uBR10012 Boot Sequence

Document ID: 3982

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Introduction

This document describes the boot sequence of the Cisco uBR10000 Series Universal Broadband Router from the Performance Routing Engine (PRE) to the radio frequency (RF), LAN, WAN, and Timing, Communications, and Control Plus (TCC+) cards.

Prerequisites

Requirements

Readers of this document should have knowledge of these topics:

- Basic Cisco router architecture
- Cisco IOS® Software command line interface

Components Used

The information in this document is based on these software and hardware versions:

- Cisco uBR10012 Universal Broadband Router
- Cisco IOS Software for the uBR10000 Series (UBR10K−P6−M)

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

For more information on document conventions, refer to the Cisco Technical Tips Conventions.

PRE Boot Sequence

The boot sequence of the PRE has these distinct steps:

1. Load the boot helper.

   ```
   c10k-eboot-mz.120-16.6.ST1
   ```

   This does not support any line cards; only the Fast Ethernet (FE) interface on the PRE is usable.
2. Load the main image.

   ```
   ubr10k-p6-mz.122-1.XF
   ubr10k-k8p6-mz.122-1.XF
   ```

   Each of these types of line cards poll the PRE for the firmware:

   - Cable line card
   - TCC+
   - Toaster
   - Gigabit Ethernet
   - Optical Carrier 12 (OC-12) power-on servicing (POS)

This output shows the actual live boot sequence and its log messages:

```
System Bootstrap, Version 12.0(9r)SL2, RELEASE SOFTWARE (fc1)

!--- Bootstrap version.

Copyright (c) 2000 by cisco Systems, Inc.
Reset Reason Register = RESET_REASON_RESET_REG (0x76)

!--- Reason for reload: RESET.

C10000 platform with 524288 Kbytes of main memory

Self decompressing the image :
################################################
################################################
Self decompressing the image :
################################################
################################################
Self decompressing the image :
################################################
################################################
Self decompressing the image :
################################################
################################################
Self decompressing the image :
################################################
################################################
Self decompressing the image :
################################################
#####
[OK]

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subject to restrictions as set forth in subparagraph
(c) of the Commercial Computer Software - Restricted
Rights clause at FAR sec. 52.227-19 and subparagraph
(c) (1) (ii) of the Rights in Technical Data and Computer
```

```
Software clause at DFARS sec. 252.227-7013.
           cisco Systems, Inc.
           170 West Tasman Drive
           San Jose, California 95134-1706

Cisco Internetwork Operating System Software
IOS (tm) 10000 Software (UBR10K-P6-M), Version 12.2(1)XF, EARLY
DEPLOYMENT RELEASE SOFTWARE (fc1)

!--- Main image.

TAC Support: http://www.cisco.com/cgi-bin/ibld/view.pl?i=support
Copyright (c) 1986-2001 by cisco Systems, Inc.
Compiled Fri 18-May-01 16:15 by ccai
Image text-base: 0x60008960, data-base: 0x612E0000
cisco uBR10000 (PRE-RP) processor with 393215K/131072K bytes of memory.

!--- Processor type.

Processor board ID TBA05100542
R7000 CPU at 262Mhz, Implementation 39, Rev 2.1, 256KB L2, 2048KB L3 Cache
Backplane version 1.0, 8 slot
Last reset from register reset
Toaster processor tmc0 is running.
Toaster processor tmc1 is running.
1 Ethernet/IEEE 802.3 interface(s)
1 FastEthernet/IEEE 802.3 interface(s)
509K bytes of non-volatile configuration memory.
46976K bytes of ATA PCMCIA card at slot 0 (Sector size 512 bytes).
32768K bytes of Flash internal SIMM (Sector size 256KB).

00:00:15: Downloading Microcode: file=system:pxf/c10k102-3.ucode,
version=102.3(40.4),
description=Experimental Software created Wed 31-Jan-01 16:22 by clauer
in view clauer-omega_dev

!--- Microcode for Parallel eXpress Forwarding (PXF) engine.

00:00:16: %SYS-7-NV_BLOCK_INIT: Initalized the geometry of nvram
00:00:22: %LINK-3-UPDOWN: Interface Ethernet0/0/0, changed state to up

!--- 10Base2 interface.

00:00:22: %LINK-5-CHANGED: Interface FastEthernet0/0/0, changed state to reset

!--- Management FE interface.
!--- Each of these lines of output appear on one line:

00:00:23: %UBR10000-5-USFREQCHG: Interface Cable6/1/0 Port U0,
          frequency changed to 34.992 MHz
00:00:23: %UBR10000-5-UPDOWN: Interface Cable6/1/0 Port U0,
          changed state to down
00:00:23: %UBR10000-5-UPDOWN: Interface Cable6/1/0 Port U1,
          changed state to down
00:00:23: %UBR10000-5-UPDOWN: Interface Cable6/1/0 Port U2,
          changed state to down
00:00:23: %UBR10000-5-UPDOWN: Interface Cable6/1/0 Port U3,
          changed state to down
00:00:24: %LINEPROTO-5-UPDOWN: Line protocol on Interface Ethernet0/0/0,
          changed state to up
00:00:24: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0/0,
          changed state to down
00:00:25: %LINK-5-CHANGED: Interface POS2/0/0,
          changed state to administratively down
00:00:25: %LINK-5-CHANGED: Interface GigabitEthernet4/0/0,
          changed state to administratively down
```

```
00:00:26: %LINEPROTO-5-UPDOWN: Line protocol on Interface POS2/0/0,
          changed state to down
00:00:26: %LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet4/0/0,
          changed state to down
00:00:29: !!pxf clients started, forwarding code operational!!

!--- The PFX engine microcode is decompressed and executed.

00:00:30: %SYS-5-RESTART: System restarted --
Cisco Internetwork Operating System Software
IOS (tm) 10000 Software (UBR10K-P6-M), Version 12.2(1)XF, EARLY
DEPLOYMENT RELEASE SOFTWARE (fc1)
TAC Support: http://www.cisco.com/cgi-bin/ibld/view.pl?i=support
Copyright (c) 1986-2001 by cisco Systems, Inc.
Compiled Fri 18-May-01 16:15 by ccai
00:00:30: %SYS-6-BOOTTIME: Time taken to reboot after reload = 349 seconds

!--- The time taken to boot after the reload initiated.

00:00:31: %LINK-3-UPDOWN: Interface FastEthernet0/0/0,
          changed state to up
00:00:32: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0/0,
          changed state to up
00:00:34: %IPCOIR-5-CARD_DETECTED: Card type 2cable-mc28 (0x254)
          in slot 6/1

!--- RF card registration request received.

00:00:34: %IPCOIR-5-CARD_DETECTED: Card type 2cable-mc28 (0x254)
          in slot 7/0

!--- RF card registration request received.

00:00:34: %IPCOIR-5-CARD_LOADING: Loading card in slot 6/1

!--- TFTP is used to transfer the RF card microcode.

00:00:34: %IPCOIR-5-CARD_LOADING: Loading card in slot 7/0

!--- TFTP is used to transfer the RF card microcode.

00:00:34: %IPCOIR-5-CARD_DETECTED: Card type 2cable-tccplus (0x2AF)
          in slot 1/1

!--- TCC+ registration request received.

00:00:34: %IPCOIR-5-CARD_DETECTED: Card type 1oc12pos-1 (0x164)
          in slot 2/0

!--- LAN to WAN registration received.

00:00:34: %IPCOIR-5-CARD_DETECTED: Card type 1gigethernet-1 (0x166)
          in slot 4/0

!--- LAN to WAN registration received.

00:00:34: %IPCOIR-2-CARD_UP_DOWN: Card in slot 1/1 is up.
          Notifying 2cable-tccplus driver.
00:00:34: %IPCOIR-2-CARD_UP_DOWN: Card in slot 2/0 is up.
          Notifying 1oc12pos-1 driver.
00:00:34: %UBR10KTCC-2-ACTIVE_TCC: TCCplus card 1/1 is active
          with Local oscillator as clock reference
00:00:35: %IPCOIR-2-CARD_UP_DOWN: Card in slot 4/0 is up.
          Notifying 1gigethernet-1 driver.
00:00:35: %C10KGE-6-GBIC_OK: Interface GigabitEthernet4/0/0,
          1000BASE-SX Gigabit Interface Converter (GBIC) inserted
```

RF Line Card Boot Sequence

The boot sequence of the RF line card has these distinct steps:

1. ROM Monitor (ROMmon) loads boot helper in the line card.
2. Boot helper sends the software version number and the card type.
3. The PRE downloads the image that corresponds to the card type.
4. The Cisco IOS Software image is decompressed and executed.
5. The Barium interface is set up so that data can pass to the PRE.

```
brubeck# debug ipc events

Special Events debugging is on
*Aug  1 05:12:10.596: IPC: Registration request for seat 'clc_6_1'

!--- The RF line card requests registration with the software version
!--- number and the line card type.

*Aug  1 05:12:10.604: IPC: Got an open port request for port 0x10008
*Aug  1 05:12:10.604: IPC: Got an open port request for port 0x10009
1w1d: %IPCOIR-5-CARD_DETECTED: Card type 2cable-mc28 (0x254) in slot 6/1

!--- The card type is detected.

1w1d: %IPCOIR-2-CARD_UP_DOWN: Card in slot 6/1 is up.
                              Notifying 2cable-mc28 driver.

!--- Microcode for the RF line card.

SLOT 6/1: 00:00:16: %IPCGRP-6-UCODEVER: Reported microcode version, 990227862.
SLOT 6/1: 00:00:16: %IPCGRP-6-INTENBDISAB: Interface disabled
<REMOVED>

!--- The main image is downloaded, decompressed, and executed.

SLOT 6/1: 00:00:19: %IPCGRP-6-BARENBDISAB: Barium interface enabled

!--- Enable Barium interface.

1w1d: %LINK-3-UPDOWN: Interface Cable6/1/1, changed state to up
SLOT 6/1: 00:00:20: %LINK-3-UPDOWN: Interface Cable6/1/1, changed state to up
SLOT 6/1: 00:00:20: %LINK-3-UPDOWN: Interface Barium3/0, changed state to up

!--- The Barium interface is set to up.

1w1d: %LINEPROTO-5-UPDOWN: Line protocol on Interface Cable6/1/1,
                           changed state to up
1w1d: %LINEPROTO-5-UPDOWN: Line protocol on Interface Cable6/1/0,
                           changed state to up
SLOT 6/1: 00:00:21: %LINEPROTO-5-UPDOWN: Line protocol on Interface Barium3/0,
                                         changed state to up

!--- The Barium line protocol is up and can now pass data to the PRE.
```

The boot helper continues to send the software version number and the card type as a keepalive. If the microcode is upgraded on the PRE, then the new microcode is downloaded and the upgrade occurs automatically.

LAN or WAN Card Boot Sequence

The boot sequence of a LAN or WAN card has these distinct steps:

1. The line card requests registration using the software version number and the card type.
2. The PRE downloads the image that corresponds to the card type.
3. The Cisco IOS Software image is decompressed and executed.

```
brubeck# debug ipc events

Special Events debugging is on
*Aug  1 05:08:01.496: IPC: Registration request for seat
                          'C10K Line Card slot 2/0'

!--- The LAN or WAN card requests registration with the software
!--- version and the card type.

*Aug  1 05:08:01.500: IPC: Got an open port request for port 0x10008
1w1d: %IPCOIR-5-CARD_DETECTED: Card type 1oc12pos-1 (0x164) in slot 2/0

!--- The card type is detected.

1w1d: %IPCOIR-5-CARD_LOADING: Loading card in slot 2/0

!--- TFTP is used to transfer the microcode to the line card.

1w1d: %C10K-5-LC_NOTICE: Slot[2/0] 1oc12pos-1 Image
Downloaded...Booting...

!--- The image is decompressed and the code is executed.
```

TCC+ Card Boot Sequence

The boot sequence of a TCC+ card has these distinct steps:

1. The TCC+ card requests registration using the software version number and the card type.
2. The PRE downloads the image that corresponds to the card type.
3. The Cisco IOS Software image is decompressed and executed

```
brubeck# debug ipc events

Special Events debugging is on
*Aug  1 07:00:40.751: IPC: Registration request for seat
                          'C10K Line Card slot 1/1'

!--- The TCC+ card requests registration.

*Aug  1 07:00:40.755: IPC: Got an open port request for port 0x10008
1w1d: %IPCOIR-5-CARD_DETECTED: Card type 2cable-tccplus (0x2AF) in slot 1/1

!--- The card type is detected.

1w1d: %IPCOIR-5-CARD_LOADING: Loading card in slot 1/1

!--- TFTP is used to transfer the microcode to the TCC+ card.

1w1d: %C10K-5-LC_NOTICE: Slot[1/1] utility-card Image
Downloaded...Booting...

!--- The image is decompressed and the code is executed.
```

```
1w1d: %IPCOIR-5-CARD_DETECTED: Card type 2cable-tccplus (0x2AF) in slot 1/1
1w1d: %IPCOIR-2-CARD_UP_DOWN: Card in slot 1/1 is up.
                              Notifying 2cable-tccplus driver.
1w1d: %UBR10KTCC-2-ACTIVE_TCC: TCCplus card 1/1 is active
                               with Local oscillator as clock reference

!--- The card is active and reports its clock source.
```

Related Information

- **Broadband Cable Technology Support**
- **Cisco uBR10012 Universal Broadband Router**
- **Cisco uBR10000 Series Universal Broadband Router Release Notes**
- **Technical Support − Cisco Systems**

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