解密802.1X SSID中的无线数据包捕获

目录

简介

本文档介绍如何使用Catalyst 9800 WLC上提供的故障排除工具解密802.1X WLAN的空口数据包捕获。

先决条件

要求

Cisco 建议您了解以下主题：

- 如何在Catalyst 9800 WLC中配置802.1X WLAN
- 如何在Catalyst 9800 WLC中启用条件调试的情况下进行放射性跟踪
- 如何在嗅探器模式下使用接入点或Macbook及其无线诊断工具进行空中数据包捕获

使用的组件

本文档中的信息基于以下软件和硬件版本：

- Catalyst 9800-L WLC、Cisco IOS® XE Cupertino 17.9.3
- 嗅探器模式下的Catalyst 9130AX接入点
- 思科ISE版本3.3
- Wireshark 4.0.8

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。

背景信息

一旦通过EAP+8021X验证身份，无线流量就会使用从请求方和身份验证方之间的握手生成的成对临时密钥(PTK)加密，使用成对主密钥(PMK)进行计算。此PMK派生自主会话密钥(MSK)。MSK包含在RADIUS访问接受消息的属性值对中（使用RADIUS共享密钥加密）。因此，即使四次握手被第三方拦截，也无法通过空中数据包捕获透明地看到流量。

通常，PMK的生成意味着有线网络中捕获的数据包、了解RADIUS共享密钥以及一些用于提取兴趣值的编码。相反，通过这种方法，可以使用可用于Catalyst 9800 WLC上故障排除的工具之一（放射性跟踪）来获取MSK，然后将其用于任何众所周知的数据包分析工具（例如Wireshark）。
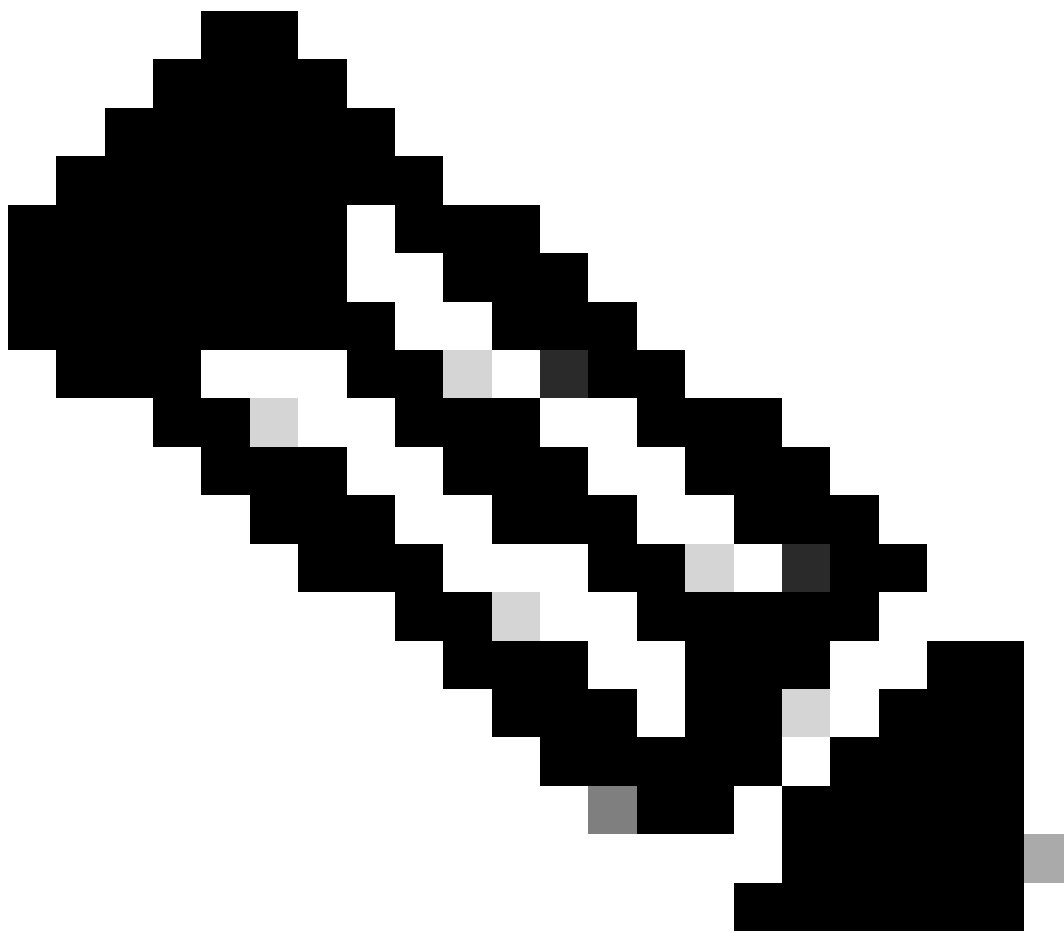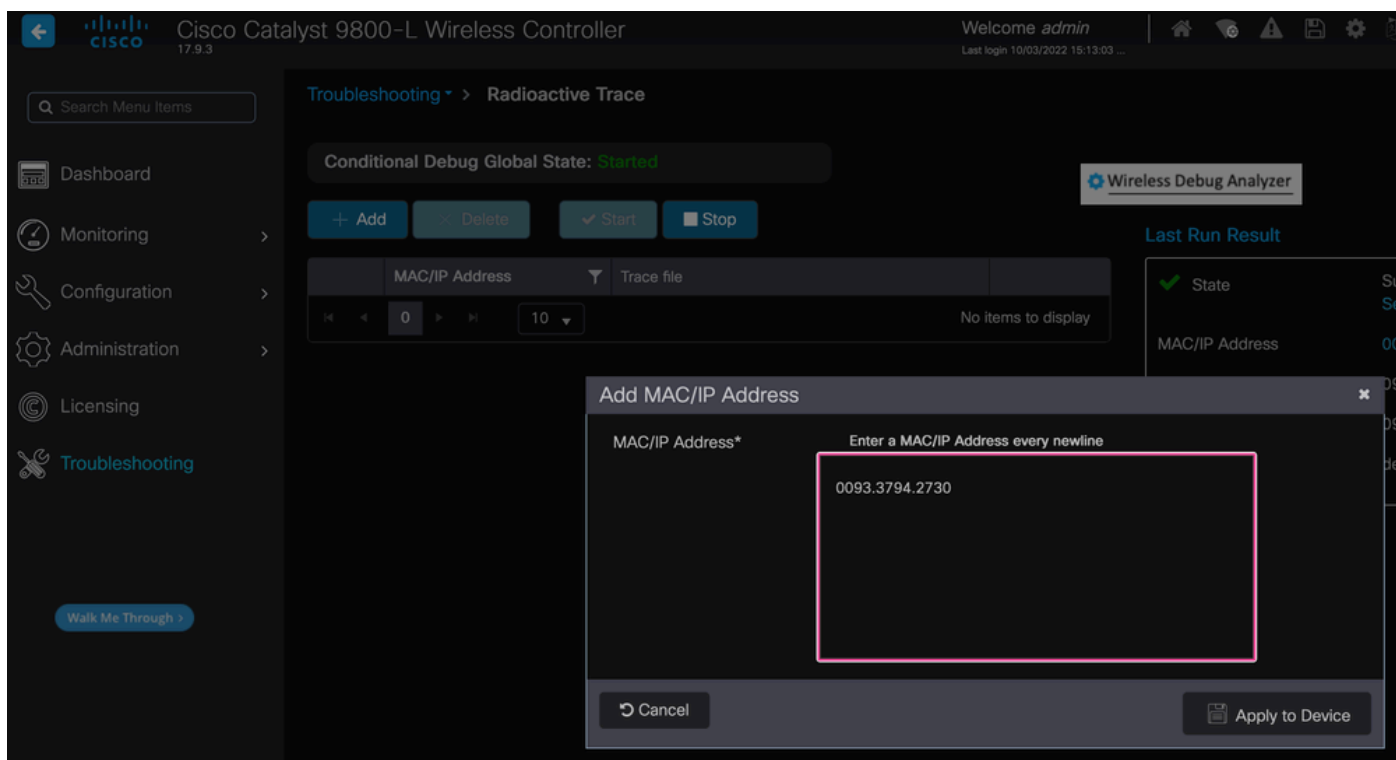

注意：此过程仅适用于WPA2，因为计算成对临时密钥(PTK)所需的信息会通过四次握手在空中交换。相反，在WPA3中，对等同时身份验证(SAE)通过所谓的蜻蜓握手来执行。

配置

步骤1:启动目标终端的放射性跟踪

在您的Catalyst 9800 WLC上，转到故障排除>放射性跟踪，并单击Add按钮，键入要解密其流量的设备的MAC地址。

添加到放射性踪迹列表的MAC地址

添加完成后，请确保单击列表顶部的Start按钮以启用Conditional Debug。这允许您查看数据平面（MSK位于此处）交换的信息。
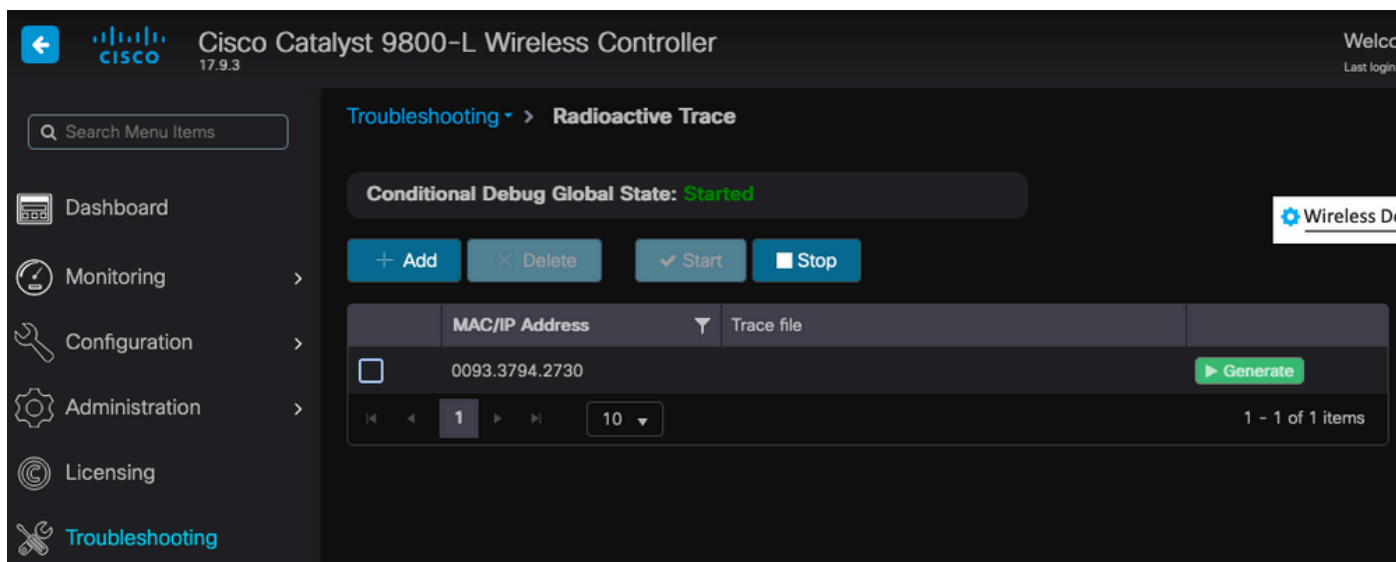
设备已添加到放射性跟踪列表，并且启用了条件调试。

注意：如果您不启用条件调试，则只能看到控制平面中的流量，这还不包括MSK。有关此过程的详细信息，请参阅Catalyst 9800 WLC故障排除文档上的调试和日志收集的条件调试和放射性跟踪部分。

第二步：获取空中数据包捕获

开始空中数据包捕获，并将您的终端连接到802.1X WLAN。

您可以在嗅探器模式下使用接入点或使用Macbook内置无线诊断工具来获取此空中数据包捕获。

注意：确保数据包捕获包括所有802.11帧。最重要的是，在此过程中必须捕获四次握手。

观察通过四次握手的所有流量（数据包475至478）如何加密。

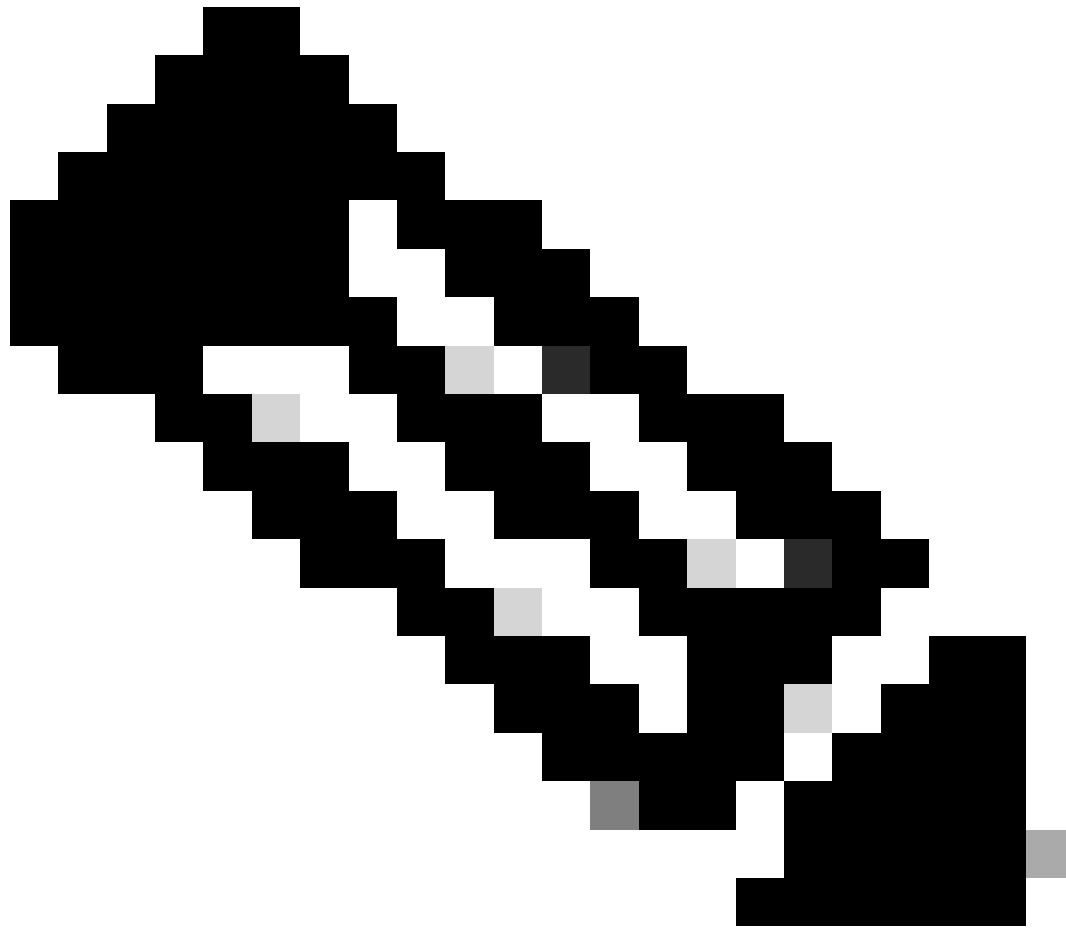| No.	Time	Time delta from	Source	Destination	Protocol	Length	Signal streng	Signal/nois	Info
449	14:12:10.052518	0.001339000	IntelCor_94:27:30	Cisco_aa:18:8f	802.11	248	-59 dBm	35 dB	Reassociation Request, SN=22, FN=0, Flags=........C, SSID="ota-dot1x"
450	14:12:10.056200	0.003682000	Cisco_aa:18:8f	IntelCor_94:27:30	802.11	227	-34 dBm	60 dB	Reassociation Response, SN=3741, FN=0, Flags=........C
451	14:12:10.058303	0.002103000	IntelCor_94:27:30	Cisco_aa:18:8f	802.11	93	-59 dBm	35 dB	Action, SN=23, FN=0, Flags=........C
452	14:12:10.059417	0.001114000	Cisco_aa:18:8f	IntelCor_94:27:30	EAP	109	-34 dBm	60 dB	Request, Identity
453	14:12:10.108429	0.049012000	IntelCor_94:27:30	Cisco_aa:18:8f	EAP	146	-59 dBm	35 dB	Response, Identity
454	14:12:10.116900	0.008480000	Cisco_aa:18:8f	IntelCor_94:27:30	EAP	110	-34 dBm	60 dB	Request, TLS EAP (EAP-TLS)
455	14:12:10.119150	0.002241000	IntelCor_94:27:30	Cisco_aa:18:8f	EAP	146	-59 dBm	35 dB	Response, Legacy Nak (Response Only)
456	14:12:10.122792	0.003642000	Cisco_aa:18:8f	IntelCor_94:27:30	EAP	110	-33 dBm	61 dB	Request, Protected EAP (EAP-PEAP)
457	14:12:10.124621	0.001829000	IntelCor_94:27:30	Cisco_aa:18:8f	TLSv1.2	330	-60 dBm	34 dB	Encrypted Handshake Message
458	14:12:10.166650	0.042029000	Cisco_aa:18:8f	IntelCor_94:27:30	EAP	1116	-33 dBm	61 dB	Request, Protected EAP (EAP-PEAP)
459	14:12:10.170039	0.003389000	IntelCor_94:27:30	Cisco_aa:18:8f	EAP	146	-59 dBm	35 dB	Response, Protected EAP (EAP-PEAP)
460	14:12:10.175814	0.005775000	Cisco_aa:18:8f	IntelCor_94:27:30	EAP	1112	-34 dBm	60 dB	Request, Protected EAP (EAP-PEAP)
461	14:12:10.180069	0.004255000	IntelCor_94:27:30	Cisco_aa:18:8f	EAP	146	-59 dBm	35 dB	Response, Protected EAP (EAP-PEAP)
462	14:12:10.182929	0.002860000	Cisco_aa:18:8f	IntelCor_94:27:30	TLSv1.2	268	-34 dBm	60 dB	Server Hello, Certificate, Server Key Exchange, Server Hello Done
463	14:12:10.236135	0.053206000	IntelCor_94:27:30	Cisco_aa:18:8f	TLSv1.2	308	-60 dBm	34 dB	Encrypted Handshake Message, Change Cipher Spec, Encrypted Handshake Message
464	14:12:10.244438	0.008303000	Cisco_aa:18:8f	IntelCor_94:27:30	TLSv1.2	161	-34 dBm	60 dB	Change Cipher Spec, Encrypted Handshake Message
465	14:12:10.248078	0.003640000	IntelCor_94:27:30	Cisco_aa:18:8f	EAP	146	-60 dBm	34 dB	Response, Protected EAP (EAP-PEAP)
466	14:12:10.251302	0.003224000	Cisco_aa:18:8f	IntelCor_94:27:30	TLSv1.2	144	-34 dBm	60 dB	Application Data
467	14:12:10.259110	0.007808000	IntelCor_94:27:30	Cisco_aa:18:8f	TLSv1.2	149	-60 dBm	34 dB	Application Data
468	14:12:10.263865	0.004755000	Cisco_aa:18:8f	IntelCor_94:27:30	TLSv1.2	175	-34 dBm	60 dB	Application Data
469	14:12:10.271714	0.007849000	IntelCor_94:27:30	Cisco_aa:18:8f	TLSv1.2	203	-60 dBm	34 dB	Application Data
470	14:12:10.285280	0.013566000	Cisco_aa:18:8f	IntelCor_94:27:30	TLSv1.2	190	-33 dBm	61 dB	Application Data
471	14:12:10.287513	0.002233000	IntelCor_94:27:30	Cisco_aa:18:8f	TLSv1.2	146	-60 dBm	34 dB	Application Data
472	14:12:10.291081	0.003568000	Cisco_aa:18:8f	IntelCor_94:27:30	TLSv1.2	143	-34 dBm	60 dB	Application Data
473	14:12:10.294213	0.003132000	IntelCor_94:27:30	Cisco_aa:18:8f	EAP	146	-60 dBm	34 dB	Response, Protected EAP (EAP-PEAP)
474	14:12:10.315016	0.020803000	Cisco_aa:18:8f	IntelCor_94:27:30	EAP	108	-33 dBm	61 dB	Success
475	14:12:10.316556	0.001540000	Cisco_aa:18:8f	IntelCor_94:27:30	EAPOL	221	-34 dBm	60 dB	Key (Message 1 of 4)
476	14:12:10.321017	0.004461000	IntelCor_94:27:30	Cisco_aa:18:8f	EAPOL	223	-60 dBm	34 dB	Key (Message 2 of 4)
477	14:12:10.322061	0.001044000	Cisco_aa:18:8f	IntelCor_94:27:30	EAPOL	255	-34 dBm	60 dB	Key (Message 3 of 4)
478	14:12:10.323817	0.001756000	IntelCor_94:27:30	Cisco_aa:18:8f	EAPOL	199	-60 dBm	34 dB	Key (Message 4 of 4)
479	14:12:10.324699	0.000882000	Cisco_aa:18:8f	IntelCor_94:27:30	802.11	148	-34 dBm	60 dB	Action, SN=24, FN=0, Flags=........C, Dialog Token=3
480	14:12:10.325899	0.001200000	Cisco_aa:18:8f	IntelCor_94:27:30	802.11	148	-34 dBm	60 dB	Action, SN=3746, FN=0, Flags=........C, Dialog Token=3
481	14:12:10.334956	0.009057000	IntelCor_94:27:30	IPv6mcast_02	802.11	207	-61 dBm	33 dB	QoS Data, SN=13, FN=0, Flags=.p.....TC
482	14:12:10.348407	0.013451000	IntelCor_94:27:30	Broadcast	802.11	197	-61 dBm	33 dB	QoS Data, SN=14, FN=0, Flags=.p.....TC
483	14:12:10.348903	0.000496000	Cisco_aa:18:8f	IntelCor_94:27:30	802.11	99	-34 dBm	60 dB	Action, SN=3747, FN=0, Flags=........C, Dialog Token=90
484	14:12:10.349222	0.000319000	Cisco_3f:80:f1	IntelCor_94:27:30	802.11	197	-30 dBm	64 dB	QoS Data, SN=0, FN=0, Flags=.p....F.C
485	14:12:10.349623	0.000401000	IntelCor_94:27:30	Cisco_aa:18:8f	802.11	99	-60 dBm	34 dB	Action, SN=25, FN=0, Flags=........C, Dialog Token=90
486	14:12:10.350046	0.000423000	IntelCor_94:27:30	Cisco_3f:80:f1	802.11	220	-61 dBm	33 dB	QoS Data, SN=15, FN=0, Flags=.p.....TC
487	14:12:10.530286	0.180240000	IntelCor_94:27:30	Cisco_3f:80:f1	802.11	206	-61 dBm	33 dB	QoS Data, SN=16, FN=0, Flags=.p.....TC
488	14:12:10.616297	0.086011000	Cisco_3f:80:f1	IntelCor_94:27:30	802.11	222	-30 dBm	64 dB	QoS Data, SN=1, FN=0, Flags=.p....F.C
489	14:12:10.623163	0.006866000	IntelCor_94:27:30	IPv4mcast_16	802.11	199	-61 dBm	33 dB	QoS Data, SN=17, FN=0, Flags=.p.....TC
490	14:12:10.623515	0.000352000	IntelCor_94:27:30	IPv6mcast_16	802.11	267	-61 dBm	33 dB	QoS Data, SN=18, FN=0, Flags=.p.....TC
491	14:12:10.623890	0.000375000	IntelCor_94:27:30	Cisco_3f:80:f1	802.11	243	-61 dBm	33 dB	QoS Data, SN=19, FN=0, Flags=.p.....TC
492	14:12:10.625663	0.001773000	Cisco_3f:80:f1	IntelCor_94:27:30	802.11	207	-30 dBm	64 dB	QoS Data, SN=2, FN=0, Flags=.p....F.C
493	14:12:10.627395	0.001732000	IntelCor_94:27:30	Cisco_3f:80:f1	802.11	243	-61 dBm	33 dB	QoS Data, SN=20, FN=0, Flags=.p.....TC
494	14:12:10.628807	0.001412000	Cisco_3f:80:f1	IntelCor_94:27:30	802.11	207	-30 dBm	64 dB	QoS Data, SN=3, FN=0, Flags=.p....F.C
495	14:12:10.632290	0.003483000	IntelCor_94:27:30	Cisco_3f:80:f1	802.11	243	-61 dBm	33 dB	QoS Data, SN=21, FN=0, Flags=.p.....TC
496	14:12:10.632626	0.000336000	IntelCor_94:27:30	Cisco_3f:80:f1	802.11	211	-61 dBm	33 dB	QoS Data, SN=22, FN=0, Flags=.p.....TC

加密的无线流量。

第三步：生成并导出设备的放射性踪迹

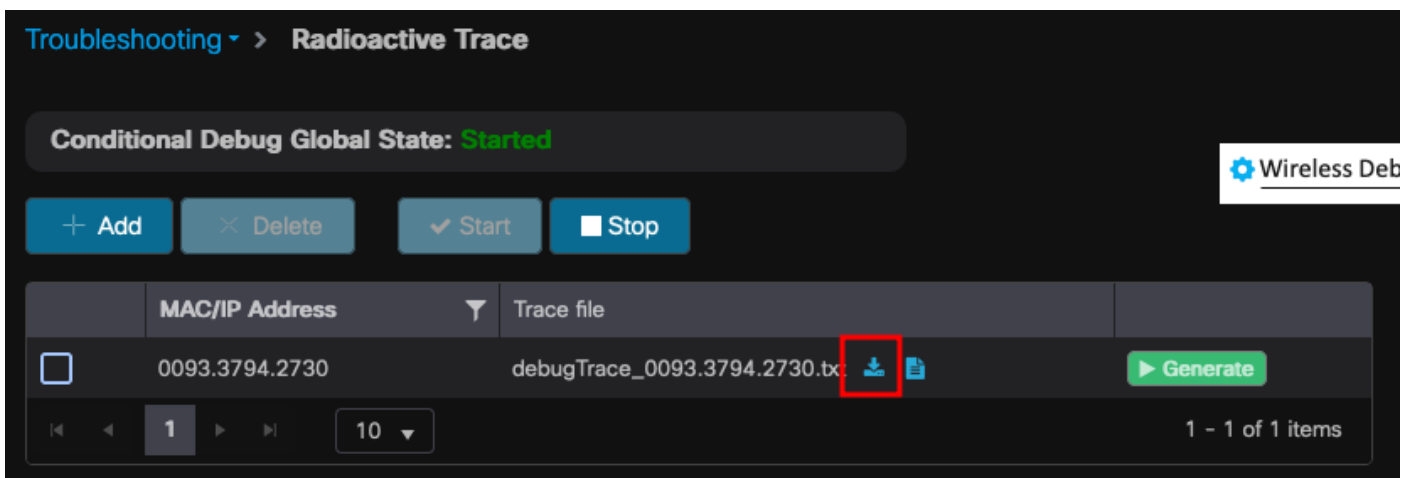在步骤1所在的屏幕中，捕获无线流量之后，单击绿色的Generate按钮。

在"时间间隔"弹出窗口中，选择符合您需求的时间范围。无需在此启用内部日志。

单击Apply to Device以生成放射性跟踪。
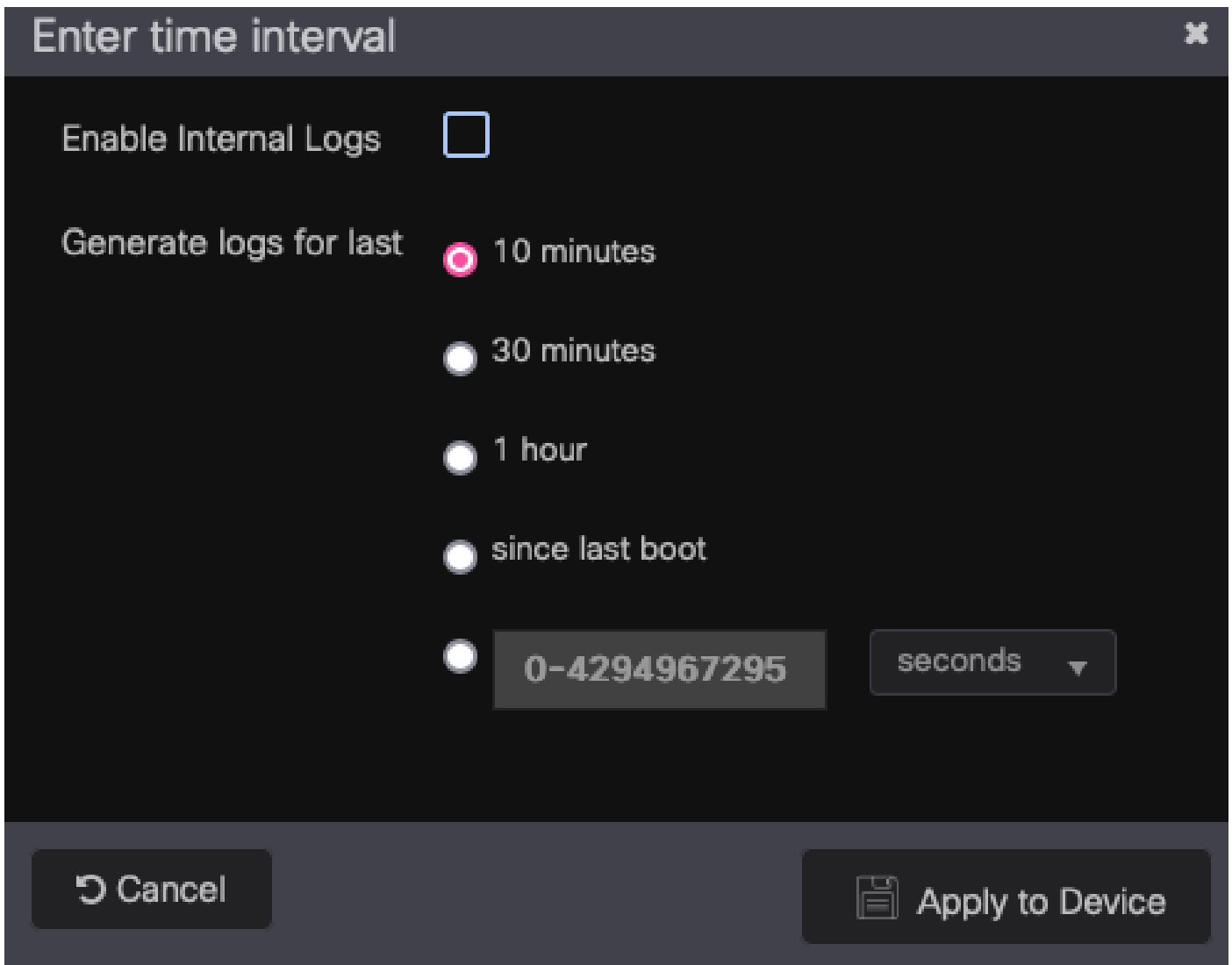
RA跟踪的时间间隔。

一旦放射性跟踪准备就绪，跟踪文件名旁边就会显示一个download图标。单击它下载你的放射性核素追踪

放射性痕迹软件可以下载。

第四步：从放射性踪迹中获取MSK

打开下载的Radious Trace文件，然后在Access-Accept 消息后搜索eap-msk属性。

<#root>

2022/09/23 20:00:08.646494126 {wncd_x_R0-0}{1}: [radius] [15612]: (info): RADIUS: Received from id 1812,

Access-Accept

, len 289
2022/09/23 20:00:08.646504952 {wncd_x_R0-0}{1}: [radius] [15612]: (info): RADIUS: authenticator 8b 11 2
2022/09/23 20:00:08.646511532 {wncd_x_R0-0}{1}: [radius] [15612]: (info): RADIUS: User-Name [1] 7 "Alic
2022/09/23 20:00:08.646516250 {wncd_x_R0-0}{1}: [radius] [15612]: (info): RADIUS: Class [25] 55 ...
2022/09/23 20:00:08.646566556 {wncd_x_R0-0}{1}: [radius] [15612]: (info): RADIUS: EAP-Message [79] 6 ..
2022/09/23 20:00:08.646577756 {wncd_x_R0-0}{1}: [radius] [15612]: (info): RADIUS: Message-Authenticator
2022/09/23 20:00:08.646601246 {wncd_x_R0-0}{1}: [radius] [15612]: (info): RADIUS: EAP-Key-Name [102] 67
2022/09/23 20:00:08.646610188 {wncd_x_R0-0}{1}: [radius] [15612]: (info): RADIUS: Vendor, Microsoft [26]
2022/09/23 20:00:08.646614262 {wncd_x_R0-0}{1}: [radius] [15612]: (info): RADIUS: MS-MPPE-Send-Key [16]
2022/09/23 20:00:08.646622868 {wncd_x_R0-0}{1}: [radius] [15612]: (info): RADIUS: Vendor, Microsoft [26]
2022/09/23 20:00:08.646642158 {wncd_x_R0-0}{1}: [radius] [15612]: (info): RADIUS: MS-MPPE-Recv-Key [17]
2022/09/23 20:00:08.646668839 {wncd_x_R0-0}{1}: [radius] [15612]: (info): Valid Response Packet, Free t
2022/09/23 20:00:08.646843647 {wncd_x_R0-0}{1}: [dot1x] [15612]: (info): [0093.3794.2730:capwap_9000000
2022/09/23 20:00:08.646878921 {wncd_x_R0-0}{1}: [dot1x] [15612]: (info): [0093.3794.2730:capwap_9000000
2022/09/23 20:00:08.646884283 {wncd_x_R0-0}{1}: [dot1x] [15612]: (info): [0093.3794.2730:capwap_9000000
2022/09/23 20:00:08.646913535 {wncd_x_R0-0}{1}: [dot1x] [15612]: (info): [0000.0000.0000:capwap_9000000
2022/09/23 20:00:08.646914875 {wncd_x_R0-0}{1}: [dot1x] [15612]: (info): [0000.0000.0000:capwap_9000000
2022/09/23 20:00:08.646996798 {wncd_x_R0-0}{1}: [dot1x] [15612]: (info): [0093.3794.2730:capwap_9000000
2022/09/23 20:00:08.646998966 {wncd_x_R0-0}{1}: [dot1x] [15612]: (info): [0093.3794.2730:capwap_9000000
2022/09/23 20:00:08.647000954 {wncd_x_R0-0}{1}: [dot1x] [15612]: (info): [0000.0000.0000:unknown] Pkt b
2022/09/23 20:00:08.647004108 {wncd_x_R0-0}{1}: [dot1x] [15612]: (info): [0093.3794.2730:capwap_9000000
2022/09/23 20:00:08.647008702 {wncd_x_R0-0}{1}: [auth-mgr] [15612]: (info): [0093.3794.2730:capwap_9000
2022/09/23 20:00:08.647025898 {wncd_x_R0-0}{1}: [auth-mgr] [15612]: (info): [0093.3794.2730:capwap_9000
2022/09/23 20:00:08.647033682 {wncd_x_R0-0}{1}: [auth-mgr] [15612]: (info): [0093.3794.2730:capwap_9000
2022/09/23 20:00:08.647101204 {wncd_x_R0-0}{1}: [aaa-attr-inf] [15612]: (info): Applying Attribute : us
2022/09/23 20:00:08.647115452 {wncd_x_R0-0}{1}: [aaa-attr-inf] [15612]: (info): Applying Attribute : cl
2022/09/23 20:00:08.647116846 {wncd_x_R0-0}{1}: [aaa-attr-inf] [15612]: (info): Applying Attribute : EA
2022/09/23 20:00:08.647118074 {wncd_x_R0-0}{1}: [aaa-attr-inf] [15612]: (info): Applying Attribute : Me
2022/09/23 20:00:08.647119674 {wncd_x_R0-0}{1}: [aaa-attr-inf] [15612]: (info): Applying Attribute : EA
2022/09/23 20:00:08.647128748 {wncd_x_R0-0}{1}: [aaa-attr-inf] [15612]: (info): Applying Attribute : MS
2022/09/23 20:00:08.647137606 {wncd_x_R0-0}{1}: [aaa-attr-inf] [15612]: (info): Applying Attribute : MS
2022/09/23 20:00:08.647139194 {wncd_x_R0-0}{1}: [aaa-attr-inf] [15612]: (info): Applying Attribute : dn
2022/09/23 20:00:08.647140612 {wncd_x_R0-0}{1}: [aaa-attr-inf] [15612]: (info): Applying Attribute : fo
2022/09/23 20:00:08.647141990 {wncd_x_R0-0}{1}: [aaa-attr-inf] [15612]: (info): Applying Attribute : au
2022/09/23 20:00:08.647158674 {wncd_x_R0-0}{1}: [aaa-attr-inf] [15612]: (info): Applying Attribute :

eap-msk

 0

fb c1 c3 f8 2c 13 66 6e 4d dc 26 b8 79 7e 89 83 f0 12 54 73 cb 61 51 da fa af 02 bf 96 87 67 4c c7 22 ch

2022/09/23 20:00:08.647159912 {wncd_x_R0-0}{1}: [aaa-attr-inf] [15612]: (info): Applying Attribute : ea
2022/09/23 20:00:08.647161666 {wncd_x_R0-0}{1}: [aaa-attr-inf] [15612]: (info): Applying Attribute : me
2022/09/23 20:00:08.647164452 {wncd_x_R0-0}{1}: [aaa-attr-inf] [15612]: (info): Applying Attribute : cl
2022/09/23 20:00:08.647166150 {wncd_x_R0-0}{1}: [aaa-attr-inf] [15612]: (info): Applying Attribute : in
2022/09/23 20:00:08.647202312 {wncd_x_R0-0}{1}: [auth-mgr] [15612]: (info): [0093.3794.2730:capwap_9000

eap-msk字符串后面的值是MSK。复制并保存此文件，以便在下一步中使用。

```
<#root>

2022/09/23 20:00:08.647158674 {wncd_x_R0-0}{1}: [aaa-attr-inf] [15612]: (info): Applying Attribute :

eap-msk

 0

fb c1 c3 f8 2c 13 66 6e 4d dc 26 b8 79 7e 89 83 f0 12 54 73 cb 61 51 da fa af 02 bf 96 87 67 4c c7 22 cb
```
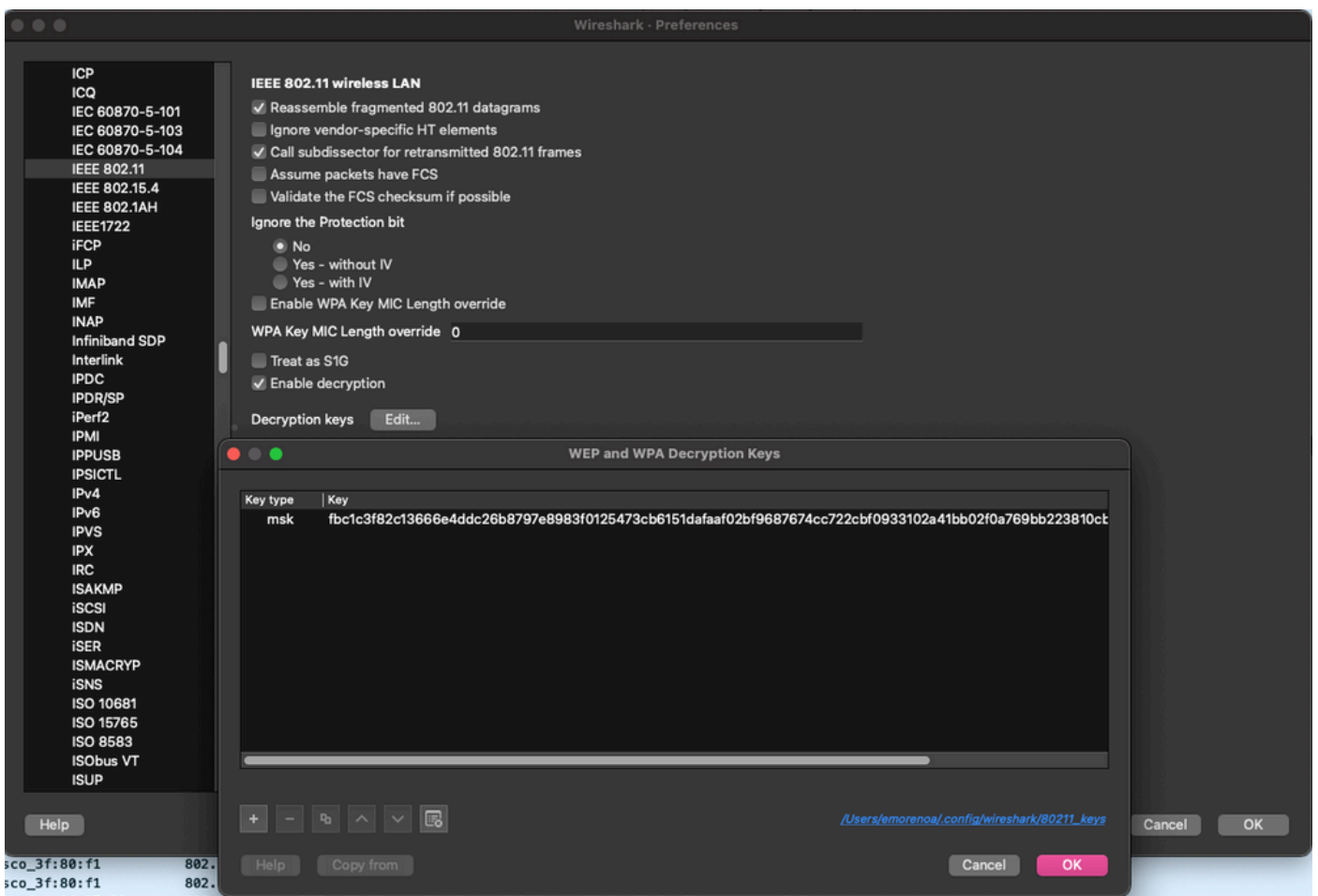
第五步：在Wireshark中添加MSK作为IEEE 802.11解密密钥

在Wireshark上，转到Wireshark > Preferences > Protocols > IEEE 802.11。

选中Enable decryption复选框，然后选择Decryption keys旁边的Edit。

单击底部的+按钮以添加新的解密密钥，并选择msk作为密钥类型。

粘贴在步骤4中获得的eap-msk值（不含空格）。

最后，单击OK关闭解密密钥窗口，然后单击OK关闭首选项窗口并应用解密密钥。

解密密钥已添加到wireshark首选项。

第六步：分析解密的802.1X流量

观察无线流量现在如何可见。在屏幕截图中，您可以看到ARP流量（数据包482和484）、DNS查询

和响应（数据包487和488）、ICMP流量（数据包491到497），甚至可以看到TCP会话三次握手的开始（数据包507）。

No.	Time	Time delta from p	Source	Destination	Protocol	Length	Signal strength	Signal/nois	Info
449	14:12:10.052518	0.001339000	IntelCor_94:27:30	Cisco_aa:18:8f	802.11	248	-59 dBm	35 dB	Reassociation Request, SN=22, FN=0, Flags=........C, SSID="ota-dot1x"
450	14:12:10.056200	0.003682000	Cisco_aa:18:8f	IntelCor_94:27:30	802.11	227	-34 dBm	60 dB	Reassociation Response, SN=3741, FN=0, Flags=........C
451	14:12:10.058303	0.002103000	IntelCor_94:27:30	Cisco_aa:18:8f	802.11	93	-59 dBm	35 dB	Action, SN=23, FN=0, Flags=........C
452	14:12:10.059417	0.001114000	Cisco_aa:18:8f	IntelCor_94:27:30	EAP	109	-34 dBm	60 dB	Request, Identity
453	14:12:10.108429	0.049012000	IntelCor_94:27:30	Cisco_aa:18:8f	EAP	146	-59 dBm	35 dB	Response, Identity
454	14:12:10.116909	0.008480000	Cisco_aa:18:8f	IntelCor_94:27:30	EAP	110	-34 dBm	60 dB	Request, TLS EAP (EAP-TLS)
455	14:12:10.119150	0.002241000	IntelCor_94:27:30	Cisco_aa:18:8f	EAP	146	-59 dBm	35 dB	Response, Legacy Nak (Response Only)
456	14:12:10.122792	0.003642000	Cisco_aa:18:8f	IntelCor_94:27:30	EAP	110	-34 dBm	61 dB	Request, Protected EAP (EAP-PEAP)
457	14:12:10.124621	0.001829000	IntelCor_94:27:30	Cisco_aa:18:8f	TLSv1.2	330	-60 dBm	34 dB	Encrypted Handshake Message
458	14:12:10.166650	0.042029000	Cisco_aa:18:8f	IntelCor_94:27:30	EAP	1116	-33 dBm	61 dB	Request, Protected EAP (EAP-PEAP)
459	14:12:10.170039	0.003389000	IntelCor_94:27:30	Cisco_aa:18:8f	EAP	146	-59 dBm	35 dB	Response, Protected EAP (EAP-PEAP)
460	14:12:10.175814	0.005775000	Cisco_aa:18:8f	IntelCor_94:27:30	EAP	1112	-34 dBm	60 dB	Request, Protected EAP (EAP-PEAP)
461	14:12:10.180069	0.004255000	IntelCor_94:27:30	Cisco_aa:18:8f	EAP	146	-59 dBm	35 dB	Response, Protected EAP (EAP-PEAP)
462	14:12:10.182929	0.002860000	Cisco_aa:18:8f	IntelCor_94:27:30	TLSv1.2	268	-34 dBm	60 dB	Server Hello, Certificate, Server Key Exchange, Server Hello Done
463	14:12:10.236135	0.053206000	IntelCor_94:27:30	Cisco_aa:18:8f	TLSv1.2	308	-60 dBm	34 dB	Encrypted Handshake Message, Change Cipher Spec, Encrypted Handshake Message
464	14:12:10.244438	0.008303000	Cisco_aa:18:8f	IntelCor_94:27:30	TLSv1.2	161	-34 dBm	60 dB	Change Cipher Spec, Encrypted Handshake Message
465	14:12:10.248078	0.003640000	IntelCor_94:27:30	Cisco_aa:18:8f	EAP	146	-60 dBm	34 dB	Response, Protected EAP (EAP-PEAP)
466	14:12:10.251302	0.003224000	Cisco_aa:18:8f	IntelCor_94:27:30	TLSv1.2	144	-34 dBm	60 dB	Application Data
467	14:12:10.259110	0.007808000	IntelCor_94:27:30	Cisco_aa:18:8f	TLSv1.2	149	-60 dBm	34 dB	Application Data
468	14:12:10.263865	0.004755000	Cisco_aa:18:8f	IntelCor_94:27:30	TLSv1.2	175	-34 dBm	60 dB	Application Data
469	14:12:10.271714	0.007849000	IntelCor_94:27:30	Cisco_aa:18:8f	TLSv1.2	203	-60 dBm	34 dB	Application Data
470	14:12:10.285280	0.013566000	Cisco_aa:18:8f	IntelCor_94:27:30	TLSv1.2	190	-33 dBm	61 dB	Application Data
471	14:12:10.287513	0.002233000	IntelCor_94:27:30	Cisco_aa:18:8f	TLSv1.2	146	-60 dBm	34 dB	Application Data
472	14:12:10.291081	0.003568000	Cisco_aa:18:8f	IntelCor_94:27:30	TLSv1.2	143	-34 dBm	60 dB	Application Data
473	14:12:10.294213	0.003132000	IntelCor_94:27:30	Cisco_aa:18:8f	EAP	146	-60 dBm	34 dB	Response, Protected EAP (EAP-PEAP)
474	14:12:10.315016	0.020803000	Cisco_aa:18:8f	IntelCor_94:27:30	EAP	108	-33 dBm	61 dB	Success
475	14:12:10.316556	0.001540000	Cisco_aa:18:8f	IntelCor_94:27:30	EAPOL	221	-34 dBm	60 dB	Key (Message 1 of 4)
476	14:12:10.321017	0.004461000	IntelCor_94:27:30	Cisco_aa:18:8f	EAPOL	223	-60 dBm	34 dB	Key (Message 2 of 4)
477	14:12:10.322061	0.001044000	Cisco_aa:18:8f	IntelCor_94:27:30	EAPOL	255	-34 dBm	60 dB	Key (Message 3 of 4)
478	14:12:10.323817	0.001756000	IntelCor_94:27:30	Cisco_aa:18:8f	EAPOL	199	-60 dBm	34 dB	Key (Message 4 of 4)
479	14:12:10.324699	0.000882000	IntelCor_94:27:30	Cisco_aa:18:8f	802.11	148	-60 dBm	34 dB	Action, SN=24, FN=0, Flags=........C, Dialog Token=3
480	14:12:10.325899	0.001200000	Cisco_aa:18:8f	IntelCor_94:27:30	802.11	148	-34 dBm	60 dB	Action, SN=3746, FN=0, Flags=........C, Dialog Token=3
481	14:12:10.334956	0.009057000	fe80::1badf:865b:f10_	ff02::2	ICMPv6	207	-61 dBm	33 dB	Router Solicitation from 00:93:37:94:27:30
482	14:12:10.348407	0.013451000	Cisco_94:27:30	Broadcast	ARP	197	-61 dBm	33 dB	Who has 172.16.5.1? Tell 172.16.5.66
483	14:12:10.348903	0.000496000	Cisco_aa:18:8f	IntelCor_94:27:30	802.11	99	-34 dBm	60 dB	Action, SN=3747, FN=0, Flags=........C, Dialog Token=90
484	14:12:10.349222	0.000319000	Cisco_3f:80:f1	IntelCor_94:27:30	ARP	197	-30 dBm	64 dB	172.16.5.1 is at 78:da:6e:3f:80:f1
485	14:12:10.349623	0.000401000	IntelCor_94:27:30	Cisco_aa:18:8f	802.11	99	-60 dBm	34 dB	Action, SN=25, FN=0, Flags=........C, Dialog Token=90
486	14:12:10.350046	0.000423000	172.16.5.66	172.18.108.43	DNS	220	-61 dBm	33 dB	Standard query 0xad51 A Cisco.com
487	14:12:10.530286	0.180240000	172.18.108.43	172.16.5.66	DNS	206	-61 dBm	33 dB	Standard query 0xad51 A Cisco.com
488	14:12:10.616297	0.086011000	172.18.108.43	172.16.5.66	DNS	222	-30 dBm	64 dB	Standard query response 0xad51 A Cisco.com A 72.163.4.161
489	14:12:10.623163	0.006866000	172.16.5.66	224.0.0.22	IGMPv3	199	-61 dBm	33 dB	Membership Report / Join group 224.0.0.251 for any sources / Join group 239.255.255.250 for any sources
490	14:12:10.623515	0.000352000	fe80::1badf:865b:f10_	ff02::16	ICMPv6	267	-61 dBm	33 dB	Multicast Listener Report Message v2
491	14:12:10.623890	0.000375000	172.16.5.66	172.253.63.99	ICMP	243	-61 dBm	33 dB	Echo (ping) request id=0x0001, seq=8137/51487, ttl=8 (no response found!)
492	14:12:10.625663	0.001773000	10.152.216.193	172.16.5.66	ICMP	207	-30 dBm	64 dB	Time-to-live exceeded (Time to live exceeded in transit)
493	14:12:10.627395	0.001732000	172.16.5.66	172.253.63.99	ICMP	243	-61 dBm	33 dB	Echo (ping) request id=0x0001, seq=8138/51743, ttl=9 (no response found!)
494	14:12:10.628807	0.001412000	10.152.216.129	172.16.5.66	ICMP	207	-30 dBm	64 dB	Time-to-live exceeded (Time to live exceeded in transit)
495	14:12:10.632290	0.003483000	172.16.5.66	172.253.63.99	ICMP	243	-61 dBm	33 dB	Echo (ping) request id=0x0001, seq=8139/51999, ttl=10 (no response found!)
496	14:12:10.632626	0.000336000	172.16.5.66	72.163.4.161	ICMP	211	-61 dBm	33 dB	Echo (ping) request id=0x0001, seq=8140/52255, ttl=128 (reply in 501)
497	14:12:10.632626	0.000000000	10.152.192.145	172.16.5.66	ICMP	207	-30 dBm	64 dB	Time-to-live exceeded (Time to live exceeded in transit)
498	14:12:10.632695	0.000069000	IntelCor_94:27:30	Cisco_aa:18:8f	802.11	99	-60 dBm	34 dB	Action, SN=26, FN=0, Flags=........C, Dialog Token=6
499	14:12:10.632972	0.000277000	Cisco_aa:18:8f	IntelCor_94:27:30	802.11	99	-34 dBm	60 dB	Action, SN=3754, FN=0, Flags=........C, Dialog Token=6
500	14:12:10.634467	0.001495000	172.16.5.66	172.253.63.99	ICMP	243	-61 dBm	33 dB	Echo (ping) request id=0x0001, seq=8141/52511, ttl=11 (no response found!)
501	14:12:10.666791	0.032324000	72.163.4.161	172.16.5.66	ICMP	211	-30 dBm	64 dB	Echo (ping) reply id=0x0001, seq=8140/52255, ttl=236 (request in 496)
502	14:12:10.668564	0.001773000	10.152.216.189	172.16.5.66	ICMP	207	-30 dBm	64 dB	Time-to-live exceeded (Time to live exceeded in transit)
503	14:12:10.669017	0.000453000	10.152.216.189	172.16.5.66	ICMP	207	-30 dBm	64 dB	Time-to-live exceeded (Time to live exceeded in transit)
504	14:12:10.718518	0.049501000	172.16.5.66	239.255.255.250	SSDP	354	-61 dBm	33 dB	M-SEARCH * HTTP/1.1
505	14:12:10.747832	0.029314000	172.18.108.43	172.16.5.66	DNS	364	-30 dBm	64 dB	Standard query response 0x3c48 A www.msftconnecttest.com CNAME ncsi-geo.trafficmanager.net CNAME www.msf
506	14:12:10.748179	0.000347000	172.18.108.43	172.16.5.66	DNS	364	-30 dBm	64 dB	Standard query response 0x3c48 A www.msftconnecttest.com CNAME ncsi-geo.trafficmanager.net CNAME www.msf
507	14:12:10.750548	0.002369000	172.16.5.66	23.218.218.158	TCP	203	-61 dBm	33 dB	59781 → 80 [SYN] Seq=0 Win=65520 Len=0 MSS=1260 WS=256 SACK_PERM

解密的无线流量。