

Understanding show cable modem Command States

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Introduction

This document explains cable modem online states in the Cisco 900 and 7200 Series Universal Broadband Routers (uBR), and it explains the reason why they fail setup. Information on the states appear after you issue the **show cable modem** command.

Prerequisites

Requirements

You should have a basic understanding of the DOCSIS protocol and of the Cisco IOS® software command line on uBR series routers.

Components Used

The information in this document is based on Cisco uBR7200 and uBR900 cable modem termination system (CMTS) and DOCSIS-compliant cable modems.

The information in this document was created from the devices in a specific lab environment. All of the devices used in this document started with a cleared (default) configuration. If your network is live, make sure that you understand the potential impact of any command.

Conventions

Refer to Cisco Technical Tips Conventions for more information on document conventions.

show cable modem Sample Output

```
sniper# show cable modem
Interface  Prim Online  Timing Rec    QoS CPE IP address  MAC address
          Sid  State  Offset Power
Cable2/0/U0 11  online  2287    0.25  5    0    10.1.1.25    0050.7366.2223
```

Cable2/0/U0	12	online	2812	0.25	5	0	10.1.1.28	0001.9659.4415
Cable2/0/U0	13	online	2810	-0.50	5	0	10.1.1.20	0030.96f9.65d9
Cable2/0/U0	14	online	2290	0.50	5	0	10.1.1.26	0050.7366.2221
Cable2/0/U0	15	online	2292	0.25	5	0	10.1.1.30	0050.7366.1fb9
Cable2/0/U0	16	online	2815	0.00	5	0	10.1.1.27	0001.9659.4461

Understanding Online States

The tables in this section show the possible values for the MAC state field.

Registration and Provisioning Status Conditions

MAC State Value	Description
init(r1)	The cable modem (CM) sent initial ranging.
init(r2)	The CM is ranging. The CMTS received initial ranging from the CM and has sent radio frequency (RF) power, timing offset, and frequency adjustments to the CM.
init(rc)	Ranging has completed. Note: If a CM appears to be stuck in this state, it could be that the CM is able to communicate successfully on the cable network but the upstream is at capacity and does not have any additional bandwidth to allow the CM to finish registration and come online. Either manually move one or more CMs to other upstreams or issue the cable load-balance group commands to enable load balancing on the upstream.
init(d)	The DHCP request was received. This also indicates that the first IP broadcast packet has been received from the CM.
init(i)	The cable modem has received the DHCPOFFER reply from the DHCP server that has assigned an IP address to the modem, but the modem has not yet replied with a DHCPREQUEST message to request that particular IP address, nor has it sent an IP packet with that IP address. Note: If a CM appears to be stuck in this state, the CM has likely received the DHCPOFFER reply from the DHCP server, but this reply might have contained one or more invalid options for that particular CM.
init(o)	The CM has begun to download the option file (DOCSIS configuration file) using the Trivial File Transfer Protocol (TFTP), as specified in the DHCP response. If the CM remains in this state, it indicates that the download has failed.

init(t)	Time-of-day (ToD) exchange has started.
resetting	The CM is being reset and will shortly restart the registration process.

Non-Error Status Conditions

MAC State Value	Description
cc(r1)	The CM had registered and was online, but has received a Downstream Channel Change (DCC) or an Upstream Channel Change (UCC) request message from the CMTS. The CM has begun to move to the new channel, and the CMTS has received the CM's initial ranging on the new downstream or upstream channel. At the MAC layer, the CM is considered offline because it is not yet passing traffic on the new channel, but this state does not trigger the flap-list counters.
cc(r2)	This state should normally follow cc(r1); and it indicates that the CM has finished its initial ranging on the new channel and is currently performing continuous ranging on the new channel. At the MAC layer, the CM is considered offline because it is not yet passing traffic on the new channel, but this state does not trigger the flap-list counters.
offline	The CM is considered offline (disconnected or powered down).
online	The CM has registered and is enabled to pass data on the network.
online(d)	<p>The CM registered, but network access for CPE devices that use this CM has been disabled through the DOCSIS configuration file. The CM does not forward traffic to or from the CPE devices, but the CMTS can continue to communicate with the CM using DOCSIS messages and IP traffic (such as SNMP commands).</p> <p>Note: If BPI was enabled in the DOCSIS configuration file sent to the CM, assume that the CM is using BPI encryption, unless other messages show that the BPI negotiation and key assignments have failed.</p>
online(pkd)	The CM registered, but network access for CPE devices that use this CM has been disabled through the DOCSIS configuration file. In addition, BPI is enabled and the

	<p>key-encrypting key (KEK) is assigned.</p> <p>Note: This state is equivalent to the <code>online(d)</code> and <code>online(pk)</code> states.</p>
<code>online(ptd)</code>	<p>The CM registered, but network access for CPE devices that use this CM has been disabled through the DOCSIS configuration file. In addition, BPI is enabled and the traffic encryption key (TEK) is assigned. BPI encryption is now being performed.</p> <p>Note: This state is equivalent to the <code>online(d)</code> and <code>online(pt)</code> states.</p>
<code>online(pk)</code>	<p>The CM registered, BPI is enabled, and the KEK is assigned.</p>
<code>online(pt)</code>	<p>The CM registered, BPI is enabled, and the TEK is assigned. BPI encryption is now being performed.</p> <p>Note: If network access was disabled in the DOCSIS configuration file sent to the CM, then the network disabled status takes precedence, and the MAC status field shows <code>online(d)</code> instead of <code>online(pt)</code>, even when BPI encryption is enabled and operational.</p>
<p>Note: If an exclamation point (!) appears in front of one of the online states, it indicates that the cable dynamic-secret command has been used with either the mark or reject option, and that the cable modem has failed the dynamic secret authentication check.</p>	
<code>expire(pk)</code>	<p>The CM registered, BPI is enabled, and the KEK was assigned; but the current KEK expired before the CM could successfully renew a new KEK value.</p>
<code>expire(pkd)</code>	<p>The CM registered, but network access for CPE devices that use this CM has been disabled through the DOCSIS configuration file. In addition, BPI is enabled and the KEK was assigned; but the current KEK expired before the CM could successfully renew a new KEK value.</p> <p>Note: This state is equivalent to the <code>online(d)</code> and <code>expire(pk)</code> states.</p>
<code>expire(pt)</code>	<p>The CM registered, BPI is enabled, and the TEK was assigned; but the current TEK expired before the CM could successfully renew a new KEK value.</p>
<code>expire(ptd)</code>	

	<p>The CM registered, but network access for CPE devices that use this CM has been disabled through the DOCSIS configuration file. In addition, BPI is enabled and the TEK was assigned; but the current TEK expired before the CM could successfully renew a new KEK value.</p> <p>Note: This state is equivalent to the <code>online(d)</code> and <code>expire(pt)</code> states.</p>
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Error Status Conditions

MAC State Value	Description
<code>reject(m)</code>	<p>The CM attempted to register, but registration was refused due to a bad Message Integrity Check (MIC) value. This also could indicate that the shared secret in the DOCSIS configuration file does not match the value that is configured on the CMTS with the cable shared-secret command.</p> <p>In Cisco IOS Software Release 12.1(11b)EC1 and 12.2(8)BC2 or later releases, this could also indicate that the cable tftp-enforce command has been used to require that a CM attempt a TFTP download of the DOCSIS configuration file before it registers, but the CM did not do so.</p>
<code>reject(c)</code>	<p>The CM attempted to register, but registration was refused due to a number of possible errors:</p> <ul style="list-style-type: none"> • The CM attempted to register with a minimum guaranteed upstream bandwidth that would exceed the limits imposed by the cable upstream admission-control command. • The CM has been disabled because of a security violation. • A bad class of service (CoS) value in the DOCSIS configuration file. • The CM attempted to create a new CoS configuration but the CMTS is not configured to permit such changes. • The CM failed the timestamp check for its DOCSIS configuration file. (This could indicate a possible theft-of-service attempt, or a problem with the synchronization of the clocks on the CM and CMTS.)

<code>reject(pk)</code>	The KEK key assignment is rejected and BPI encryption has not been established.
<code>reject(pkd)</code>	The CM registered, but network access for CPE devices that use this CM has been disabled through the DOCSIS configuration file. In addition, BPI encryption was not established because KEK key assignment was rejected. Note: This state is equivalent to the <code>online(d)</code> and <code>reject(pk)</code> states.
<code>reject(pt)</code>	The TEK key assignment is rejected and BPI encryption has not been established.
<code>reject(ptd)</code>	The CM registered, but network access for CPE devices that use this CM has been disabled through the DOCSIS configuration file. In addition, BPI encryption was not established because TEK key assignment was rejected. Note: This state is equivalent to the <code>online(d)</code> and <code>reject(pt)</code> states.
Note: In Cisco IOS Software Release 12.1(20)EC, 12.2(15)BC1, and earlier, when network access is disabled in the DOCSIS configuration file sent to the CM, the network disabled status takes precedence, and the MAC status field shows <code>online(d)</code> even if BPI encryption fails. Issue the show cable modem mac-address command to confirm whether BPI is enabled or disabled for a particular cable modem.	
<code>reject(ts)</code>	The CM attempted to register, but registration failed because the TFTP server timestamp in the CM registration request did not match the timestamp maintained by the CMTS. This might indicate that the CM attempted to register by replaying an old DOCSIS configuration file used during a prior registration attempt.
<code>reject(ip)</code>	The CM attempted to register, but registration failed because the IP address in the CM request did not match the IP address that the TFTP server recorded when it sent the DOCSIS configuration file to the CM. IP spoofing could be occurring.
<code>reject(na)</code>	The CM attempted to register, but registration failed because the CM did not send a Registration-Acknowledgement (REG-ACK) message in reply to the Registration-Response (REG-RSP) message sent by the CMTS. A Registration-NonAcknowledgement (REG-NACK) is assumed.

Note: The cable modem cannot transmit or receive Internet Protocol (IP) traffic when in a `reject(xx)` state. The maximum data rate is fixed at 1 KBit/sec in each direction. CMTS discards all packets.

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