReq
(apf_80211.c:4057) Changing state for mobile 00:1b:77:42:07:69 on AP
00:1c:b0:ea:5f:c0 from Idle to Probe
!--- Controller adds the new client, moving into probing status Wed Oct 31 10:51:37 2007:
00:1b:77:42:07:69 Scheduling deletion of Mobile Station: (callerId: 24) in 5 seconds Wed Oct 31
10:51:38 2007: 00:1b:77:42:07:69 Scheduling deletion of Mobile Station: (callerId: 24) in 5
seconds Wed Oct 31 10:51:38 2007: 00:1b:77:42:07:69 Scheduling deletion of Mobile Station:
(callerId: 24) in 5 seconds !--- AP is reporting probe activity every 500 ms as configured

Wed Oct 31 10:51:41 2007: 00:1b:77:42:07:69 Scheduling deletion of Mobile
Station: (callerId: 24) in 5 seconds
Wed Oct 31 10:51:41 2007: 00:1b:77:42:07:69 Scheduling deletion of Mobile
Station: (callerId: 24) in 5 seconds
Wed Oct 31 10:51:41 2007: 00:1b:77:42:07:69 Scheduling deletion of Mobile
Station: (callerId: 24) in 5 seconds
Wed Oct 31 10:51:41 2007: 00:1b:77:42:07:69 Scheduling deletion of Mobile
Station: (callerId: 24) in 5 seconds
Wed Oct 31 10:51:44 2007: 00:1b:77:42:07:69 Scheduling deletion of Mobile
Station: (callerId: 24) in 5 seconds
Wed Oct 31 10:51:44 2007: 00:1b:77:42:07:69 Scheduling deletion of Mobile
Station: (callerId: 24) in 5 seconds
Wed Oct 31 10:51:44 2007: 00:1b:77:42:07:69 Scheduling deletion of Mobile
Station: (callerId: 24) in 5 seconds
Wed Oct 31 10:51:44 2007: 00:1b:77:42:07:69 Scheduling deletion of Mobile
Station: (callerId: 24) in 5 seconds
Wed Oct 31 10:51:49 2007: 00:1b:77:42:07:69 apfMsExpireCallback (apf_ms.c:433)
Expiring Mobile!
Wed Oct 31 10:51:49 2007: 00:1b:77:42:07:69 0.0.0.0 START (0) Deleted mobile
LWAPP rule on AP [00:1c:b0:ea:5f:c0]
Wed Oct 31 10:51:49 2007: 00:1b:77:42:07:69 Deleting mobile on AP
00:1c:b0:ea:5f:c0(0)
!--- After 5 seconds of inactivity, client is deleted, never moved into !--- authentication or
association phases.
```

预共享密钥错误

以下输出显示客户端正在尝试通过 WPA-PSK 向基础设施进行认证，但因客户端与控制器之间的预共享密钥不匹配而失败，从而造成将该客户端最终列入黑名单：

```
Wed Oct 31 10:55:55 2007: 00:1b:77:42:07:69 Adding mobile on LWAPP AP
00:1c:b0:ea:5f:c0(0)
Wed Oct 31 10:55:55 2007: 00:1b:77:42:07:69 Scheduling deletion of Mobile
Station: (callerId: 23) in 5 seconds
Wed Oct 31 10:55:55 2007: 00:1b:77:42:07:69 apfProcessProbeReq (apf_80211.c:
4057) Changing state for mobile 00:1b:77:42:07:69 on AP 00:1c:b0:ea:5f:c0
from Idle to Probe
Wed Oct 31 10:55:55 2007: 00:1b:77:42:07:69 Scheduling deletion of Mobile
```

Station: (callerId: 24) in 5 seconds
Wed Oct 31 10:55:55 2007: 00:1b:77:42:07:69 Association received from mobile
on AP 00:1c:b0:ea:5f:c0
Wed Oct 31 10:55:55 2007: 00:1b:77:42:07:69 STA - rates (8): 130 132 139 150
12 18 24 36 0 0 0 0 0 0
Wed Oct 31 10:55:55 2007: 00:1b:77:42:07:69 STA - rates (12): 130 132 139 150
12 18 24 36 48 72 96 108 0 0 0 0
Wed Oct 31 10:55:55 2007: 00:1b:77:42:07:69 Processing WPA IE type 221,
length 24 for mobile 00:1b:77:42:07:69
Wed Oct 31 10:55:55 2007: 00:1b:77:42:07:69 0.0.0.0 START (0)
Initializing policy
Wed Oct 31 10:55:55 2007: 00:1b:77:42:07:69 0.0.0.0 START (0) Change state to
AUTHCHECK (2) last state AUTHCHECK (2)
Wed Oct 31 10:55:55 2007: 00:1b:77:42:07:69 0.0.0.0 AUTHCHECK (2) Change
state to 8021X_REQD (3) last state 8021X_REQD (3)
Wed Oct 31 10:55:55 2007: 00:1b:77:42:07:69 0.0.0.0 8021X_REQD (3) Plumbed
mobile LWAPP rule on AP 00:1c:b0:ea:5f:c0
Wed Oct 31 10:55:55 2007: 00:1b:77:42:07:69 apfPemAddUser2 (apf_policy.c:209)
Changing state for mobile 00:1b:77:42:07:69 on AP 00:1c:b0:ea:5f:c0 from
Probe to Associated
Wed Oct 31 10:55:55 2007: 00:1b:77:42:07:69 Stopping deletion of Mobile
Station: (callerId: 48)
Wed Oct 31 10:55:55 2007: 00:1b:77:42:07:69 Sending Assoc Response to station
on BSSID 00:1c:b0:ea:5f:c0 (status 0)
Wed Oct 31 10:55:55 2007: 00:1b:77:42:07:69 apfProcessAssocReq (apf_80211.c:
3838) Changing state for mobile 00:1b:77:42:07:69 on AP 00:1c:b0:ea:5f:c0
from Associated to Associated
Wed Oct 31 10:55:55 2007: 00:1b:77:42:07:69 Creating a new PMK Cache Entry
for station 00:1b:77:42:07:69 (RSN 0)
Wed Oct 31 10:55:55 2007: 00:1b:77:42:07:69 Initiating WPA PSK to mobile
00:1b:77:42:07:69
Wed Oct 31 10:55:55 2007: 00:1b:77:42:07:69 dot1x - moving mobile
00:1b:77:42:07:69 into Force Auth state
Wed Oct 31 10:55:55 2007: 00:1b:77:42:07:69 Skipping EAP-Success to mobile
00:1b:77:42:07:69
Wed Oct 31 10:55:55 2007: 00:1b:77:42:07:69 Sending EAPOL-Key Message to
mobile 00:1b:77:42:07:69
state INITPMK (message 1), replay counter 00.00.00.00.00.00.00.00
Wed Oct 31 10:55:55 2007: 00:1b:77:42:07:69 Received EAPOL-Key from mobile
00:1b:77:42:07:69
Wed Oct 31 10:55:55 2007: 00:1b:77:42:07:69 Received EAPOL-key in PKT_START
state (message 2) from mobile 00:1b:77:42:07:69
Wed Oct 31 10:55:55 2007: 00:1b:77:42:07:69 Received EAPOL-key M2 with
invalid MIC from mobile 00:1b:77:42:07:69
Wed Oct 31 10:55:56 2007: 00:1b:77:42:07:69 802.1x 'timeoutEvt' Timer expired
for station 00:1b:77:42:07:69
Wed Oct 31 10:55:56 2007: 00:1b:77:42:07:69 Retransmit 1 of EAPOL-Key M1
(length 99) for mobile 00:1b:77:42:07:69
Wed Oct 31 10:55:56 2007: 00:1b:77:42:07:69 Received EAPOL-Key from mobile
00:1b:77:42:07:69
Wed Oct 31 10:55:56 2007: 00:1b:77:42:07:69 Received EAPOL-key in PKT_START
state (message 2) from mobile 00:1b:77:42:07:69
Wed Oct 31 10:55:56 2007: 00:1b:77:42:07:69 Received EAPOL-key M2 with invalid
MIC from mobile 00:1b:77:42:07:69
!--- MIC error due to wrong preshared key Wed Oct 31 10:55:57 2007: 00:1b:77:42:07:69 802.1x
'timeoutEvt' Timer expired for station 00:1b:77:42:07:69 Wed Oct 31 10:55:57 2007:
00:1b:77:42:07:69 Retransmit 2 of EAPOL-Key M1 (length 99) for mobile 00:1b:77:42:07:69 Wed Oct
31 10:55:57 2007: 00:1b:77:42:07:69 Received EAPOL-Key from mobile 00:1b:77:42:07:69 Wed Oct 31
10:55:57 2007: 00:1b:77:42:07:69 Received EAPOL-key in PKT_START state (message 2) from mobile
00:1b:77:42:07:69 Wed Oct 31 10:55:57 2007: 00:1b:77:42:07:69 Received EAPOL-key M2 with invalid
MIC from mobile 00:1b:77:42:07:69 Wed Oct 31 10:55:58 2007: 00:1b:77:42:07:69 802.1x
'timeoutEvt' Timer expired for station 00:1b:77:42:07:69 Wed Oct 31 10:55:58 2007:
00:1b:77:42:07:69 Retransmit failure for EAPOL-Key M1 to mobile 00:1b:77:42:07:69, retransmit
count 3, mscb deauth count 0 Wed Oct 31 10:55:58 2007: 00:1b:77:42:07:69 Sent Deauthenticate to

mobile on BSSID 00:1c:b0:ea:5f:c0 slot 0(caller lx_ptsm.c:462) *!--- Client is deauthenticated, after three retries !--- The process is repeated three times, until client is blacklisted* Wed Oct 31 10:56:10 2007: 00:1b:77:42:07:69 Blacklisting (if enabled) mobile 00:1b:77:42:07:69 Wed Oct 31 10:56:10 2007: 00:1b:77:42:07:69 apfBlacklistMobileStationEntry2 (apf_ms.c:3560) Changing state for mobile 00:1b:77:42:07:69 on AP 00:1c:b0:ea:5f:c0 from Associated to Exclusion-list (1) Wed Oct 31 10:56:10 2007: 00:1b:77:42:07:69 Scheduling deletion of Mobile Station: (callerId: 44) in 10 seconds Wed Oct 31 10:56:10 2007: 00:1b:77:42:07:69 0.0.0.0 8021X_REQD (3) Change state to START (0) last state 8021X_REQD (3) Wed Oct 31 10:56:10 2007: 00:1b:77:42:07:69 0.0.0.0 START (0) Reached FAILURE: from line 3522 Wed Oct 31 10:56:10 2007: 00:1b:77:42:07:69 Scheduling deletion of Mobile Station: (callerId: 9) in 10 seconds

[相关信息](#)

- [轻量接入点常见问题](#)
- [无线 LAN 控制器 \(WLC\) 故障排除常见问题](#)
- [Cisco 无线 LAN 控制器模块问题与解答](#)
- [无线局域网控制器\(WLC\)常见问题](#)
- [统一无线网络中的无线电资源管理](#)
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