故障排除 UBR 电缆调制解调器不上线的问题

目录

简介

本文讨论不同的阐明，电缆调制解调器(CMs)在来前经历联机和设立的IP连通性。本文突出显示最常用的Cisco IOS软件故障排除命令验证什么状态CMs是和能造成调制解调器在该状态到达的原因。这是由Debug与Show at命令两个，有线调制解调器终端系统(CMTS)和CM说明的。本文也讨论可以采取到达在正确状态，包括几个类似(pt)或一些步骤(d)。

注意： 参考请知道基本的初始化如何为有线调制解调器初始化流程图和概述工作。

开始使用前

规则

有关文档规则的详细信息，请参阅 Cisco 技术提示规则。

先决条件

本文读者应该熟悉DOCSIS协议。

使用的组件

本文档不限于特定的软件和硬件版本。

电缆调制解调器状态故障排除

第一个且最有用的命令使用在CMTS是show cable modem ：

```
sydney# show cable modem Interface Prim Online Timing Rec QoS CPE IP address MAC address Sid
State Offset Power Cable2/0/U0 4 online(d) 2814 -0.50 6 0 10.1.1.20 0030.96f9.65d9 Cable2/0/U0 5
online(pt) 2290 -0.25 5 0 10.1.1.25 0050.7366.2223 Cable2/0/U0 6 offline 2287 -0.25 2 0
10.1.1.26 0050.7366.2221 Cable2/0/U0 7 online(d) 2815 -0.25 6 0 10.1.1.27 0001.9659.4461
```

以上的State字段显示什么状态CM在。字段能有以下值：

CM状态(如CMTS所显示)	含义
	有线调制解调器考虑脱机
init(r1)	有线调制解调器发送的初始搜索
init(r2)	有线调制解调器排列
init(rc)	有线调制解调器搜索完成
init (d)	接收的DHCP请求
init (i)	接收的DHCP回复;分配的IP地址
init (t)	开始的TOD交换
init (o)	开始的选项文件传输
	注册的有线调制解调器，启用为数据
(d)	有线调制解调器的有线调制解调器注册的，但是网络访问禁用
online(pk)	有线调制解调器注册的，分配的BPI启用的和KEK
online(pt)	有线调制解调器注册的，分配的BPI启用的和TEK
reject(pk)	拒绝的KEK调制解调器关键任务
reject(pt)	拒绝的TEK调制解调器关键任务
(m)	有线调制解调器尝试注册;注册拒绝由于坏MIC (消息完整性检查)
(c)	有线调制解调器尝试注册;注册拒绝由于坏COS (服务等级(COS))

在CM端的等效命令是show controllers cable-modem 0 mac state并且查看MAC字段。我们与输出的State字段主要将关注因为后一个命令的输出显示可以相当大，只有某些部分哪里可适用将显示。debug cable-modem mac log verbose的完全捕获可以在CM端部分的完全的调试捕获找到在此技术

说明结束时。

注意： 在CMTS您在SID值能使用**debug cable interface cable x/y sid sid value verbose**过滤然后运行其他调试指令，例如**debug cable range**。这样debug输出对指定的SID值不会被限制和没有影响CMTS性能。

以下部分讨论每状态值，什么可能的原因是，并且什么步骤可以采取在正确在线状态到达。

注意： 在排除故障前所有状态的开始查看所有电缆调制解调器的状态发现是重要的此状态是否适用于所有调制解调器或一些，并且这是否是新或现有的网络。如果它是现有的网络，则请调查所有最近更改。在本文的大部分中假设，问题影响所有电缆调制解调器，并且以下实验室拓扑结构是可适用的：

因为此设置排除有线电视信号，可以使用上述设置为了实现故障排除目的，并且排除RF问题。

注意： ubr7100有一个集成上行变频器，因此外部升频器没有要求。参考设置集成上行变频器欲知更多信息。

脱机状态

```
sydney# show cable modem Interface Prim Online Timing Rec QoS CPE IP address MAC address Sid
State Offset Power Cable2/0/U0 5 offline 2290 0.00 2 0 10.1.1.25 0050.7366.2223 Cable2/0/U0 6
offline 2811 0.00 2 0 10.1.1.22 0050.7366.1e01 Cable2/0/U0 7 offline 2810 -0.50 2 0 10.1.1.20
0030.96f9.65d9 Cable2/0/U0 8 offline 2810 -0.25 2 0 10.1.1.21 0030.96f9.6605
```

从上面输出Show Cable Modem显示命令我们有四调制解调器在。有时调制解调器可能通过其他状态循环然后回到。以下列表给出不能的调制解调器的多数常见原因达到求积分法振幅modulation(QAM)锁定：

- 有线调制解调器没有连接对网络或没有打开
- 微弱的载波信号(许多个噪声)
- 不正确的下行中心频率
- 在DOCSIS文件指定的错误频率
- 缺乏下行数字QAM调整的信号
- 在CMTS路由器的**cable modem change-frequency**指定的错误频率
- 在MCxx卡的不正确的填充

下面是**show controllers cable-modem 0**被裁减的输出显示如被采取从有线调制解调器(Kuffing)端：

```
kuffing# show controllers cable-modem 0 BCM Cable interface 0: CM unit 0, idb 0x8086C88C, ds
0x8086E460, regaddr = 0x2700000, reset_mask 0x80 station address 0030.96f9.65d9 default station
address 0030.96f9.65d9 PLD VERSION: 1 Concatenation: ON Max bytes Q0: 2000 Q1: 2000 Q2: 2000 Q3:
2000 MAC State is ds_channel_scanning_state, Prev States = 3 MAC mcfilter 01E02F00 data mcfilter
00000000 MAC extended header ON DS: BCM 3300 Receiver: Chip id = BCM3300 US: BCM 3300
Transmitter: Chip id = 3300 Tuner: status=0x00 Rx: tuner_freq 529776400, symbol_rate 5361000,
local_freq 11520000 snr_estimate 166(TenthdB), ber_estimate 0, lock_threshold 26000 QAM not in
lock, FEC not in lock, qam_mode QAM_64 (Annex B) Tx: tx_freq 27984000, symbol rate 8 (1280000
sym/sec) power_level: 6.0 dBmV (commanded) 7 (gain in US AMP units) 63 (BCM3300 attenuation in
.4 dB units) :::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::: !--- Rest of
display omitted.
```

自上我们能看到信噪比估计是16.6 dB。理论上来讲这应该是至少30dB为了CM能正常运行为64个QAM。有线数据业务接口规范(DOCSIS)下行与上行说明的参考的RF规格，并且关于正在验证下行信号。有时您可以有好信噪比(SNR)说34dB，但是仍然有噪声现在例如脉冲噪声。这经常是由有的正向通路扫描发射机导致的干涉调制解调器信号的信号。这可能由操作在零的间距模式的光谱分析程序只检测。

关于调查的更多信息噪声问题使用光谱分析程序参考连接Cisco ubr7200系列路由器对电缆头端。脉冲噪声的一个征兆是在输出看到的无法修复的错误**show interfaces cable 2/0 upstream**中0如下所示：

```
sydney# show interfaces cable 2/0 upstream 0 Cable2/0: Upstream 0 is up Received 46942
broadcasts, 0 multicasts, 205903 unicasts 0 discards, 12874 errors, 0 unknown protocol 252845
packets input, 1 uncorrectable 12871 noise, 0 microreflections Total Modems On This Upstream
Channel : 3 (3 active) Default MAC scheduler Queue[Rng Polls] 0/64, fifo queueing, 0 drops
Queue[Cont Mslots] 0/104, fifo queueing, 0 drops Queue[CIR Grants] 0/64, fair queueing, 0 drops
Queue[BE Grants] 0/64, fair queueing, 0 drops Queue[Grant Shpr] 0/64, calendar queueing, 0 drops
Reserved slot table currently has 0 CBR entries Req IEs 77057520, Req/Data IEs 0 Init Mtn IEs
1194343, Stn Mtn IEs 117174 Long Grant IEs 46953, Short Grant IEs 70448 Avg upstream channel
utilization : 1% Avg percent contention slots : 96% Avg percent initial ranging slots : 4% Avg
percent minislots lost on late MAPs : 0% Total channel bw reserved 0 bps CIR admission control
not enforced Current minislot count : 7192093 Flag: 0 Scheduled minislot count : 7192182 Flag: 0
```

注意： 如果无法修复错误的数量比1极大在10,000很可能脉冲噪声存在。

在CM的最佳输入功率电平是**0dBmV**，接收方有范围-15dBmv对+15dBmV。这可以由光谱分析程序测量。如果电源太低您可能需要根据Cisco uBR7200系列硬件安装指南配置升频器。如果太强信号的is is您可能然后需要添加更多衰减在高频率的端口连接。如果一个特定的频率有许多噪声存在，您在光谱里可能需要选择另一个频率。

注意： ubr7100有一个集成上行变频器。参考设置集成上行变频器欲知更多信息。

警告： 如果问题只影响一或两三调制解调器，当正确地操作几其他的调制解调器，则它是不太可能问题在升频器侧。更改升频器配置，当这发生时能严重降低网络的其余。

要确认CM未能达到QAM锁定请打开您应该看到输出类似于以下的**debug cable-modem mac log verbose**：

```
5w0d: 3084365.172 CMAC_LOG_STATE_CHANGE                ds_channel_scannie
5w0d: 3084365.172 CMAC_LOG_WILL_SEARCH_DS_FREQUENCY_BAND      99/805790200/99770
5w0d: 3084365.176 CMAC_LOG_WILL_SEARCH_DS_FREQUENCY_BAND      98/601780000/79970
5w0d: 3084365.176 CMAC_LOG_WILL_SEARCH_DS_FREQUENCY_BAND      97/403770100/59570
5w0d: 3084365.176 CMAC_LOG_WILL_SEARCH_DS_FREQUENCY_BAND      96/73753600/115750
5w0d: 3084365.180 CMAC_LOG_WILL_SEARCH_DS_FREQUENCY_BAND      95/217760800/39770
5w0d: 3084365.180 CMAC_LOG_WILL_SEARCH_DS_FREQUENCY_BAND      94/121756000/16970
5w0d: 3084365.180 CMAC_LOG_WILL_SEARCH_DS_FREQUENCY_BAND      93/175758700/21170
5w0d: 3084365.184 CMAC_LOG_WILL_SEARCH_DS_FREQUENCY_BAND      92/79753900/857540
5w0d: 3084365.184 CMAC_LOG_WILL_SEARCH_DS_FREQUENCY_BAND      91/55752700/677530
5w0d: 3084365.188 CMAC_LOG_WILL_SEARCH_DS_FREQUENCY_BAND      90/177000000/21300
5w0d: 3084365.188 CMAC_LOG_WILL_SEARCH_DS_FREQUENCY_BAND      89/219000000/22500
5w0d: 3084365.188 CMAC_LOG_WILL_SEARCH_DS_FREQUENCY_BAND      88/141000000/17100
5w0d: 3084365.192 CMAC_LOG_WILL_SEARCH_DS_FREQUENCY_BAND      87/135012500/13500
5w0d: 3084365.192 CMAC_LOG_WILL_SEARCH_DS_FREQUENCY_BAND      86/123012500/12900
5w0d: 3084365.192 CMAC_LOG_WILL_SEARCH_DS_FREQUENCY_BAND      85/405000000/44700
5w0d: 3084365.196 CMAC_LOG_WILL_SEARCH_DS_FREQUENCY_BAND      84/339012500/39900
5w0d: 3084365.196 CMAC_LOG_WILL_SEARCH_DS_FREQUENCY_BAND      83/333025000/33300
5w0d: 3084365.200 CMAC_LOG_WILL_SEARCH_DS_FREQUENCY_BAND      82/231012500/32700
5w0d: 3084365.200 CMAC_LOG_WILL_SEARCH_DS_FREQUENCY_BAND      81/111025000/11700
5w0d: 3084365.200 CMAC_LOG_WILL_SEARCH_DS_FREQUENCY_BAND      80/93000000/105000
5w0d: 3084365.204 CMAC_LOG_WILL_SEARCH_DS_FREQUENCY_BAND      79/453000000/85500
5w0d: 3084365.204 CMAC_LOG_WILL_SEARCH_SAVED_DS_FREQUENCY     453000000
5w0d: 3084366.324 CMAC_LOG_DS_NO_QAM_FEC_LOCK 453000000 5w0d: 3084366.324
CMAC_LOG_DS_TUNER_KEEPALIVE 5w0d: 3084367.440 CMAC_LOG_DS_NO_QAM_FEC_LOCK 453000000 5w0d:
3084368.556 CMAC_LOG_DS_NO_QAM_FEC_LOCK 453000000 5w0d: 3084369.672 CMAC_LOG_DS_NO_QAM_FEC_LOCK
459000000 5w0d: 3084370.788 CMAC_LOG_DS_NO_QAM_FEC_LOCK 465000000 5w0d: 3084371.904
CMAC_LOG_DS_NO_QAM_FEC_LOCK 471000000 5w0d: 3084373.020 CMAC_LOG_DS_NO_QAM_FEC_LOCK 477000000
5w0d: 3084374.136 CMAC_LOG_DS_NO_QAM_FEC_LOCK 483000000 5w0d: 3084375.252
CMAC_LOG_DS_NO_QAM_FEC_LOCK 489000000 5w0d: 3084376.368 CMAC_LOG_DS_NO_QAM_FEC_LOCK 495000000
```

```
5w0d: 3084376.368 CMAC_LOG_DS_TUNER_KEEPALIVE 5w0d: 3084377.484 CMAC_LOG_DS_NO_QAM_FEC_LOCK
501000000 5w0d: 3084378.600 CMAC_LOG_DS_NO_QAM_FEC_LOCK 507000000 5w0d: 3084379.716
CMAC_LOG_DS_NO_QAM_FEC_LOCK 513000000 5w0d: 3084380.832 CMAC_LOG_DS_NO_QAM_FEC_LOCK 519000000
5w0d: 3084381.948 CMAC_LOG_DS_NO_QAM_FEC_LOCK 525000000
:::::::::::::::::::::::::::::::::::::::: ::::::::::
```

注意： 如果有线调制解调器锁定在特定下行频率上，在永远将开始扫描以该相同频率前，除非配置清除。(请参阅示例调试。)如果下行频率值更改将持续扫描其他频率，直到锁定在另一个频率上。一旦锁定，它将保存新的值给下一次。也是值得注意的在CMTS的配置命令电缆下行频率只是装饰性的并且没有效果在升频器输出频率除了一旦ubr7100，有一个集成上行变频器。在12.1之前的Cisco IOS版本中CM将自动地添加可视和可配置的**cable-modem downstream saved channel命令**。在12.1及以后此命令在配置里不再是可配置亦不可视。

不达到的CM的另一个原因QAM锁定是在升频器配置的不正确的下行中心频率，例如在标准的6MHz信道波段的全国电视系统委员会(NTSC)频率MAP在北美信道与中心频率的100-100使用648.0-654.0 651兆赫。多数升频器使用中心的视频载波频率。然而，升频器GI C6U或C8U用途1.75MHz在中心频率之下您然后需要设置649.25兆赫的频率信道100-100的。学习GI upconverter为什么使用此频率读的电缆频率(RF)常见问题(仅限注册用户)。

另一个常见错误是指定在**Downstream Frequency字段的**错误频率值在DOCSIS CPE Configurator的无线电频率信息下。通常没有需要指定频率值在此选项下。然而，如果有需要，例如某一调制解调器在一个不同的频率需要锁定，然后应该选择适当的频率值如以前解释。以下调试说明此与最初锁定在453MHz然后在DOCSIS配置文件指定，因而造成调制解调器通过此进程无限地重置和循环的535.25MHz的CM ：

```
4d00h: 345773.916 CMAC_LOG_WILL_SEARCH_SAVED_DS_FREQUENCY     453000000
4d00h: 345774.956 CMAC_LOG_UCD_MSG_RCVD                       1
4d00h: 345775.788 CMAC_LOG_DS_64QAM_LOCK_ACQUIRED 453000000 4d00h: 345775.792
CMAC_LOG_DS_CHANNEL_SCAN_COMPLETED 4d00h: 345775.794 CMAC_LOG_STATE_CHANGE wait_ucd_state 4d00h:
345776.946 CMAC_LOG_UCD_MSG_RCVD 1 4d00h: 345778.960 CMAC_LOG_UCD_MSG_RCVD 1 4d00h: 345778.962
CMAC_LOG_ALL_UCDS_FOUND 4d00h: 345778.966 CMAC_LOG_STATE_CHANGE wait_map_state 4d00h: 345778.968
CMAC_LOG_FOUND_US_CHANNEL 1 4d00h: 345780.996 CMAC_LOG_UCD_MSG_RCVD 1 4d00h: 345781.000
CMAC_LOG_UCD_NEW_US_FREQUENCY 27984000 4d00h: 345781.004 CMAC_LOG_SLOT_SIZE_CHANGED 8 4d00h:
345781.084 CMAC_LOG_UCD_UPDATED 4d00h: 345781.210 CMAC_LOG_MAP_MSG_RCVD 4d00h: 345781.212
CMAC_LOG_INITIAL_RANGING_MINISLOTS 40 4d00h: 345781.216 CMAC_LOG_STATE_CHANGE ranging_1_state
4d00h: 345781.220 CMAC_LOG_RANGING_OFFSET_SET_TO 9610 4d00h: 345781.222 CMAC_LOG_POWER_LEVEL_IS
22.0 dBmV (comma) 4d00h: 345781.226 CMAC_LOG_STARTING_RANGING 4d00h: 345781.228
CMAC_LOG_RANGING_BACKOFF_SET 0 4d00h: 345781.232 CMAC_LOG_RNG_REQ_QUEUED 0 4d00h: 345781.272
CMAC_LOG_RNG_REQ_TRANSMITTED 4d00h: 345781.280 CMAC_LOG_RNG_RSP_MSG_RCVD 4d00h: 345781.282
CMAC_LOG_RNG_RSP_SID_ASSIGNED 3 4d00h: 345781.284 CMAC_LOG_ADJUST_RANGING_OFFSET 2288 4d00h:
345781.288 CMAC_LOG_RANGING_OFFSET_SET_TO 11898 4d00h: 345781.292 CMAC_LOG_ADJUST_TX_POWER 7
4d00h: 345781.294 CMAC_LOG_POWER_LEVEL_IS 24.0 dBmV (comma) 4d00h: 345781.298
CMAC_LOG_STATE_CHANGE ranging_2_state 4d00h: 345781.302 CMAC_LOG_RNG_REQ_QUEUED 3 4d00h:
345782.298 CMAC_LOG_RNG_REQ_TRANSMITTED 4d00h: 345782.300 CMAC_LOG_RNG_RSP_MSG_RCVD 4d00h:
345782.304 CMAC_LOG_RANGING_SUCCESS 4d00h: 345782.316 CMAC_LOG_STATE_CHANGE dhcp_state 4d00h:
345782.450 CMAC_LOG_DHCP_ASSIGNED_IP_ADDRESS 10.1.1.25 4d00h: 345782.452
CMAC_LOG_DHCP_TFTP_SERVER_ADDRESS 172.17.110.136 4d00h: 345782.456
CMAC_LOG_DHCP_TOD_SERVER_ADDRESS 172.17.110.136 4d00h: 345782.460
CMAC_LOG_DHCP_SET_GATEWAY_ADDRESS 4d00h: 345782.464 CMAC_LOG_DHCP_TZ_OFFSET 0 4d00h: 345782.466
CMAC_LOG_DHCP_CONFIG_FILE_NAME frequency.cm 4d00h: 345782.470
CMAC_LOG_DHCP_ERROR_ACQUIRING_SEC_SVR_ADDR 4d00h: 345782.474 CMAC_LOG_DHCP_COMPLETE 4d00h:
345782.598 CMAC_LOG_STATE_CHANGE establish_tod_state 4d00h: 345782.606 CMAC_LOG_TOD_REQUEST_SENT
4d00h: 345782.620 CMAC_LOG_TOD_REPLY_RECEIVED 3178880491 4d00h: 345782.628 CMAC_LOG_TOD_COMPLETE
4d00h: 345782.630 CMAC_LOG_STATE_CHANGE security_associate_state 4d00h: 345782.634
CMAC_LOG_SECURITY_BYPASSED 4d00h: 345782.636 CMAC_LOG_STATE_CHANGE configuration_file 4d00h:
345782.640 CMAC_LOG_LOADING_CONFIG_FILE frequency.cm 4d00h: %LINEPROTO-5-UPDOWN: Line protocol
on Interface cable-modem0, changed state to up 4d00h: 345783.678
CMAC_LOG_CONFIG_FILE_PROCESS_COMPLETE 4d00h: 345783.682 CMAC_LOG_DS_FREQ_OVERRIDE 535250000
4d00h: 345783.686 CMAC_LOG_STATE_CHANGE reset_hardware_state 4d00h: 345784.048
CMAC_LOG_STATE_CHANGE wait_for_link_up_state 4d00h: 345784.052 CMAC_LOG_DRIVER_INIT_IDB_RESET
0x082A5226 4d00h: 345784.054 CMAC_LOG_LINK_DOWN 4d00h: 345784.056 CMAC_LOG_LINK_UP 4d00h:
```

```
345784.062 CMAC_LOG_STATE_CHANGE ds_channel_scanning_state 4d00h: 345785.198
CMAC_LOG_DS_NO_QAM_FEC_LOCK 535250000 4d00h: 345785.212 CMAC_LOG_DS_TUNER_KEEPALIVE 4d00h:
345787.018 CMAC_LOG_UCD_MSG_RCVD 1 4d00h: 345787.022 CMAC_LOG_DS_64QAM_LOCK_ACQUIRED 453000000
```

注意： 频率覆盖。

在CMTS路由器的cable modem change-frequency指定的错误频率能也造成CM交换频率，并且，如果在CMTS配置的频率没有选择仔细然后对在上面的相同的结果将被看到。默认情况下**cable modem change-frequency命令**在CMTS也可选和典型地被离开。

在下行信道获取了后，下一个任务是设置适当的上行信道。调制解调器细听包含上行信道物理属性例如上行频率、调制、信道宽度和在突发描述符定义的其他参数讨论在DOCSIS的部分4的上行信道描述符(UCD) 。

找不到可用的UCD的调制解调器可能在上游服务没有提供的下行信道。这可能是数据转发器配置错误。show controllers cable命令是开始的合适场所。调制解调器可能不查找可用的UCD的另一个可能的来源是其硬件或MAC可能不支持在突发描述符的参数。这比DOCSIS兼容调制解调器可能是或者数据转发器配置错误或较少。

一旦找到可用的UCD调制解调器将开始监听到包含上行MAP时间的MAP (带宽分配映射)消息。时间段被映射到微槽并且分配到单个调制解调器。也有MAP的地区广播的，争用基于最初的维护(或广播)范围。它是MAP的这些地区调制解调器必须发送其初始排列请求，直到CMTS回应测距响应(RNG-RSP)。

找不到最初的维护区域的调制解调器，在T2计时器失效可能是数据转发器配置错误前。一个人应该也检查插入期在CMTS的电缆接口。使用插入期，控制CMTS多快的一个优化的参数允许调制解调器在注册时点击DHCP服务器，并且在任一种大规模中断以后间接控制DHCP/TFTP/TOD服务器负载。它直接地控制时间长度恢复网络。

警告： 而提供服务器有零负载，插入期不正确的设置将导致长时间的调制解调器脱机。插入期的最好的值**自动**。

文档确定CMTS上的RF或配置问题有非常RF问题详细说明在电缆装置中。

测距过程- init(r1)、init(r2) 和 init(rc) 状态

在此阶段， CM开始测距过程计算必要的传输功率功率电平到达CMTS在其所需的输入功率电平。一个相当好的传输功率是大致在生产网络的40 - 50 dBmV。其他硬件可能变化。类似下行信道，上行信道的载波应该是充分地坚强为了CMTS接收方能辩明符号。太高的信号的回程RF网络的正在传输将导致失真和相互调制，原因增加误码率，包括数据全部损失。这归结于截去信号。

CM传送测距请求(RNG-REQ)信息对CMTS并且等待测距响应(RNG-RSP)消息或T3计时器失效。如果T3超时出现，重试计数增加。如果重试计数比重试次数最大是较少，调制解调器传送另一RNG-REQ在一更高的功率电平。此测距过程在MAP的最初的维护或广播区域发生，因为CMTS未为在MAP的单点传输分配调制解调器服务标识符(SID)。因此，广播区域是基于的争用和受冲突支配。要补尝此调制解调器有计算范围的补偿算法RNG-REQ发射之间的一个随机Backoff时间。使用cable upstream range-backoff命令，这可以配置。当传输功率到达了CMTS的充足的水平，将响应对与包含临时SID的RNG-RSP的RNG-REQ。此SID将用于识别MAP的单点传输地区单播范围的。

在输出之下在指示**init(r1)的**状态显示CM用SID 6 CM不能通过初始搜索阶段：

```
sydney#show cable modem
Interface   Prim Online     Timing Rec    QoS CPE IP address      MAC address
            Sid  State      Offset Power
```

```
Cable2/0/U0 5    offline    2287    0.00  2   0   10.1.1.25       0050.7366.2223
Cable2/0/U0 6    init(r1) 2813 12.00 2 0 10.1.1.22 0050.7366.1e01 Cable2/0/U0 7 offline 2810
0.25 2 0 10.1.1.20 0030.96f9.65d9
```

下面的调试显示CM如何不能在超出的重试次数以后T3计时器失效和编号完成测距过程和重置。注释来自CMTS的CMAC_LOG_ADJUST_TX_POWER消息询问CM调节其电源：

```
1w3d: 871160.618 CMAC_LOG_STATE_CHANGE                    ranging_1_state
1w3d: 871160.618 CMAC_LOG_RANGING_OFFSET_SET_TO           9610

1w3d: 871160.622 CMAC_LOG_POWER_LEVEL_IS 19.0 dBmV (comman) 1w3d: 871160.622
CMAC_LOG_STARTING_RANGING 1w3d: 871160.622 CMAC_LOG_RANGING_BACKOFF_SET 0 1w3d: 871160.622
CMAC_LOG_RNG_REQ_QUEUED 0 1w3d: 871160.678 CMAC_LOG_RNG_REQ_TRANSMITTED 1w3d: 871160.682
CMAC_LOG_RNG_RSP_MSG_RCVD 1w3d: 871160.682 CMAC_LOG_RNG_RSP_SID_ASSIGNED 6 1w3d: 871160.682
CMAC_LOG_ADJUST_RANGING_OFFSET 2813 1w3d: 871160.682 CMAC_LOG_RANGING_OFFSET_SET_TO 12423 1w3d:
871160.686 CMAC_LOG_ADJUST_TX_POWER -48 1w3d: 871160.686 CMAC_LOG_STATE_CHANGE ranging_2_state
1w3d: 871160.686 CMAC_LOG_RNG_REQ_QUEUED 6 1w3d: 871161.690 CMAC_LOG_RNG_REQ_TRANSMITTED 1w3d:
871161.690 CMAC_LOG_RNG_RSP_MSG_RCVD 1w3d: 871161.694 CMAC_LOG_ADJUST_TX_POWER -36 1w3d:
871161.694 CMAC_LOG_RANGING_CONTINUE 1w3d: 871162.698 CMAC_LOG_RNG_REQ_TRANSMITTED 1w3d:
871162.898 CMAC_LOG_T3_TIMER 1w3d: 871163.734 CMAC_LOG_RNG_REQ_TRANSMITTED 1w3d: 871163.934
CMAC_LOG_T3_TIMER 1w3d: 871164.766 CMAC_LOG_RNG_REQ_TRANSMITTED 1w3d: 871164.966
CMAC_LOG_T3_TIMER 131.CABLEMODEM.CISCO: 1w3d: %UBR900-3-RESET_T3_RETRIES_EXHAUSTED: R03.0
Ranging 1w3d: 871164.966 CMAC_LOG_RESET_T3_RETRIES_EXHAUSTED 1w3d: 871164.966
CMAC_LOG_STATE_CHANGE reset_interface_state 1w3d: 871164.966 CMAC_LOG_STATE_CHANGE
reset_hardware_state
```

注意： init(r1)是ranging_1_state并且init(r2)是您能通过显示以下命令获得传输功率征兆在CM的ranging_2_state ：

```
Staryn# show controllers cable-modem 0 BCM Cable interface 0: CM unit 0, idb 0x2010AC, ds
0x86213E0, regaddr = 0x800000, reset_mask 0x80 station address 0050.7366.2223 default station
address 0050.7366.2223 PLD VERSION: 32 MAC State is wait_for_link_up_state, Prev States = 2 MAC
mcfilter 00000000 data mcfilter 00000000 MAC extended header ON DS: BCM 3116 Receiver: Chip id =
2 US: BCM 3037 Transmitter: Chip id = 30AC Tuner: status=0x00 Rx: tuner_freq 0, symbol_rate
5055932, local_freq 11520000 snr_estimate 30640, ber_estimate 0, lock_threshold 26000 QAM not in
lock, FEC not in lock, qam_mode QAM_64 Tx: tx_freq 27984000, power_level 0x20 (8.0 dBmV),
symbol_rate 8 (1280000 sym/s)
```

如果调制解调器不能进行在距离修正状态外面，可能起因是不足的传输功率功率电平。在传输功率上的设置能通过调节在低频率端口的衰减调节。增强的衰减将导致增加的传输功率功率电平。大致衰减20 -30dB是开始的合适场所。在初始搜索init(r1)以后是的调制解调器进行在init(r2)上调制解调器必须配置传输定时偏移量和功率电平保证的地方从调制解调器的发射在适当的时候接收并且在可接受输入功率电平在CMTS接收方。这通过单播RNG-REQ和RNG-RSP消息的会话执行。RNG-RSP消息包含调制解调器必须做的功率和计时偏移较正。调制解调器继续传送RNG-REQ和进行调整每RNG-RSP，直到RNG-RSP消息通过到达init(rc)状态指示测距成功或测距完成。如果调制解调器不能进行在init(r2)外面传输功率需要完善。下面是CM的输出显示在init(r2)状态。

```
sydney# show cable modem Interface Prim Online Timing Rec QoS CPE IP address MAC address Sid
State Offset Power Cable2/0/U0 5 init(r2) 2289 *4.00 2 0 10.1.1.25 0050.7366.2223 Cable2/0/U0 6
online 2811 -0.25 5 0 10.1.1.22 0050.7366.1e01 Cable2/0/U0 7 online 2811 -0.50 5 0 10.1.1.20
0030.96f9.65d9
```

注意： 在表明的Rec Power列旁边的*符号噪声功率调整方法为此调制解调器是活跃的。如果看到!这意味着调制解调器到达了其最大传输功率。

在CMTS ：

```
sydney# conf t Enter configuration commands, one per line. End with CNTL/Z.
sydney(config)#access-list 101 permit ip host 10.1.1.10 host 172.17.110.136
sydney(config)#access-list 101 permit ip host 172.17.110.136 host 10.1.1.10 sydney(config)#^Z
where 10.1.1.10 is ip address of Cable interface on the CMTS and 172.17.110.136 is ip address of
DHCP server sydney# debug list 101 sydney# debug ip packet detail IP packet debugging is on for
```

```
access list: 101 (detailed) sydney# 2w5d: IP: s=10.1.1.10 (local), d=172.17.110.136
(Ethernet1/0), len 604, sending 2w5d: UDP src=67, dst=67 2w5d: IP: s=172.17.110.136
(Ethernet1/0), d=10.1.1.10, len 328, rcvd 4 2w5d: UDP src=67, dst=67
```

如果这是测验或实验路由器，您能也使用**debug ip udp** ：

```
sydney# debug ip udp 2w5d: UDP: rcvd src=0.0.0.0(68), dst=255.255.255.255(67), length=584 2w5d:
UDP: sent src=10.1.1.10(67), dst=172.17.110.136(67), length=604 2w5d: UDP: rcvd
src=172.17.110.136(67), dst=10.1.1.10(67), length=308 2w5d: UDP: sent src=0.0.0.0(67),
dst=255.255.255.255(68), length=328 2w5d: UDP: rcvd src=0.0.0.0(68), dst=255.255.255.255(67),
length=584 2w5d: UDP: sent src=10.1.1.10(67), dst=172.17.110.136(67), length=604 2w5d: UDP: rcvd
src=172.17.110.136(67), dst=10.1.1.10(67), length=308 2w5d: UDP: sent src=0.0.0.0(67),
dst=255.255.255.255(68), length=328
```

警告： 运行**debug ip udp命令**在通用宽带路由器(UBR)不可能与访问列表一道使用，因为这可能造成UBR制止系统为了跟上调试。在这种情况下，所有调制解调器可能失去同步，并且调试将是无用的。是可行的网络分析器用于跟踪IP信息包进出CMTS，并且仅debug ip命令使用作为最后一招。

注意： 上述访问列表配置全局并且没有效果在IP操作。在**debug ip packet detail期间，**它曾经对指定的IP地址限制调试。确保您首先运行**调试列表101**。

如果数据包没通过调试消息被看到，请检查在此调制解调器附加的电缆接口的**电缆帮助-地址语句配置**。如果这正确地配置，并且DHCP服务器子网的数据包踪迹也不显示从调制解调器的DHCP信息包，则查找的合适场所是UBR的电缆接口的调制解调器的电缆接口或输入错误的输出错误。

如果数据包被看到传送在DHCP服务器子网上，它是一个好想法将调制解调器调试消息仔细检查发现是否有参数请求或分配错误。这是一个人应该调查在调制解调器和DHCP服务器之间的路由故障排除的阶段。复核DHCP服务器配置和DHCP日志也是可行的。

下面示例调试采取在CM通过运行**debug cable-modem mac log verbose命令**：

```
1w3d: 865015.920 CMAC_LOG_RANGING_SUCCESS
1w3d: 865015.920 CMAC_LOG_STATE_CHANGE                          dhcp_state
1w3d: 865053.580 CMAC_LOG_RNG_REQ_TRANSMITTED
1w3d: 865053.584 CMAC_LOG_RNG_RSP_MSG_RCVD
1w3d: 865055.924 CMAC_LOG_WATCHDOG_TIMER
131.CABLEMODEM.CISCO: 1w3d: %UBR900-3-RESET_DHCP_WATCHDOG_EXPIRED: Cable Interface Reset due to
DHCP watchdog timer expiration 1w3d: 865055.924 CMAC_LOG_RESET_DHCP_WATCHDOG_EXPIRED 1w3d:
865055.924 CMAC_LOG_STATE_CHANGE reset_interface_state 1w3d: 865055.924
CMAC_LOG_DHCP_PROCESS_KILLED 1w3d: 865055.924 CMAC_LOG_STATE_CHANGE reset_hardware_state
```

和能在失败的DHCP过程上被看到，并且有线调制解调器重置。

如果使用Cisco网络认证(CNR)，请读排除故障在有线网络的DHCP问题使用Cisco Network Registrar Debugs帮助您在init (d)故障排除。本文包含关于如何的非常详细资料信息使用CNR调试。

DHCP - init(d) 状态

在成功的范围以后的后面的阶段通过DHCP获取网络配置。CM发送DHCP请求，并且CMTS中继在两个方向的那些DHCP信息包。下面是显示一个调制解调器用在init (d)的SID 7的输出Show Cable Modem显示，表明DHCP请求从有线调制解调器接收：

```
sydney# show cable modem Interface Prim Online Timing Rec QoS CPE IP address MAC address Sid
State Offset Power Cable2/0/U0 7 init(d) 2811 0.25 2 0 10.1.1.20 0030.96f9.65d9 Cable2/0/U0 8
online 2813 0.25 3 0 10.1.1.21 0030.96f9.6605 Cable2/0/U0 9 online 2812 -0.75 3 0 10.1.1.22
0050.7366.1e01
```

注意： 有线调制解调器周期通过对init (不确定d)的init(r1)。可能的原因如下：

- 缺少**cable helper-address ip address命令**在CMTS或错误的IP地址
- 从CMTS的IP连通性问题到DHCP服务器
- 下来DHCP服务器
- 错误的默认网关配置在DHCP服务器
- 在CM或低上行SNR的低传输功率，参考RF规格。
- DHCP服务器超载
- DHCP服务器是在IP地址外面
- 为调制解调器保留的IP地址是内部的错误的范围，参见了解在网络认证GUI用户指南的IP地址管理。

注意： 验证您有在DHCP服务器设置的正确默认网关。一种方式验证IP连通性将使用扩展ping以是的源IP地址在CMTS电缆接口和目的地配置的主要地址是DHCP服务器的IP地址。这可以重复与备用IP地址作为源地址验证CPE有IP连通性。请参阅CMTS示例配置。

DHCP过程由发送广播的有线调制解调器开始DHCP DISCOVER信息。如果DHCP服务器响应对与OFFER的DISCOVER，调制解调器可能选择发送要求提供的配置。DHCP服务器能回应已确认(ACK)或没确认(NAK)。NAK可能是一个不兼容IP地址的结果和网关地址和威力发生，如果调制解调器从一条下行信道跳跃了到在一不同的子网驻留的另一个。当调制解调器寻找租期的续订， IP地址和网关地址DHCP请求信息将是不同的网络号，并且DHCP服务器将拒绝与NAK的REQUEST。这些情况是少见的，并且调制解调器将发布租期和开始与DHCP DISCOVER信息。

频繁地，在DHCP状态的错误表明自己作为超时而不是NAKs。DHCP消息定货应该是DISCOVER，OFFER， REQUEST， ACK。如果调制解调器传送DISCOVER没有从DHCP服务器的OFFER答复，请打开在CMTS的IP调试。这可以执行与以下步骤：

DHCP - init(i) 状态

一旦对DHCP请求的一回复接收，并且IP地址分配到下**show cable modem**给的有线调制解调器是`init (i)`：

```
sydney# show cable modem Interface Prim Online Timing Rec QoS CPE IP address MAC address Sid
State Offset Power Cable2/0/U0 7 init(i) 2815 -0.25 2 0 10.1.1.20 0030.96f9.65d9 Cable2/0/U0 8
online 2813 0.25 3 0 10.1.1.21 0030.96f9.6605 Cable2/0/U0 9 online 2812 0.50 3 0 10.1.1.22
0050.7366.1e01
```

自上有线调制解调器用**SID 7**从未超过状态初始化`(i)`。重复性**show cable modem**显示通常将显示循环在init(r1),init(r2)之间的有线调制解调器， init(rc)， init (d)和init (不确定i)。

进一步比init (i)可能有的编号没获得的有线调制解调器的原因。这是最普通部分的列表：

- 在DHCP服务器指定的不正确或无效的DOCSIS文件
- TFTP server问题，例如错误的IP地址， TFTP server不可达的
- 获得TOD或计时偏移的问题
- 在DHCP配置的不正确路由器设置

因为有线调制解调器到达了就init (i)我们知道去就获取IP地址。这在**debug cable-modem mac log verbose**输出的输出显示可以清楚显示在下面有线调制解调器的：

```
3d20h: 334402.548 CMAC_LOG_RANGING_SUCCESS
3d20h: 334402.548 CMAC_LOG_STATE_CHANGE                          dhcp_state
3d20h: 334415.492 CMAC_LOG_DHCP_ASSIGNED_IP_ADDRESS 10.1.1.20 !--- IP address Assigned to CM.
3d20h: 334415.492 CMAC_LOG_DHCP_TFTP_SERVER_ADDRESS 172.17.110.136 3d20h: 334415.492
CMAC_LOG_DHCP_TOD_SERVER_ADDRESS 172.17.110.136 3d20h: 334415.492
CMAC_LOG_DHCP_SET_GATEWAY_ADDRESS 3d20h: 334415.492 CMAC_LOG_DHCP_TZ_OFFSET 0 3d20h: 334415.496
CMAC_LOG_DHCP_CONFIG_FILE_NAME nofile !--- DOCSIS file CM is trying to load. 3d20h: 334415.496
CMAC_LOG_DHCP_ERROR_ACQUIRING_SEC_SVR_ADDR 3d20h: 334415.496
```

```
CMAC_LOG_DHCP_ERROR_ACQUIRING_LOG_ADDRESS 3d20h: 334415.496 CMAC_LOG_DHCP_COMPLETE 3d20h:
334415.508 CMAC_LOG_STATE_CHANGE establish_tod_state 3d20h: 334415.512 CMAC_LOG_TOD_REQUEST_SENT
172.17.110.136 3d20h: 334415.524 CMAC_LOG_TOD_REPLY_RECEIVED 3178343318 3d20h: 334415.524
CMAC_LOG_TOD_COMPLETE 3d20h: 334415.528 CMAC_LOG_STATE_CHANGE security_association_state 3d20h:
334415.528 CMAC_LOG_SECURITY_BYPASSED 3d20h: 334415.528 CMAC_LOG_STATE_CHANGE configuration_file
3d20h: 334415.528 CMAC_LOG_LOADING_CONFIG_FILE nofile !--- DOCSIS file name.
133.CABLEMODEM.CISCO: 3d20h: %LINEPROTO-5-UPDOWN: Line protocol on Interface cap 3d20h:
334416.544 CMAC_LOG_CONFIG_FILE_TFTP_FAILED -1 3d20h: 334416.548
CMAC_LOG_CONFIG_FILE_PROCESS_COMPLETE 3d20h: 334416.548 CMAC_LOG_RESET_CONFIG_FILE_READ_FAILED
```

同样地， TFTP server问题将给相似的错误造成无限地重置和循环通过同一进程的CM ：

```
3d21h: 336136.520 CMAC_LOG_STATE_CHANGE                    dhcp_state
3d21h: 336149.404 CMAC_LOG_DHCP_ASSIGNED_IP_ADDRESS        10.1.1.20
3d21h: 336149.404 CMAC_LOG_DHCP_TFTP_SERVER_ADDRESS 172.17.110.100 !--- Incorrect TFTP Server
address. 3d21h: 336149.404 CMAC_LOG_DHCP_TOD_SERVER_ADDRESS 172.17.110.136 3d21h: 336149.404
CMAC_LOG_DHCP_SET_GATEWAY_ADDRESS 3d21h: 336149.404 CMAC_LOG_DHCP_TZ_OFFSET 0 3d21h: 336149.408
CMAC_LOG_DHCP_CONFIG_FILE_NAME platinum.cm 3d21h: 336149.408
CMAC_LOG_DHCP_ERROR_ACQUIRING_SEC_SVR_ADDR 3d21h: 336149.408
CMAC_LOG_DHCP_ERROR_ACQUIRING_LOG_ADDRESS 3d21h: 336149.408 CMAC_LOG_DHCP_COMPLETE 3d21h:
336149.420 CMAC_LOG_STATE_CHANGE establish_tod_state 3d21h: 336149.424 CMAC_LOG_TOD_REQUEST_SENT
172.17.110.136 3d21h: 336149.436 CMAC_LOG_TOD_REPLY_RECEIVED 3178345052 3d21h: 336149.436
CMAC_LOG_TOD_COMPLETE 3d21h: 336149.440 CMAC_LOG_STATE_CHANGE security_association_state 3d21h:
336149.440 CMAC_LOG_SECURITY_BYPASSED 3d21h: 336149.440 CMAC_LOG_STATE_CHANGE configuration_file
3d21h: 336149.440 CMAC_LOG_LOADING_CONFIG_FILE platinum.cm 133.CABLEMODEM.CISCO: 3d21h:
%LINEPROTO-5-UPDOWN: Line protocol on Interface cap 3d21h: 336163.252
CMAC_LOG_RNG_REQ_TRANSMITTED 3d21h: 336163.252 CMAC_LOG_RNG_RSP_MSG_RCVD 3d21h: 336165.448
CMAC_LOG_CONFIG_FILE_TFTP_FAILED -1 !--- TFTP process failing. 3d21h: 336165.448
CMAC_LOG_CONFIG_FILE_PROCESS_COMPLETE 3d21h: 336165.452 CMAC_LOG_RESET_CONFIG_FILE_READ_FAILED
3d21h: 336165.452 CMAC_LOG_STATE_CHANGE reset_interface_state
```

方式测试TFTP server是通过下载文件的尝试(类似DOCSIS配置文件)到CMTS的闪存卡。通过使用**copy tftp flash命令**，这执行。注意那在下面输出中那里是尝试的错误打开名为platinum.cm的文件。原因是CMTS没有连接对TFTP server的IP地址， 172.17.110.100，因为它是伪造品。

```
sydney# copy tftp flash Address or name of remote host []? 172.17.110.100 Source filename []?
platinum.cm Destination filename [platinum.cm]? Accessing tftp://172.17.110.100/platinum.cm...
%Error opening tftp://172.17.110.100/platinum.cm (Permission denied) sydney#
```

在这里检查连接到TFTP server必要的。

问题获得每日定时(ToD)的或计时偏移也将导致不获得的调制解调器在线状态：

```
3d21h: 338322.500 CMAC_LOG_STATE_CHANGE                    dhcp_state
3d21h: 338334.260 CMAC_LOG_RNG_REQ_TRANSMITTED
3d21h: 338334.260 CMAC_LOG_RNG_RSP_MSG_RCVD
3d21h: 338335.424 CMAC_LOG_DHCP_ASSIGNED_IP_ADDRESS        10.1.1.20
3d21h: 338335.424 CMAC_LOG_DHCP_TFTP_SERVER_ADDRESS        172.17.110.136
3d21h: 338335.424 CMAC_LOG_DHCP_ERROR_ACQUIRING_TOD_ADDRESS 3d21h: 338335.424
CMAC_LOG_DHCP_SET_GATEWAY_ADDRESS 3d21h: 338335.424 CMAC_LOG_DHCP_ERROR_ACQUIRING_TZ_OFFSET
3d21h: 338335.424 CMAC_LOG_DHCP_CONFIG_FILE_NAME platinum.cm 3d21h: 338335.428
CMAC_LOG_DHCP_ERROR_ACQUIRING_SEC_SVR_ADDR 3d21h: 338335.428
CMAC_LOG_DHCP_ERROR_ACQUIRING_LOG_ADDRESS 3d21h: 338335.428 CMAC_LOG_DHCP_COMPLETE 3d21h:
338335.428 CMAC_LOG_RESET_DHCP_FAILED 3d21h: 338335.432 CMAC_LOG_STATE_CHANGE
reset_interface_state 3d21h: 338335.432 CMAC_LOG_STATE_CHANGE reset_hardware_state 3d21h:
338336.016 CMAC_LOG_STATE_CHANGE wait_for_link_up_state
```

注意： 在Cisco IOS软件版本必要的版本12.1(1) TOD之前指定在DHCP服务器为了有线调制解调器能联机。然而，在Cisco IOS软件版本版本12.1(1) TOD仍然没有要求，但是有线调制解调器需要获得计时偏移后，如以下调试所显示， ：

```
344374.528 CMAC_LOG_STATE_CHANGE                    dhcp_state
344377.292 CMAC_LOG_RNG_REQ_TRANSMITTED
344377.292 CMAC_LOG_RNG_RSP_MSG_RCVD
```

```
344387.412 CMAC_LOG_DHCP_ASSIGNED_IP_ADDRESS           10.1.1.20
344387.412 CMAC_LOG_DHCP_TFTP_SERVER_ADDRESS           172.17.110.136
344387.412 CMAC_LOG_DHCP_TOD_SERVER_ADDRESS            172.17.110.136
!--- TOD server IP address obtained. 344387.412 CMAC_LOG_DHCP_SET_GATEWAY_ADDRESS 344387.412
CMAC_LOG_DHCP_ERROR_ACQUIRING_TZ_OFFSET !--- Timing offset not specified in DHCP server.
344387.412 CMAC_LOG_DHCP_CONFIG_FILE_NAME platinum.cm 344387.412
CMAC_LOG_DHCP_ERROR_ACQUIRING_SEC_SVR_ADDR 344387.412 CMAC_LOG_DHCP_ERROR_ACQUIRING_LOG_ADDRESS
344387.412 CMAC_LOG_DHCP_COMPLETE 344387.412 CMAC_LOG_RESET_DHCP_FAILED 344387.412
CMAC_LOG_STATE_CHANGE reset_interface_state !--- Modem resetting.
```

在下面调试我们安排**no time-server**指定因此，但是我们安排计时偏移配置在DHCP服务器联机的有线调制解调器：

```
3d23h: 345297.516 CMAC_LOG_DHCP_ASSIGNED_IP_ADDRESS           10.1.1.20
3d23h: 345297.516 CMAC_LOG_DHCP_TFTP_SERVER_ADDRESS           172.17.110.136
3d23h: 345297.516 CMAC_LOG_DHCP_ERROR_ACQUIRING_TOD_ADDRESS 3d23h: 345297.516 CMAC_LOG_DHCP_SET_GATEWAY_ADDRESS
3d23h: 345297.516 CMAC_LOG_DHCP_TZ_OFFSET 03d23h: 345297.516 CMAC_LOG_DHCP_CONFIG_FILE_NAME
platinum.c 3d23h: 345297.520 CMAC_LOG_DHCP_ERROR_ACQUIRING_SEC_SVR_ADDR 3d23h: 345297.520
CMAC_LOG_DHCP_ERROR_ACQUIRING_LOG_ADDRESS 3d23h: 345297.520 CMAC_LOG_DHCP_COMPLETE 3d23h:
345297.532 CMAC_LOG_STATE_CHANGE establish_tod_state 3d23h: 345297.532
CMAC_LOG_TOD_NOT_REQUESTED_NO_TIME_ADDR 3d23h: 345297.532 CMAC_LOG_STATE_CHANGE
security_association_state 3d23h: 345297.536 CMAC_LOG_SECURITY_BYPASSED 3d23h: 345297.536
CMAC_LOG_STATE_CHANGE configuration_file 3d23h: 345297.536 CMAC_LOG_LOADING_CONFIG_FILE
platinum.cm 3d23h: 345297.568 CMAC_LOG_CONFIG_FILE_PROCESS_COMPLETE 3d23h: 345297.568
CMAC_LOG_STATE_CHANGE registration_state 3d23h: 345297.592 CMAC_LOG_REG_RSP_MSG_RCVD 3d23h:
345297.592 CMAC_LOG_COS_ASSIGNED_SID 1/7 3d23h: 345297.596 CMAC_LOG_RNG_REQ_QUEUED 7 3d23h:
345297.596 CMAC_LOG_REGISTRATION_OK 3d23h: 345297.596 CMAC_LOG_STATE_CHANGE
establish_privacy_state 3d23h: 345297.596 CMAC_LOG_PRIVACY_NOT_CONFIGURED 3d23h: 345297.596
CMAC_LOG_STATE_CHANGE maintenance_state 133.CABLEMODEM.CISCO: 3d23h: %LINEPROTO-5-UPDOWN: Line
protocol on Interface changed state to up
```

什么DHCP选项全面列表要求，并且哪个是可选请参考的[DHCP和DOCSIS配置文件电缆调制解调器(DOCSIS 1.0)]技术说明的。

注意： 注意：常见错误做，当曾经CNR作为DHCP服务器时是选择Ntp server在策略配置菜单的服务器选项下。反而，应该选择时间偏移和时间服务器在Bootp兼容选项下。欲知关于配置的详情CNR参考[配置]在CNR文档的[DHCP]。

不包括Router选项设置在DHCP服务器或指定一个无效的IP地址在Router选项字段也将导致不超过的调制解调器init (i)状态，和能从下面**debug cable-modem mac log verbose**被看到：

```
1d16h: 146585.940 CMAC_LOG_CONFIG_FILE_TFTP_FAILED - 1d16h: 146585.940
CMAC_LOG_CONFIG_FILE_PROCESS_COMPLETE 1d16h: 146585.944 CMAC_LOG_RESET_CONFIG_FILE_READ_FAILED
1d16h: 146585.944 CMAC_LOG_STATE_CHANGE reset_interface_state 1d16h: 146585.944
CMAC_LOG_STATE_CHANGE reset_hardware_state
```

注意： 无效的DOCSIS配置文件，特别是一个最大上行传输突发设置到255在[DOCSIS CPE Configurator的]服务等级(COS)，其中任一进一步比init (i)可以防止调制解调器继续。这在设置在微槽单元的此值的早DOCSIS规范典型地看到。推荐值是1600个或1800个字节。

TOD 交换 init(t) 状态

在调制解调器获取了其网络参数后必须请求从每日定时(ToD)服务器的每日定时。TOD使用一UTC时间戳(从一月的秒钟1， 1970)。当与从DHCP的时间偏移选项值结合当前时间可以计算。时间使用Syslog和事件日志时间戳。

在我们之下有电缆调制解调器用SID 1和2在init (t)。注意与最近的IOS，以后比Cisco IOS软件版本版本12.1(1)有线调制解调器将来联机，即使TOD交换失败，参见调试输出如下跟随**show cable modem命令**：

```
sydney# show cable mode Interface Prim Online Timing Rec QoS CPE IP address MAC address Sid
State Offset Power Cable2/0/U0 1 init(t) 2808 0.00 2 0 10.1.1.20 0030.96f9.65d9 Cable2/0/U0 2
init(t) 2809 0.25 2 0 10.1.1.21 0030.96f9.6605 Cable2/0/U0 3 init(i) 2810 -0.25 2 0 10.1.1.22
0050.7366.1e01 2d01h: 177933.712 CMAC_LOG_STATE_CHANGE dhcp_state 2d01h: 177933.716
CMAC_LOG_RNG_REQ_TRANSMITTED 2d01h: 177933.716 CMAC_LOG_RNG_RSP_MSG_RCVD 2d01h: 177946.596
CMAC_LOG_DHCP_ASSIGNED_IP_ADDRESS 10.1.1.20 2d01h: 177946.596 CMAC_LOG_DHCP_TFTP_SERVER_ADDRESS
172.17.110.136 2d01h: 177946.596 CMAC_LOG_DHCP_TOD_SERVER_ADDRESS 172.17.110.130 2d01h:
177946.596 CMAC_LOG_DHCP_SET_GATEWAY_ADDRESS 2d01h: 177946.596 CMAC_LOG_DHCP_TZ_OFFSET 0 2d01h:
177946.600 CMAC_LOG_DHCP_CONFIG_FILE_NAME platinum.cm 2d01h: 177946.600
CMAC_LOG_DHCP_ERROR_ACQUIRING_SEC_SVR_ADDR 2d01h: 177946.600
CMAC_LOG_DHCP_ERROR_ACQUIRING_LOG_ADDRESS 2d01h: 177946.600 CMAC_LOG_DHCP_COMPLETE 2d01h:
177946.612 CMAC_LOG_STATE_CHANGE establish_tod_state 2d01h: 177946.716
CMAC_LOG_RNG_REQ_TRANSMITTED 2d01h: 177946.716 CMAC_LOG_RNG_RSP_MSG_RCVD 133.CABLEMODEM.CISCO:
2d01h: %LINEPROTO-5-UPDOWN: Line protocol on Interface cap 2d01h: 177947.716
CMAC_LOG_RNG_REQ_TRANSMITTED 2d01h: 177947.716 CMAC_LOG_RNG_RSP_MSG_RCVD 2d01h: 177948.616
CMAC_LOG_TOD_REQUEST_SENT 172.17.110.130 2d01h: 177948.716 CMAC_LOG_RNG_REQ_TRANSMITTED 2d01h:
177954.616 CMAC_LOG_TOD_REQUEST_SENT 172.17.110.130 2d01h: 177954.716
CMAC_LOG_RNG_REQ_TRANSMITTED 2d01h: 177954.716 CMAC_LOG_RNG_RSP_MSG_RCVD 2d01h: 177960.616
CMAC_LOG_TOD_REQUEST_SENT 172.17.110.130 2d01h: 177960.712 CMAC_LOG_RNG_REQ_TRANSMITTED 2d01h:
177960.716 CMAC_LOG_RNG_RSP_MSG_RCVD 2d01h: 177961.716 CMAC_LOG_RNG_REQ_TRANSMITTED
131.CABLEMODEM.CISCO: 2d01h: %UBR900-3-TOD_FAILED_TIMER_EXPIRED:TOD failed, but Cable Interface
proceeding to operational state 2d01h: 177986.616 CMAC_LOG_TOD_WATCHDOG_EXPIRED 2d01h:
177986.616 CMAC_LOG_STATE_CHANGE security_association_state 2d01h: 177986.616
CMAC_LOG_SECURITY_BYPASSED 2d01h: 177986.616 CMAC_LOG_STATE_CHANGE configuration_file 2d01h:
177986.620 CMAC_LOG_LOADING_CONFIG_FILE platinum.cm 2d01h: 177986.644
CMAC_LOG_CONFIG_FILE_PROCESS_COMPLETE 2d01h: 177986.644 CMAC_LOG_STATE_CHANGE registration_state
2d01h: 177986.644 CMAC_LOG_REG_REQ_MSG_QUEUED 2d01h: 177986.648 CMAC_LOG_REG_REQ_TRANSMITTED
2d01h: 177986.652 CMAC_LOG_REG_RSP_MSG_RCVD 2d01h: 177986.652 CMAC_LOG_COS_ASSIGNED_SID 1/1
2d01h: 177986.656 CMAC_LOG_RNG_REQ_QUEUED 1 2d01h: 177986.656 CMAC_LOG_REGISTRATION_OK !---
Modem online. 2d01h: 177986.656 CMAC_LOG_STATE_CHANGE establish_privacy_state 2d01h: 177986.656
CMAC_LOG_PRIVACY_NOT_CONFIGURED 2d01h: 177986.656 CMAC_LOG_STATE_CHANGE maintenance_state 2d01h:
177988.716 CMAC_LOG_RNG_REQ_TRANSMITTED
```

下面从有线调制解调器运行Cisco IOS软件版本版本12.0(7)T捕获的调试显示调制解调器重置由于TOD计时器失效。调制解调器从未在这种情况下获得在线状态。

```
18:31:23:  66683.974 CMAC_LOG_STATE_CHANGE                      dhcp_state
18:31:24:  66684.110 CMAC_LOG_DHCP_ASSIGNED_IP_ADDRESS          10.1.1.25
18:31:24:  66684.114 CMAC_LOG_DHCP_TFTP_SERVER_ADDRESS          172.17.110.136
18:31:24:  66684.118 CMAC_LOG_DHCP_TOD_SERVER_ADDRESS           172.17.110.130
! Deliberate wrong IP Address
18:31:24:  66684.122 CMAC_LOG_DHCP_SET_GATEWAY_ADDRESS
18:31:24:  66684.124 CMAC_LOG_DHCP_TZ_OFFSET                    0
18:31:24:  66684.128 CMAC_LOG_DHCP_CONFIG_FILE_NAME             platinum.cm
18:31:24:  66684.132 CMAC_LOG_DHCP_ERROR_ACQUIRING_SEC_SVR_ADDR
18:31:24:  66684.136 CMAC_LOG_DHCP_COMPLETE
18:31:24:  66684.260 CMAC_LOG_STATE_CHANGE                      establish_tod_state
18:31:24:  66684.268 CMAC_LOG_TOD_REQUEST_SENT
18:31:25: %LINEPROTO-5-UPDOWN: Line protocol on Interface cable-modem0, changed state to up
18:31:29:  66689.952 CMAC_LOG_RNG_REQ_TRANSMITTED
18:31:29:  66689.956 CMAC_LOG_RNG_RSP_MSG_RCVD
18:32:04: 66724.266 CMAC_LOG_WATCHDOG_TIMER 18:32:04: %UBR900-3-RESET_TOD_WATCHDOG_EXPIRED:
Cable Interface Reset due to TOD watchdog timer 18:32:04: 66724.272
CMAC_LOG_RESET_TOD_WATCHDOG_EXPIRED 18:32:04: 66724.274 CMAC_LOG_STATE_CHANGE reset_interface !-
-- Modem resetting.
```

时刻错误几乎总是指向DHCP误配置。能导致TOD错误的可能的误配置是网关地址误配置或错误的TOD服务器地址。确保您能ping时间服务器排除IP连通性问题并且确保时间服务器是可用的。

为了实现故障排除目的，CMTS可以配置作为ToD服务器。命令是：

```
sydney# conf t Enter configuration commands, one per line. End with CNTL/Z. sydney(config)#
cable time-server sydney(config)# service udp-small-servers max-servers 25
```

能使用调试ToD问题的某些命令，当CMTS配置，因为ToD是**show cable clock**， **show controllers clock-reference**。

选项文件传输已启动 - init(o) 状态

主要配置和管理界面对有线调制解调器是从提供服务器下载的配置文件。此配置文件包含：

- 下行信道和上行信道认证和特性
- 服务等级设置
- 基础线保密性设置
- 一般操作设置
- 网络管理信息
- 软件升级字段
- 过滤器
- 卖方细节设置

在init滞留的有线调制解调器(o)状态通常指示有线调制解调器开始或准备下载配置文件，但是不成功归结于以下可能的来源：

- 不正确，损坏(例如：而不是二进制的ASCII)，或者未命中DOCSIS配置文件无法到达TFTP server，二者之一是不可用，太忙碌或者没有IP连通性
- 在DOCSIS文件的无效的或遗漏的配置参数
- 在TFTP server的错误文件权限

注意： 您不可以总是发现init (o)，反而您也许发现init (i)通过然后循环从init(r1)到init (i)。一更加准确的状态可以通过显示**show controller cable-modem 0 mac state**输出派生。这是被裁减的显示：

```
kuffing# show controller cable-modem 0 mac state MAC State: configuration_file_state Ranging
SID: 4 Registered: FALSE Privacy Established: FALSE
```

如果它是失败的配置文件损坏或TFTP server跟随**show cable modem命令**下面的**debug cable-modem mac log verbose不会**告诉您。调试指向他们两个。

```
sydney# show cable modem Interface Prim Online Timing Rec QoS CPE IP address MAC address Sid
State Offset Power Cable2/0/U0 1 init(o) 2812 0.00 2 0 10.1.1.21 0030.96f9.6605 Cable2/0/U0 2
init(o) 2814 0.50 2 0 10.1.1.22 0050.7366.1e01 w3d: 880748.992 CMAC_LOG_STATE_CHANGE dhcp_state
1w3d: 880751.652 CMAC_LOG_RNG_REQ_TRANSMITTED 1w3d: 880751.656 CMAC_LOG_RNG_RSP_MSG_RCVD 1w3d:
880761.876 CMAC_LOG_DHCP_ASSIGNED_IP_ADDRESS 10.1.1.20 1w3d: 880761.876
CMAC_LOG_DHCP_TFTP_SERVER_ADDRESS 172.17.110.136 1w3d: 880761.876
CMAC_LOG_DHCP_TOD_SERVER_ADDRESS 172.17.110.136 1w3d: 880761.876
CMAC_LOG_DHCP_SET_GATEWAY_ADDRESS 1w3d: 880761.876 CMAC_LOG_DHCP_TZ_OFFSET 0 1w3d: 880761.880
CMAC_LOG_DHCP_CONFIG_FILE_NAME data.cm !--- Corrupt configuration file. 1w3d: 880761.880
CMAC_LOG_DHCP_ERROR_ACQUIRING_SEC_SVR_ADDR 1w3d: 880761.880
CMAC_LOG_DHCP_ERROR_ACQUIRING_LOG_ADDRESS 1w3d: 880761.880 CMAC_LOG_DHCP_COMPLETE 1w3d:
880761.892 CMAC_LOG_STATE_CHANGE establish_tod_state 1w3d: 880761.896 CMAC_LOG_TOD_REQUEST_SENT
172.17.110.136 1w3d: 880761.904 CMAC_LOG_TOD_REPLY_RECEIVED 3180091733 1w3d: 880761.908
CMAC_LOG_TOD_COMPLETE 1w3d: 880761.908 CMAC_LOG_STATE_CHANGE security_association_state 1w3d:
880761.908 CMAC_LOG_SECURITY_BYPASSED 1w3d: 880761.912 CMAC_LOG_STATE_CHANGE
configuration_file_state 1w3d: 880761.912 CMAC_LOG_LOADING_CONFIG_FILE data.cm 1w3d: 880762.652
CMAC_LOG_RNG_REQ_TRANSMITTED 1w3d: 880762.652 CMAC_LOG_RNG_RSP_MSG_RCVD 133.CABLEMODEM.CISCO:
1w3d: %LINEPROTO-5-UPDOWN: Line protocol on Interface cable-modem0, changed state to up 1w3d:
880762.928 CMAC_LOG_CONFIG_FILE_TFTP_FAILED -1 1w3d: 880762.932
CMAC_LOG_CONFIG_FILE_PROCESS_COMPLETE 1w3d: 880762.932 CMAC_LOG_RESET_CONFIG_FILE_READ_FAILED
1w3d: 880762.932 CMAC_LOG_STATE_CHANGE reset_interface_state 1w3d: 880762.932
CMAC_LOG_STATE_CHANGE reset_hardware_state
```

无效的配置参数示例在DOCSIS CPE Configurator的是无效或缺少厂商ID或卖方细节信息。结果类似于上述调试除下列信息之外：

```
133.CABLEMODEM.CISCO: 00:13:07: %LINEPROTO-5-UPDOWN: Line protocol on Interface cable-modem0,
changed state to up

00:13:08: 788.004 CMAC_LOG_CONFIG_FILE_CISCO_BAD_TYPE 155 00:13:08: 788.004
CMAC_LOG_CONFIG_FILE_CISCO_BAD_TYPE 115 00:13:08: 788.004 CMAC_LOG_CONFIG_FILE_CISCO_BAD_TYPE
116 00:13:08: 788.004 CMAC_LOG_CONFIG_FILE_CISCO_BAD_ATTR_MAX_LENG128 00:13:08: 788.008
CMAC_LOG_CONFIG_FILE_PROCESS_COMPLETE 00:13:08: 788.008 CMAC_LOG_RESET_CONFIG_FILE_READ_FAILED
```

"Online, Online(d), Online(pk), Online(pt) 状态"

```
sydney#show cable modem Interface Prim Online Timing Rec QoS CPE IP address MAC address Sid
State Offset Power Cable2/0/U0 4 online 2810 -0.75 6 0 10.1.1.20 0030.96f9.65d9 Cable2/0/U0 5
online(pt) 2290 0.25 5 0 10.1.1.25 0050.7366.2223 Cable2/0/U0 7 online(d) 2815 0.00 6 0
10.1.1.27 0001.9659.4461
```

除联机外(d)，联机， online(pk)和online(pt)表明CM获得了在线状态并且能传送和接收数据。联机(d)，然而，表明调制解调器有来的联机，但是拒绝网络访问。这由在无线电频率信息下的禁用的网络访问选项典型地造成的DOCSIS CPE Configurator。网络访问的默认启用。会创建拒绝PCs连接对CM的DOCSIS配置文件。

这能清楚看见从Show Cable Modem显示和上面**debug cable-modem mac log verbose** ：

```
04:11:34:  15094.700 CMAC_LOG_STATE_CHANGE                      dhcp_state

04:11:46:  15106.392 CMAC_LOG_RNG_REQ_TRANSMITTED
04:11:46:  15106.396 CMAC_LOG_RNG_RSP_MSG_RCVD
04:11:47:  15107.620 CMAC_LOG_DHCP_ASSIGNED_IP_ADDRESS          10.1.1.20
04:11:47:  15107.620 CMAC_LOG_DHCP_TFTP_SERVER_ADDRESS          172.17.110.136
04:11:47:  15107.620 CMAC_LOG_DHCP_TOD_SERVER_ADDRESS           172.17.110.136
04:11:47:  15107.620 CMAC_LOG_DHCP_SET_GATEWAY_ADDRESS
04:11:47:  15107.620 CMAC_LOG_DHCP_TZ_OFFSET                    0
04:11:47:  15107.624 CMAC_LOG_DHCP_CONFIG_FILE_NAME             noaccess.cm
!--- Network Access disabled. 04:11:47: 15107.624 CMAC_LOG_DHCP_ERROR_ACQUIRING_SEC_SVR_ADDR
04:11:47: 15107.624 CMAC_LOG_DHCP_ERROR_ACQUIRING_LOG_ADDRESS 04:11:47: 15107.624
CMAC_LOG_DHCP_COMPLETE 04:11:47: 15107.636 CMAC_LOG_STATE_CHANGE establish_tod_state 04:11:47:
15107.640 CMAC_LOG_TOD_REQUEST_SENT 172.17.110.136 04:11:47: 15107.648
CMAC_LOG_TOD_REPLY_RECEIVED 3179226080 04:11:47: 15107.652 CMAC_LOG_TOD_COMPLETE 04:11:47:
15107.652 CMAC_LOG_STATE_CHANGE security_association_state 04:11:47: 15107.652
CMAC_LOG_SECURITY_BYPASSED 04:11:47: 15107.652 CMAC_LOG_STATE_CHANGE configuration_file_state
04:11:47: 15107.652 CMAC_LOG_LOADING_CONFIG_FILE noaccess.c 133.CABLEMODEM.CISCO: 04:11:48:
%LINEPROTO-5-UPDOWN: Line protocol on Interface cable-modem0, changed state to up 04:11:48:
15108.672 CMAC_LOG_CONFIG_FILE_PROCESS_COMPLETE 04:11:48: 15108.672 CMAC_LOG_STATE_CHANGE
registration_state 04:11:48: 15108.672 CMAC_LOG_REG_REQ_MSG_QUEUED 04:11:48: 15108.676
CMAC_LOG_REG_REQ_TRANSMITTED 04:11:48: 15108.680 CMAC_LOG_REG_RSP_MSG_RCVD 04:11:48: 15108.680
CMAC_LOG_COS_ASSIGNED_SID 1/4 04:11:48: 15108.684 CMAC_LOG_RNG_REQ_QUEUED 4 04:11:48: 15108.684
CMAC_LOG_NETWORK_ACCESS_DENIED 04:11:48: 15108.684 CMAC_LOG_REGISTRATION_OK 04:11:48: 15108.684
CMAC_LOG_STATE_CHANGE establish_privacy_state 04:11:48: 15108.684
CMAC_LOG_PRIVACY_NOT_CONFIGURED 04:11:48: 15108.684 CMAC_LOG_STATE_CHANGE maintenance_state
04:11:49: 15109.392 CMAC_LOG_RNG_REQ_TRANSMITTED
```

另一个方式检查是通过检查**show controllers cable-modem 0 mac state**输出在有线调制解调器的。

(显示开始处省略)

```
Config File:
  Network Access: FALSE !--- Network Access denied. Maximum CPEs: 3 Baseline Privacy: Auth. Wait
Timeout: 10 Reauth. Wait Timeout: 10 Auth. Grace Time: 600 Op. Wait Timeout: 1 Retry Wait
Timeout: 1 TEK Grace Time: 600 Auth. Reject Wait Time: 60 COS 1: Assigned SID: 4 Max Downstream
Rate: 10000000 Max Upstream Rate: 1024000 Upstream Priority: 7 Min Upstream Rate: 0 Max Upstream
Burst: 0 Privacy Enable: FALSE
```

(显示的其余省略。)

联机含义调制解调器有来的联机并且能沟通与CMTS。如果保密性基准接口(BPI)那么没有启用在线状态是假设的默认状态有线调制解调器初始化是成功的。如果BPI那么配置您将看到状态online(pk)被online(pt)短期然后跟随。这是在与**debug cable-modem mac log verbose**的CM端采取的debug输出显示显示仅注册部分：

```
5d03h: 445197.804 CMAC_LOG_STATE_CHANGE                         registration_state
5d03h: 445197.804 CMAC_LOG_REG_REQ_MSG_QUEUED
5d03h: 445197.812 CMAC_LOG_REG_REQ_TRANSMITTED
5d03h: 445197.816 CMAC_LOG_REG_RSP_MSG_RCVD
5d03h: 445197.816 CMAC_LOG_COS_ASSIGNED_SID                     1/4
5d03h: 445197.816 CMAC_LOG_RNG_REQ_QUEUED                       4
5d03h: 445197.816 CMAC_LOG_REGISTRATION_OK
5d03h: 445197.816 CMAC_LOG_STATE_CHANGE                         establish_privacy_state
5d03h: 445197.820 CMAC_LOG_PRIVACY_FSM_STATE_CHANGE machine: KEK, event/state:
EVENT_1_PROVISIONED/STATE_A_START, new state: STATE_B_AUTH_WAIT 5d03h: 445197.828
CMAC_LOG_BPKM_REQ_TRANSMITTED 5d03h: 445197.848 CMAC_LOG_BPKM_RSP_MSG_RCVD 5d03h: 445197.848
CMAC_LOG_PRIVACY_FSM_STATE_CHANGE machine: KEK, event/state:
EVENT_3_AUTH_REPLY/STATE_B_AUTH_WAIT, new state: STATE_C_AUTHORIZED 5d03h: 445198.524
CMAC_LOG_PRIVACY_FSM_STATE_CHANGE machine: TEK, event/state: EVENT_2_AUTHORIZED/STATE_A_START,
new state: STATE_B_OP_WAIT 5d03h: 445198.536 CMAC_LOG_RNG_REQ_TRANSMITTED 5d03h: 445198.536
CMAC_LOG_RNG_RSP_MSG_RCVD 5d03h: 445198.536 CMAC_LOG_BPKM_REQ_TRANSMITTED 5d03h: 445198.536
CMAC_LOG_BPKM_RSP_MSG_RCVD 5d03h: 445198.540 CMAC_LOG_PRIVACY_FSM_STATE_CHANGE machine: TEK,
event/state: EVENT_8_KEY_REPLY/STATE_B_OP_WAIT, new state: STATE_D_OPERATIONAL 5d03h: 445198.548
CMAC_LOG_PRIVACY_INSTALLED_KEY_FOR_SID 4 5d03h: 445198.548 CMAC_LOG_PRIVACY_ESTABLISHED 5d03h:
445198.552 CMAC_LOG_STATE_CHANGE maintenance_state 5d03h: 445201.484
CMAC_LOG_RNG_REQ_TRANSMITTED 5d03h: 445201.484 CMAC_LOG_RNG_RSP_MSG_RCVD
```

如果有与BPI的一问题一般您将看到我们不可能通过密钥验证阶段获得的Reject(pk)。这在reject(pk)和reject(pt)部分被覆盖。

注意：对于正确BPI操作请保证CMTS和CM是都运行支持BPI的镜像，由在镜像名称的符号K1表示。并且请保证字段Baseline Privacy Enable设置到1在DOCSIS CPE Configurator的服务等级选项下。如果CMTS运行支持BPI的镜像，而CM不是，并且我们安排启用的BPI在DOCSIS CPE Configurator然后您看到调制解调器循环在联机之间然后脱机。

在线电话回传

当电缆调制解调器是联机在Telco返回环境时，他们显示“T”而不是上行端口类似"U0"。下面的输出显示此情况

```
ubr7223# show cable modem Interface Prim Online Timing Rec QoS CPE IP address MAC address Sid
State Offset Power Cable2/0/T 94 online 0 0.00 3 2 10.10.169.151 0020.4066.b6b0 Cable2/0/T 95
online 0 0.00 3 1 10.10.168.18 0020.4061.db5e Cable2/0/T 96 online 0 0.00 3 1 10.10.169.240
0020.4066.b644 Cable2/0/U0 97 online 307 0.25 4 1 10.10.168.108 0020.4002.fc7c Cable2/0/T 98
online 0 0.00 3 1 10.10.169.245 0020.4003.65fe Cable2/0/U0 99 online 332 0.25 4 0 10.10.168.110
0020.400b.9b40 Cable2/0/U0 100 online 277 0.25 4 1 10.10.169.114 0020.4002.ff42 Cable2/0/T 101
online 0 0.00 3 1 10.10.169.175 0020.4066.b6c8
```

以上输出在混杂环境的在线状态显示电缆调制解调器。注意有SID 97， 99和100使用端口上行数据流0的电缆调制解调器，当电缆调制解调器使用telco返回的其余上游路径的时。Telco返回配置与故障排除程序是超出本文的范围。读者能参考Cisco uBR7200系列有线路由器的电话回程和Cisco CMTS的Telco返回对于telco返回信息。

Reject(pk) 和 Reject(pt) 状态

下面在CMTS路由器的一个Show Cable Modem显示输出：

```
sydney# show cable modem Interface Prim Online Timing Rec QoS CPE IP address MAC address Sid
State Offset Power Cable2/0/U0 1 offline 2811 0.00 2 0 10.1.1.27 0001.9659.4461 Cable2/0/U0 2
```

reject(pk) 2812 0.00 6 0 10.1.1.20 0030.96f9.65d9 Cable2/0/U0 3 online 2287 0.00 5 0 10.1.1.25 0050.7366.2223 **01:58:51: %UBR7200-5-UNAUTHSIDTIMEOUT: CMTS deleted BPI unauthorized Cable Modem 0030.96f9.65d9**

有与BPI配置的一问题您的在大多数情况下将看到reject(pk)。此状态是典型地由以下造成的：

- 由CM的损坏公共密钥在验证请求。事件正确顺序的参考的示例Debug Cable Privacy。
- cable privacy authenticate-modem配置命令出现在CMTS路由器，但是没有RADIUS服务器存在的。
- 不正确配置的RADIUS服务器。
- 不正确配置的RADIUS服务器。

Reject(pt)典型地由无效TEK或数据流加密密钥造成的。

欲知更多信息请参阅基线保密性界面规格 。

sydney# **debug cable privacy 02:32:08: CMTS Received AUTH REQ. 02:32:08: Created a new CM key for 0030.96f9.65d9. 02:32:08: CMTS generated AUTH_KEY. 02:32:08: Input : 70D158F106B0B75 02:32:08: Public Key:** 02:32:08: 0x0000: 30 68 02 61 00 DA BA 93 3C E5 41 7C 20 2C D1 87 02:32:08: 0x0010: 3B 93 56 E1 35 7A FC 5E B7 E1 72 BA E6 A7 71 91 02:32:08: 0x0020: F4 68 CB 86 A8 18 FB A9 B4 DD 5F 21 B3 6A BE CE 02:32:08: 0x0030: 6A BE E1 32 A8 67 9A 34 E2 33 4A A4 0F 8C DB BD 02:32:08: 0x0040: D0 BB DE 54 39 05 B0 E0 F7 19 29 20 8C F9 3A 69 02:32:08: 0x0050: E4 51 C6 89 FB 8A 8E C6 01 22 02 34 C5 1F 87 F6 02:32:08: 0x0060: A3 1C 7E 67 9B 02 03 01 00 01 02:32:08: RSA public Key subject: 02:32:08: 0x0000: 30 7C 30 0D 06 09 2A 86 48 86 F7 0D 01 01 01 05 02:32:08: 0x0010: 00 03 6B 00 30 68 02 61 00 DA BA 93 3C E5 41 7C 02:32:08: 0x0020: 20 2C D1 87 3B 93 56 E1 35 7A FC 5E B7 E1 72 BA 02:32:08: 0x0030: E6 A7 71 91 F4 68 CB 86 A8 18 FB A9 B4 DD 5F 21 02:32:08: 0x0040: B3 6A BE CE 6A BE E1 32 A8 67 9A 34 E2 33 4A A4 02:32:08: 0x0050: 0F 8C DB BD D0 BB DE 54 39 05 B0 E0 F7 19 29 20 02:32:08: 0x0060: 8C F9 3A 69 E4 51 C6 89 FB 8A 8E C6 01 22 02 34 02:32:08: 0x0070: C5 1F 87 F6 A3 1C 7E 67 9B 02 03 01 00 01 02:32:08: RSA encryption result = 0 02:32:08: RSA encrypted output: 02:32:08: 0x0000: B6 CA 09 93 BF 2C 05 66 9D C5 AF 67 0F 64 2E 31 02:32:08: 0x0010: 67 E4 2A EA 82 3E F7 63 8F 01 73 10 14 4A 24 ED 02:32:08: 0x0020: 65 8F 59 D8 23 BC F3 A8 48 7D 1A 08 09 BF A3 A8 02:32:08: 0x0030: D6 D2 5B C4 A7 36 C4 A9 28 F0 6C 5D A1 3B 92 A2 02:32:08: 0x0040: BC 99 CC 1F C9 74 F9 FA 76 83 ED D5 26 B4 92 EE 02:32:08: 0x0050: DD EA 50 81 C6 29 43 4F 73 DA 56 C2 29 AF 05 53 **02:32:08: CMTS sent AUTH response. 02:32:08: CMTS Received TEK REQ. 02:32:08: Created a new key for SID 2. 02:32:08: CMTS sent KEY response.**

下面在CM的一debug输出示例，当我们有验证失败时：

```
6d02h: 527617.480 CMAC_LOG_CONFIG_FILE_PROCESS_COMPLETE
6d02h: 527617.480 CMAC_LOG_STATE_CHANGE                    registration_state
6d02h: 527617.484 CMAC_LOG_REG_REQ_MSG_QUEUED
6d02h: 527617.488 CMAC_LOG_REG_REQ_TRANSMITTED
6d02h: 527617.492 CMAC_LOG_REG_RSP_MSG_RCVD
6d02h: 527617.492 CMAC_LOG_COS_ASSIGNED_SID                1/2
6d02h: 527617.492 CMAC_LOG_RNG_REQ_QUEUED                  2
6d02h: 527617.492 CMAC_LOG_REGISTRATION_OK
6d02h: 527617.496 CMAC_LOG_STATE_CHANGE                    establish_privacy_state
6d02h: 527617.496 CMAC_LOG_PRIVACY_FSM_STATE_CHANGE machine: KEK, event/state:
EVENT_1_PROVISIONED/STATE_A_START, new state: STATE_B_AUTH_WAIT 6d02h: 527617.504
CMAC_LOG_BPKM_REQ_TRANSMITTED 6d02h: 527617.504 CMAC_LOG_BPKM_RSP_MSG_RCVD 6d02h: 527617.508
CMAC_LOG_PRIVACY_FSM_STATE_CHANGE machine: KEK, event/state:
EVENT_2_AUTH_REJECT/STATE_B_AUTH_WAIT, new state: STATE_E_AUTH_REJ_WAIT 129.CABLEMODEM.CISCO:
6d02h: %CMBPKM-1-AUTHREJECT: Authorization request rejected by CMTS: Unauthorized CM 6d02h:
527618.588 CMAC_LOG_RNG_REQ_TRANSMITTED 6d02h: 527618.592 CMAC_LOG_RNG_RSP_MSG_RCVD
```

同样在CMTS路由器的debug cable privacy将给以下错误：

```
02:47:00: CMTS Received AUTH REQ.

02:47:00: Sending KEK REJECT. 02:47:05: %UBR7200-5-UNAUTHSIDTIMEOUT: CMTS deleted BPI
unauthorized Cable Modem 0030.96f9.65d9
```

注意： CM继续无限地循环从reject(pk)到init(r1)。

可以遇到的另一个可能的错误是，由于加密出口限制，一些供应商调制解调器在接口配置里可能要求以下on命令CMTS路由器：

```
sydney(config-if)# cable privacy 40-bit-des
```

注册- 拒绝 (m) 状态

在配置以后，调制解调器发送注册请求(REG-REQ)与配置设置以及CM和CMTS信息完整性检查(MIC)的需要的子集。CM MIC是为调制解调器提供一个方法肯定在配置文件设置的一个被切细的计算配置文件在运送中未被窜改。CMTS MIC是同一件事，除了也包括**电缆共享秘密验证串的**一设置。此共享机密由CMTS知道并且保证仅授权的调制解调器将允许注册与CMTS。

```
sydney# show cable modem Interface Prim Online Timing Rec QoS CPE IP address MAC address Sid
State Offset Power Cable2/0/U0 1 reject(m) 2807 0.00 2 0 10.1.1.20 0030.96f9.65d9 Cable2/0/U0 2
online 2284 -0.50 5 0 10.1.1.25 0050.7366.2223 Cable2/0/U0 3 offline 18669 0.25 2 0 10.1.1.26
0050.7366.2221 01:17:59: %UBR7200-5-AUTHFAIL: Authorization failed for Cable Modem 0030.96f9.60
01:18:21: %UBR7200-5-AUTHFAIL: Authorization failed for Cable Modem 0030.96f9.60
```

上述输出显示有线调制解调器用SID 1在拒绝(m)状态。这是由坏消息完整性检查(MIC)造成的典型地造成由：

- 电缆共享秘密配置在电缆接口下和CMTS不匹配在DOCSIS CPE Configurator的其他选项下。默认情况下两个值是空的，并且不应该引起任何问题，如果没指定。
- 损坏配置文件(DOCSIS文件)。

下面在有线调制解调器侧采取的debug输出使用**debug cable-modem mac log verbose**。

```
00:32:08:   1928.816 CMAC_LOG_STATE_CHANGE                    establish_tod_e
00:32:08:   1928.820 CMAC_LOG_TOD_REQUEST_SENT                172.17.110.136
00:32:08:   1928.828 CMAC_LOG_TOD_REPLY_RECEIVED              3179139839
00:32:08:   1928.832 CMAC_LOG_TOD_COMPLETE
00:32:08:   1928.832 CMAC_LOG_STATE_CHANGE                    security_association_state
00:32:08:   1928.832 CMAC_LOG_SECURITY_BYPASSED
00:32:08:   1928.832 CMAC_LOG_STATE_CHANGE                    configuration_e
00:32:08:   1928.832 CMAC_LOG_LOADING_CONFIG_FILE             platinum.cm
00:32:09:   1929.708 CMAC_LOG_RNG_REQ_TRANSMITTED
00:32:09:   1929.712 CMAC_LOG_RNG_RSP_MSG_RCVD
133.CABLEMODEM.CISCO: 00:32:09: %LINEPROTO-5-UPDOWN: Line protocol on Interface
00:32:09:   1929.852 CMAC_LOG_CONFIG_FILE_PROCESS_COMPLETE
00:32:09:   1929.856 CMAC_LOG_STATE_CHANGE                    registration_state
00:32:09:   1929.856 CMAC_LOG_REG_REQ_MSG_QUEUED
00:32:09:   1929.860 CMAC_LOG_REG_REQ_TRANSMITTED
00:32:09:   1929.864 CMAC_LOG_REG_RSP_MSG_RCVD
00:32:09: 1929.864 CMAC_LOG_RESET_AUTHENTICATION_FAILURE 00:32:09: 1929.868
CMAC_LOG_STATE_CHANGE reset_interface_state 00:32:09: 1929.868 CMAC_LOG_STATE_CHANGE
reset_hardware_state
```

要纠正问题请保证您有有效配置文件和一个相同的值在CMTS验证下对什么在电缆接口下的**电缆共享秘密***线路*配置。

注册- 拒绝 (c) 状态

```
sydney# show cable modem Interface Prim Online Timing Rec QoS CPE IP address MAC address Sid
State Offset Power Cable2/0/U0 1 offline 2807 -0.25 2 0 10.1.1.20 0030.96f9.65d9 Cable2/0/U0 2
online 2284 -0.25 5 0 10.1.1.25 0050.7366.2223 Cable2/0/U0 3 reject(c) 2286 -0.25 2 0 10.1.1.26
0050.7366.2221 20:35:59: %UBR7200-5-CLASSFAIL: Registration failed for Cable Modem 0050.7366.2Q
```

如上所述有线调制解调器用SID 3失败注册由于差的服务等级(COS)或拒绝(c)。典型地这造成由：

- CMTS路由器是无法或不愿意授权特定请求的COS
- 在服务等级选项的误配置的参数在DOCSIS CPE Configurator，例如有与同一个ID的两业务类

别。

下面在CM端采取的**debug cable-modem mac log verbose**显示失败由于坏COS ：

```
1w3d: 885643.820 CMAC_LOG_STATE_CHANGE registration_state 1w3d: 885643.820
CMAC_LOG_REG_REQ_MSG_QUEUED 1w3d: 885643.824 CMAC_LOG_REG_REQ_TRANSMITTED 1w3d: 885643.828
CMAC_LOG_REG_RSP_MSG_RCVD 1w3d: 885643.828 CMAC_LOG_SERVICE_NOT_AVAILABLE 0x01,0x01,0x01 1w3d:
885643.828 CMAC_LOG_RESET_SERVICE_NOT_AVAILABLE 1w3d: 885643.828 CMAC_LOG_STATE_CHANGE
reset_interface_state 1w3d: 885643.832 CMAC_LOG_STATE_CHANGE reset_hardware_state 1w3d:
885644.416 CMAC_LOG_STATE_CHANGE wait_for_link_up_state 1w3d: 885644.420
CMAC_LOG_DRIVER_INIT_IDB_RESET 0x8039E23C 1w3d: 885644.420 CMAC_LOG_LINK_DOWN 1w3d: 885644.420
CMAC_LOG_LINK_UP 1w3d: 885644.420 CMAC_LOG_STATE_CHANGE ds_channel_scanning_state
133.CABLEMODEM.CISCO: 1w3d: %LINEPROTO-5-UPDOWN: Line protocol on Interface cable-modem0,
changed state to down 1w3d: 885645.528 CMAC_LOG_UCD_MSG_RCVD 1 1w3d: 885646.828
CMAC_LOG_DS_64QAM_LOCK_ACQUIRED 453000000
```

同样地，在CMTS路由器的**debug cable registration**给予下列信息：

```
sydney# debug cable registration CMTS registration debugging is on sydney# 1d04h: %UBR7200-5-
CLASSFAIL: Registration failed for Cable Modem 0001.9659.4461 on interface Cable2/0/U0:
Bad/Missing Class of Service Config in REG-REQ
```

注意调制解调器如何最终重置并且启动再来一遍。

附录

从 CM 显示show controller命令

```
kuffing# show controllers cable-modem 0 mac state MAC State: maintenance_state Ranging SID: 1
Registered: TRUE Privacy Established: TRUE MIB Values: Mac Resets: 0 Sync lost: 0 Invalid Maps:
0 Invalid UCDs: 0 Invalid Rng Rsp: 0 Invalid Reg Rsp: 0 T1 Timeouts: 0 T2 Timeouts: 0 T3
Timeouts: 0 T4 Timeouts: 0 Range Aborts: 0 DS ID: 0 DS Frequency: 453000000 DS Symbol Rate:
5056941 DS QAM Mode 64QAM DS Search: 79 453000000 855000000 6000000 80 93000000 105000000
6000000 81 111025000 117025000 6000000 82 231012500 327012500 6000000 83 333025000 333025000
6000000 84 339012500 399012500 6000000 85 405000000 447000000 6000000 86 123012500 129012500
6000000 87 135012500 135012500 6000000 88 141000000 171000000 6000000 89 219000000 225000000
6000000 90 177000000 213000000 6000000 91 55752700 67753300 6000300 92 79753900 85754200 6000300
93 175758700 211760500 6000300 94 121756000 169758400 6000300 95 217760800 397769800 6000300 96
73753600 115755700 6000300 97 403770100 595779700 6000300 98 601780000 799789900 6000300 99
805790200 997799800 6000300 US ID: 1 US Frequency: 27984000 US Power Level: 23.0 (dBmV) US
Symbol Rate: 1280000 Ranging Offset: 12418 Mini-Slot Size: 8 Change Count: 6 Preamble Pattern:
CC CC CC CC CC CC CC CC CC CC CC CC CC CC CC CC CC CC CC CC CC CC CC CC CC CC CC CC CC CC CC
CC CC CC CC CC CC CC CC CC CC CC CC CC CC CC CC CC CC CC CC CC CC CC CC CC CC CC CC CC CC CC
CC CC CC CC CC CC CC CC CC CC CC CC CC CC CC CC CC CC CC CC CC CC CC CC CC CC CC CC CC CC CC
CC CC CC CC CC CC CC CC CC CC CC CC CC CC CC CC CC CC CC CC CC CC CC CC CC CC CC CC CC 0D 0D
Burst Descriptor 0: Interval Usage Code: 1 Modulation Type: 1 Differential Encoding: 2 Preamble
Length: 64 Preamble Value Offset: 952 FEC Error Correction: 0 FEC Codeword Info Bytes: 16
Scrambler Seed: 338 Maximum Burst Size: 1 Guard Time Size: 8 Last Codeword Length: 1 Scrambler
on/off: 1 Burst Descriptor 1: Interval Usage Code: 3 Modulation Type: 1 Differential Encoding: 2
Preamble Length: 128 Preamble Value Offset: 896 FEC Error Correction: 5 FEC Codeword Info Bytes:
34 Scrambler Seed: 338 Maximum Burst Size: 0 Guard Time Size: 48 Last Codeword Length: 1
Scrambler on/off: 1 Burst Descriptor 2: Interval Usage Code: 4 Modulation Type: 1 Differential
Encoding: 2 Preamble Length: 128 Preamble Value Offset: 896 FEC Error Correction: 5 FEC Codeword
Info Bytes: 34 Scrambler Seed: 338 Maximum Burst Size: 0 Guard Time Size: 48 Last Codeword
Length: 1 Scrambler on/off: 1 Burst Descriptor 3: Interval Usage Code: 5 Modulation Type: 1
Differential Encoding: 2 Preamble Length: 72 Preamble Value Offset: 944 FEC Error Correction: 5
FEC Codeword Info Bytes: 75 Scrambler Seed: 338 Maximum Burst Size: 6 Guard Time Size: 8 Last
Codeword Length: 1 Scrambler on/off: 1 Burst Descriptor 4: Interval Usage Code: 6 Modulation
Type: 1 Differential Encoding: 2 Preamble Length: 80 Preamble Value Offset: 936 FEC Error
Correction: 8 FEC Codeword Info Bytes: 220 Scrambler Seed: 338 Maximum Burst Size: 0 Guard Time
Size: 8 Last Codeword Length: 1 Scrambler on/off: 1 Config File: Network Access: TRUE Maximum
```

CPEs: 3 Baseline Privacy: Auth. Wait Timeout: 10 Reauth. Wait Timeout: 10 Auth. Grace Time: 600 Op. Wait Timeout: 1 Retry Wait Timeout: 1 TEK Grace Time: 600 Auth. Reject Wait Time: 60 COS 1: Assigned SID: 1 Max Downstream Rate: 10000000 Max Upstream Rate: 1024000 Upstream Priority: 6 Min Upstream Rate: 0 Max Upstream Burst: 0 Privacy Enable: TRUE Ranging Backoff Start: 0 (at initial ranging) Ranging Backoff End: 3 (at initial ranging) Data Backoff Start: 0 (at initial ranging) Data Backoff End: 4 (at initial ranging) IP Address: 10.1.1.20 Net Mask: 255.255.255.0 TFTP Server IP Address: 172.17.110.136 Time Server IP Address: 172.17.110.136 Config File Name: privacy.cm Time Zone Offset: 0 Log Server IP Address: 0.0.0.0 Drop Ack Enabled: TRUE Mac Sid Status Max Sids: 4 Sids In Use: 1 Mac Sid 0: Sid: 1 State: 2 Mac Sid 1: Sid: 0 State: 1 Mac Sid 2: Sid: 0 State: 1 Mac Sid 3: Sid: 0 State: 1 Test sid queue: 0 kuffing#

CM 端的完全调试捕获

kuffing# **debug cable mac log verbose** 1w0d: 606764.132 CMAC_LOG_LINK_UP 1w0d: 606764.132 CMAC_LOG_STATE_CHANGE ds_channel_scanning_state 1w0d: 606764.136
CMAC_LOG_WILL_SEARCH_DS_FREQUENCY_BAND 99/805790200/997799800/6000300 1w0d: 606764.136
CMAC_LOG_WILL_SEARCH_DS_FREQUENCY_BAND 98/601780000/799789900/6000300 1w0d: 606764.136
CMAC_LOG_WILL_SEARCH_DS_FREQUENCY_BAND 97/403770100/595779700/6000300 1w0d: 606764.140
CMAC_LOG_WILL_SEARCH_DS_FREQUENCY_BAND 96/73753600/115755700/6000300 1w0d: 606764.140
CMAC_LOG_WILL_SEARCH_DS_FREQUENCY_BAND 95/217760800/397769800/6000300 1w0d: 606764.140
CMAC_LOG_WILL_SEARCH_DS_FREQUENCY_BAND 94/121756000/169758400/6000300 1w0d: 606764.144
CMAC_LOG_WILL_SEARCH_DS_FREQUENCY_BAND 93/175758700/211760500/6000300 1w0d: 606764.144
CMAC_LOG_WILL_SEARCH_DS_FREQUENCY_BAND 92/79753900/85754200/6000300 1w0d: 606764.148
CMAC_LOG_WILL_SEARCH_DS_FREQUENCY_BAND 91/55752700/67753300/6000300 1w0d: 606764.148
CMAC_LOG_WILL_SEARCH_DS_FREQUENCY_BAND 90/177000000/213000000/6000000 1w0d: 606764.148
CMAC_LOG_WILL_SEARCH_DS_FREQUENCY_BAND 89/219000000/225000000/6000000 1w0d: 606764.152
CMAC_LOG_WILL_SEARCH_DS_FREQUENCY_BAND 88/141000000/171000000/6000000 1w0d: 606764.152
CMAC_LOG_WILL_SEARCH_DS_FREQUENCY_BAND 87/135012500/135012500/6000000 1w0d: 606764.152
CMAC_LOG_WILL_SEARCH_DS_FREQUENCY_BAND 86/123012500/129012500/6000000 1w0d: 606764.156
CMAC_LOG_WILL_SEARCH_DS_FREQUENCY_BAND 85/405000000/447000000/6000000 1w0d: 606764.156
CMAC_LOG_WILL_SEARCH_DS_FREQUENCY_BAND 84/339012500/399012500/6000000 1w0d: 606764.160
CMAC_LOG_WILL_SEARCH_DS_FREQUENCY_BAND 83/333025000/333025000/6000000 1w0d: 606764.160
CMAC_LOG_WILL_SEARCH_DS_FREQUENCY_BAND 82/231012500/327012500/6000000 1w0d: 606764.160
CMAC_LOG_WILL_SEARCH_DS_FREQUENCY_BAND 81/111025000/117025000/6000000 1w0d: 606764.164
CMAC_LOG_WILL_SEARCH_DS_FREQUENCY_BAND 80/93000000/105000000/6000000 1w0d: 606764.164
CMAC_LOG_WILL_SEARCH_DS_FREQUENCY_BAND 79/453000000/855000000/6000000 **1w0d: 606764.164**
CMAC_LOG_WILL_SEARCH_SAVED_DS_FREQUENCY 453000000 1w0d: 606765.416 CMAC_LOG_UCD_MSG_RCVD 1
131.CABLEMODEM.CISCO: 1w0d: %LINK-3-UPDOWN: Interface cable-modem0, changed state to up 1w0d: 606766.576 CMAC_LOG_DS_64QAM_LOCK_ACQUIRED 453000000 1w0d: 606766.576
CMAC_LOG_DS_CHANNEL_SCAN_COMPLETED 1w0d: 606766.576 CMAC_LOG_STATE_CHANGE wait_ucd_state 1w0d: 606767.416 CMAC_LOG_UCD_MSG_RCVD 1 1w0d: 606769.416 CMAC_LOG_UCD_MSG_RCVD 1 1w0d: 606769.416
CMAC_LOG_ALL_UCDS_FOUND 1w0d: 606769.416 CMAC_LOG_STATE_CHANGE wait_map_state 1w0d: 606769.420
CMAC_LOG_FOUND_US_CHANNEL 1 1w0d: 606771.416 CMAC_LOG_UCD_MSG_RCVD 1 1w0d: 606771.416
CMAC_LOG_UCD_NEW_US_FREQUENCY 27984000 1w0d: 606771.416 CMAC_LOG_SLOT_SIZE_CHANGED 8 1w0d: 606771.436 CMAC_LOG_UCD_UPDATED 1w0d: 606771.452 CMAC_LOG_MAP_MSG_RCVD 1w0d: 606771.452
CMAC_LOG_INITIAL_RANGING_MINISLOTS 41 1w0d: 606771.452 CMAC_LOG_STATE_CHANGE ranging_1_state 1w0d: 606771.452 CMAC_LOG_RANGING_OFFSET_SET_TO 9610 1w0d: 606771.456 CMAC_LOG_POWER_LEVEL_IS 20.0 dBmV (commanded) 1w0d: 606771.456 CMAC_LOG_STARTING_RANGING 1w0d: 606771.456
CMAC_LOG_RANGING_BACKOFF_SET 0 1w0d: 606771.456 CMAC_LOG_RNG_REQ_QUEUED 0 1w0d: 606771.512
CMAC_LOG_RNG_REQ_TRANSMITTED 1w0d: 606771.516 CMAC_LOG_RNG_RSP_MSG_RCVD 1w0d: 606771.516
CMAC_LOG_RNG_RSP_SID_ASSIGNED 1 1w0d: 606771.516 CMAC_LOG_ADJUST_RANGING_OFFSET 2810 1w0d: 606771.516 CMAC_LOG_RANGING_OFFSET_SET_TO 12420 1w0d: 606771.516 CMAC_LOG_ADJUST_TX_POWER 17 1w0d: 606771.520 CMAC_LOG_STATE_CHANGE ranging_2_state 1w0d: 606771.520 CMAC_LOG_RNG_REQ_QUEUED 1 1w0d: 606772.524 CMAC_LOG_RNG_REQ_TRANSMITTED 1w0d: 606772.524 CMAC_LOG_RNG_RSP_MSG_RCVD 1w0d: 606772.524 CMAC_LOG_RANGING_SUCCESS **1w0d: 606772.524 CMAC_LOG_STATE_CHANGE dhcp_state** 1w0d: 606773.564 CMAC_LOG_RNG_REQ_TRANSMITTED 1w0d: 606773.564 CMAC_LOG_RNG_RSP_MSG_RCVD 1w0d: 606775.560 CMAC_LOG_RNG_REQ_TRANSMITTED 1w0d: 606775.564 CMAC_LOG_RNG_RSP_MSG_RCVD 1w0d: 606778.560 CMAC_LOG_RNG_REQ_TRANSMITTED 1w0d: 606778.564 CMAC_LOG_RNG_RSP_MSG_RCVD 1w0d: 606780.564 CMAC_LOG_RNG_REQ_TRANSMITTED 1w0d: 606780.564 CMAC_LOG_RNG_RSP_MSG_RCVD 1w0d: 606782.560 CMAC_LOG_RNG_REQ_TRANSMITTED 1w0d: 606782.564 CMAC_LOG_RNG_RSP_MSG_RCVD 1w0d: 606785.408**CMAC_LOG_DHCP_ASSIGNED_IP_ADDRESS 10.1.1.20** 1w0d: 606785.408
CMAC_LOG_DHCP_TFTP_SERVER_ADDRESS 172.17.110.136 1w0d: 606785.408
CMAC_LOG_DHCP_TOD_SERVER_ADDRESS 172.17.110.136 1w0d: 606785.408
CMAC_LOG_DHCP_SET_GATEWAY_ADDRESS 1w0d: 606785.408 CMAC_LOG_DHCP_TZ_OFFSET 0 1w0d: 606785.412

CMAC_LOG_DHCP_CONFIG_FILE_NAME privacy.cm 1w0d: 606785.412
CMAC_LOG_DHCP_ERROR_ACQUIRING_SEC_SVR_ADDR 1w0d: 606785.412
CMAC_LOG_DHCP_ERROR_ACQUIRING_LOG_ADDRESS 1w0d: 606785.412 CMAC_LOG_DHCP_COMPLETE 1w0d:
606785.424 CMAC_LOG_STATE_CHANGE establish_tod_state 1w0d: 606785.428 CMAC_LOG_TOD_REQUEST_SENT
172.17.110.136 1w0d: 606785.440 CMAC_LOG_TOD_REPLY_RECEIVED 3179817738 1w0d: 606785.440
CMAC_LOG_TOD_COMPLETE 1w0d: 606785.440 CMAC_LOG_STATE_CHANGE security_association_state 1w0d:
606785.444 CMAC_LOG_SECURITY_BYPASSED 1w0d: 606785.444 CMAC_LOG_STATE_CHANGE
configuration_file_state 1w0d: 606785.444 **CMAC_LOG_LOADING_CONFIG_FILE privacy.cm** 1w0d:
606785.560 CMAC_LOG_RNG_REQ_TRANSMITTED 1w0d: 606785.564 CMAC_LOG_RNG_RSP_MSG_RCVD
133.CABLEMODEM.CISCO: 1w0d: %**LINEPROTO-5-UPDOWN: Line protocol on Interface cable-modem0,
changed state to up** 1w0d: 606786.460 CMAC_LOG_CONFIG_FILE_PROCESS_COMPLETE 1w0d: 606786.460
CMAC_LOG_STATE_CHANGE registration_state 1w0d: 606786.464 CMAC_LOG_REG_REQ_MSG_QUEUED 1w0d:
606786.468 CMAC_LOG_REG_REQ_TRANSMITTED 1w0d: 606786.472 CMAC_LOG_REG_RSP_MSG_RCVD 1w0d:
606786.472 CMAC_LOG_COS_ASSIGNED_SID 1/1 1w0d: 606786.472 CMAC_LOG_RNG_REQ_QUEUED 1 1w0d:
606786.472 CMAC_LOG_REGISTRATION_OK 1w0d: 606786.476 **CMAC_LOG_STATE_CHANGE**
establish_privacy_state 1w0d: 606786.476 CMAC_LOG_PRIVACY_FSM_STATE_CHANGE machine: KEK,
event/state: EVENT_1_PROVISIONED/STATE_A_START, new state: STATE_B_AUTH_WAIT 1w0d: 606786.480
CMAC_LOG_BPKM_REQ_TRANSMITTED 1w0d: 606786.496 CMAC_LOG_BPKM_RSP_MSG_RCVD 1w0d: 606786.496
CMAC_LOG_PRIVACY_FSM_STATE_CHANGE machine: KEK, event/state:
EVENT_3_AUTH_REPLY/STATE_B_AUTH_WAIT, new state: STATE_C_AUTHORIZED 1w0d: 606787.176
CMAC_LOG_PRIVACY_FSM_STATE_CHANGE machine: TEK, event/state: EVENT_2_AUTHORIZED/STATE_A_START,
new state: STATE_B_OP_WAIT 1w0d: 606787.184 CMAC_LOG_BPKM_REQ_TRANSMITTED 1w0d: 606787.188
CMAC_LOG_BPKM_RSP_MSG_RCVD 1w0d: 606787.192 CMAC_LOG_PRIVACY_FSM_STATE_CHANGE machine: TEK,
event/state: EVENT_8_KEY_REPLY/STATE_B_OP_WAIT, new state: STATE_D_OPERATIONAL 1w0d: 606787.200
CMAC_LOG_PRIVACY_INSTALLED_KEY_FOR_SID 1 1w0d: 606787.200 CMAC_LOG_PRIVACY_ESTABLISHED 1w0d:
606787.204 **CMAC_LOG_STATE_CHANGE** maintenance_state 1w0d: 606787.560 CMAC_LOG_RNG_REQ_TRANSMITTED

从 CMTS 显示show controller命令

sydney# **show controllers cable 2/0** Interface Cable2/0 Hardware is MC16B BCM3210 revision=0x56B0
idb 0x619705D8 MAC regs 0x3D100000 PLX regs 0x3D000000 rx ring entries 1024 tx ring entries 128
MAP tx ring entries 128 Rx ring 0x4B0607C0 shadow 0x6198DDF8 head 272 Tx ring 0x4B062800 shadow
0x6198EE68 head 127 tail 127 count 0 MAP Tx ring 0x4B062C40 shadow 0x6198F2D8 head 33 tail 33
count 0 MAP timer sourced from slot 2 throttled 0 enabled 0 disabled 0 Rx: spurious 769
framing_err 0 hcs_err 1 no_buffer 0 short_pkt 0 no_enqueue 0 no_enp 0 miss_count 0 latency 8
invalid_sid 0 invalid_mac 0 bad_ext_hdr_pdu 0 concat 0 bad-concat 0 Tx: full 0 drop 0 stuck 0
latency 0 MTx: full 0 drop 0 stuck 0 latency 9 Slots 132642 NoUWCollNoEngy 2 FECorHCS 1 HCS 1
Req 1547992064 ReqColl 0 ReqNoise 14211 ReqNoEnergy 1547905820 ReqData 0 ReqDataColl 0
ReqDataNoise 0 ReqDataNoEnergy 0 Rng 89613 RngColl 0 RngNoise 255 FECBlks 248575 UnCorFECBlks 2
CorFECBlks 0 MAP FIFO overflow 0, Rx FIFO overflow 0, No rx buf 0 DS FIFO overflow 0, US FIFO
overflow 0, US stuck 0 Bandwidth Requests= 0x11961 Piggyback Requests= 0xECC1 Ranging Requests=
0x15D15 Timing Offset = 0x0 Bad bandwidth Requests= 0x0 No MAP buffer= 0x0 **Cable2/0 Downstream
is up** Frequency not set, Channel Width 6 MHz, 64-QAM, Symbol Rate 5.056941 Msps FEC ITU-T J.83
Annex B, R/S Interleave I=32, J=4 Downstream channel ID: 0 **Cable2/0 Upstream 0 is up** Frequency
27.984 MHz, Channel Width 1.600 MHz, QPSK Symbol Rate 1.280 Msps Spectrum Group is overridden
SNR 29.8280 dB Nominal Input Power Level 0 dBmV, Tx Timing Offset 2815 Ranging Backoff automatic
(Start 0, End 3) Ranging Insertion Interval automatic (60 ms) Tx Backoff Start 0, Tx Backoff End
4 Modulation Profile Group 1 Concatenation is enabled part_id=0x3137, rev_id=0x03, rev2_id=0xFF
nb_agc_thr=0x0000, nb_agc_nom=0x0000 Range Load Reg Size=0x58 Request Load Reg Size=0x0E
Minislot Size in number of Timebase Ticks is = 8 Minislot Size in Symbols = 64 Bandwidth
Requests = 0x11969 Piggyback Requests = 0xECC8 Invalid BW Requests= 0x0 Minislots Requested=
0x1C13EF Minislots Granted = 0x1C13EF Minislot Size in Bytes = 16 Map Advance (Dynamic) : 2454
usecs UCD Count = 40287

已解释的计时器

T1	10 秒	时候等待可用的UCD
T2	12秒	时候等待广播区域的最初的维护间隔

T3	200毫秒	在范围期间，时候等待RNG-RSP。
T4	30秒	时候等待站点维护间隔时间执行站点维护范围。
T6	6秒	时候在注册时等待REG-RSP。

CMTS 配置示例

```
sydney# wr t Building configuration... Current configuration: ! version 12.1 service timestamps
debug uptime service timestamps log uptime no service password-encryption ! hostname sydney !
boot system flash ubr7200-ik1s-mz_121-2_T.bin no logging buffered enable password cisco ! no
cable qos permission create no cable qos permission update cable qos permission modems ! ! ! !
ip subnet-zero no ip domain-lookup ! ! ! ! ! interface FastEthernet0/0 no ip address shutdown
half-duplex ! interface Ethernet1/0 ip address 172.17.110.139 255.255.255.224 ! interface
Ethernet1/1 no ip address shutdown ! interface Ethernet1/2 no ip address shutdown ! interface
Ethernet1/3 no ip address shutdown ! interface Ethernet1/4 no ip address shutdown ! interface
Ethernet1/5 no ip address shutdown ! interface Ethernet1/6 no ip address shutdown ! interface
Ethernet1/7 no ip address shutdown ! interface Cable2/0 ip address 10.10.1.1 255.255.255.0
secondary ip address 10.1.1.10 255.255.255.0 no keepalive cable downstream annex B cable
downstream modulation 64qam cable downstream interleave-depth 32 cable upstream 0 frequency
28000000 cable upstream 0 power-level 0 no cable upstream 0 shutdown cable upstream 1 shutdown
cable upstream 2 shutdown cable upstream 3 shutdown cable upstream 4 shutdown cable upstream 5
shutdown cable dhcp-giaddr policy cable helper-address 172.17.110.136 ! interface Cable3/0 no ip
address no keepalive shutdown cable downstream annex B cable downstream modulation 64qam cable
downstream interleave-depth 32 cable upstream 0 shutdown cable upstream 1 shutdown cable
upstream 2 shutdown cable upstream 3 shutdown cable upstream 4 shutdown cable upstream 5
shutdown ! ip classless ip route 0.0.0.0 0.0.0.0 172.17.110.129 no ip http server ! ! line con 0
exec-timeout 0 0 transport input none line aux 0 line vty 0 exec-timeout 0 0 password cisco
login line vty 1 4 password cisco login ! end sydney# show version Cisco Internetwork Operating
System Software IOS (tm) 7200 Software (UBR7200-IK1S-M), Version 12.1(2)T, RELEASE SOFTWARE
(fc1) Copyright (c) 1986-2000 by cisco Systems, Inc. Compiled Tue 16-May-00 13:36 by ccai Image
text-base: 0x60008900, data-base: 0x613E8000 ROM: System Bootstrap, Version 11.1(10) [dschwart
10], RELEASE SOFTWARE (fc1) BOOTFLASH: 7200 Software (UBR7200-BOOT-M), Version 12.0(10)SC, EARLY
DEPLOYMENT RELEASE SOFTWARE (fc1) sydney uptime is 1 day, 4 hours, 31 minutes System returned to
ROM by reload System image file is "slot0:ubr7200-ik1s-mz_121-2_T.bin" cisco uBR7223 (NPE150)
processor (revision B) with 57344K/8192K bytes of memory. Processor board ID SAB0249006T R4700
CPU at 150Mhz, Implementation 33, Rev 1.0, 512KB L2 Cache 3 slot midplane, Version 1.0 Last
reset from power-on Bridging software. X.25 software, Version 3.0.0. 8 Ethernet/IEEE 802.3
interface(s) 1 FastEthernet/IEEE 802.3 interface(s) 2 Cable Modem network interface(s) 125K
bytes of non-volatile configuration memory. 1024K bytes of packet SRAM memory. 20480K bytes of
Flash PCMCIA card at slot 0 (Sector size 128K). 4096K bytes of Flash internal SIMM (Sector size
256K). Configuration register is 0x2102
```

相关信息

- 创建DOCSIS 1.0配置文件使用Cisco DOCSIS配置器(仅限注册用户)
- 技术支持 - Cisco Systems