Intel® One Boot Flash Update Utility

User Guide

Legal Statements

INFORMATION IN THIS DOCUMENT IS PROVIDED IN CONNECTION WITH INTEL PRODUCTS. NO LICENSE, EXPRESS OR IMPLIED, BY ESTOPPEL OR OTHERWISE, TO ANY INTELLECTUAL PROPERTY RIGHTS IS GRANTED BY THIS DOCUMENT. EXCEPT AS PROVIDED IN INTEL'S TERMS AND CONDITIONS OF SALE FOR SUCH PRODUCTS, INTEL ASSUMES NO LIABILITY WHATSOEVER AND INTEL DISCLAIMS ANY EXPRESS OR IMPLIED WARRANTY, RELATING TO SALE AND/OR USE OF INTEL PRODUCTS INCLUDING LIABILITY OR WARRANTIES RELATING TO FITNESS FOR A PARTICULAR PURPOSE, MERCHANTABILITY, OR INFRINGEMENT OF ANY PATENT, COPYRIGHT OR OTHER INTELLECTUAL PROPERTY RIGHT.

A "Mission Critical Application" is any application in which failure of the Intel Product could result, directly or indirectly, in personal injury or death. SHOULD YOU PURCHASE OR USE INTEL'S PRODUCTS FOR ANY SUCH MISSION CRITICAL APPLICATION, YOU SHALL INDEMNIFY AND HOLD INTEL AND ITS SUBSIDIARIES, SUBCONTRACTORS AND AFFILIATES, AND THE DIRECTORS, OFFICERS, AND EMPLOYEES OF EACH, HARMLESS AGAINST ALL CLAIMS COSTS, DAMAGES, AND EXPENSES AND REASONABLE ATTORNEYS' FEES ARISING OUT OF, DIRECTLY OR INDIRECTLY, ANY CLAIM OF PRODUCT LIABILITY, PERSONAL INJURY, OR DEATH ARISING IN ANY WAY OUT OF SUCH MISSION CRITICAL APPLICATION, WHETHER OR NOT INTEL OR ITS SUBCONTRACTOR WAS NEGLIGENT IN THE DESIGN, MANUFACTURE, OR WARNING OF THE INTEL PRODUCT OR ANY OF ITS PARTS.

Intel may make changes to specifications and product descriptions at any time, without notice. Designers must not rely on the absence or characteristics of any features or instructions marked "reserved" or "undefined". Intel reserves these for future definition and shall have no responsibility whatsoever for conflicts or incompatibilities arising from future changes to them. The information here is subject to change without notice. Do not finalize a design with this information.

The products described in this document may contain design defects or errors known as errata which may cause the product to deviate from published specifications. Current characterized errata are available on request.

Contact your local Intel sales office or your distributor to obtain the latest specifications and before placing your product order.

Copies of documents which have an order number and are referenced in this document, or other Intel literature, may be obtained by calling 1-800-548-4725, or go to: http://www.intel.com/design/literature.

Contents

Introduction

The Intel® One-Boot Flash Update Utility (Intel® OFU) is used to update the BIOS and firmware on the Intel® Server Boards while the operating system is running. The utility may be launched from a command prompt in either the Windows* or Linux* operating systems. This utility can also be executed remotely through a secure network connection using a Telnet Client and Terminal Services in Windows* or using a Telnet Client and Remote Shell under Linux*.

The Intel® Server Boards may also be updated using the Intel® Deployment Assistant. This utility is shipped with each Intel® Server Board and provides an easy-to-use graphical user interface that may be used to update the BIOS and firmware and configure key BIOS and firmware settings.

The Intel® OFU application is available in English only.

Supported Firmware Components

The Intel® OFU Utility, with the update package for your platform, can be used to update the following firmware components:

- System BIOS (All supported platforms)

- Baseboard Management Controller (BMC) integrated firmware (S1200BT, S1200V3RP, S1400, S1600, S2400, S2600, and S4600 platforms with an integrated BMC)

- Field Replaceable Unit (FRU) firmware (S1200BT, S1200V3RP, S1400, S1600, S2400, S2600, and S4600 platforms with an integrated BMC)

- Sensor Data Record (SDR) firmware (All supported platforms with a BMC)

- Intel® Remote Management Module 4 (Intel® RMM4) firmware (Supported on S1200BT, S1200V3RP, S1400, S1600, S2400, S2600, and S4600 server families if the Intel® RMM4 module is installed)

- Management Engine (ME) firmware (Supported on S1200BT, S1200V3RP, S1400, S1600, S2400, S2600, and S4600 server families)

Firmware Update Package (for IDA, OFU, WinPE*, and EFI) is available from http://support.intel.com under each platform.

When Updates Take Effect

Starting with S1200BT, S1200V3RP, S1400, S1600, S2400, S2600, and S4600 platforms, the Intel® OFU utility updates the FW and BIOS images passively via the BMC controller or BIOS. The utility hands off the required image files to the BMC Controller or to the BIOS. After verification of the images (signature verification and/or authenticity verification), the Base Board Management Controller FW or BIOS will update the images by itself. After firmware update the firmware will immediately switch to the updated firmware; while the BIOS update will take effect in the next reboot.

FRU updates have only one firmware area, so the updates will take effect immediately when the utility executes. In some cases, the System BIOS, BMC FW, and SDR updates are programmed into their respective secondary flash areas and the utility sets an internal flag in the BIOS and BMC to indicate that the update occurred. After a system reset, the newer version of the System BIOS, BMC, and SDRs are validated and then activated.

Table 1. When Firmware Updates Take Effect by Platform

Firmware Component	Intel® Server Board
	Intel® S1200BT, S1200V3RP, S1400, S1600, S2400, S2600, and S4600
BIOS	Immediate
BMC	Immediate
SDR	Immediate
FRU	Immediate
HSC/PSoC†	Depending on platform; mostly next boot
Intel® RMM4	Depending on platform; mostly next boot
ME Firmware Update	Depending on platform

Supported Operating Systems

The Intel® OFU utility runs on the Microsoft Windows*, Red Hat* Enterprise Linux, and SuSE* Linux Enterprise Server operating systems unless otherwise noted in the *Intel® OFU Release Notes* or the *Supported Operating System List* for your specific Intel® Server Platform. Both IA-32 and Intel® 64 Architecture versions are supported for the operating systems listed below. The following table shows the supported operating systems and platforms when this document is published.

Table 2. Supported Operating Systems

Operating System	Supported Platforms
Windows Server 2008* R2 SP1 x64	S1200BT, S1400, S1600, S2400, S2600, and S4600
Windows Server 2008* SP2 x64 and x32	S1200BT, S1400, S1600, S2400, S2600, and S4600
Windows Server 2012*	S1400, S1600, S2400, S2600, and S4600
Windows 7* x64 and x32	S2600 Workstation Server platforms
Windows 8* x64 and x32	S2600 Workstation Server platforms
SuSE* Linux Enterprise Server 11 SP1	S1200BT, S1400, S1600, S2400, S2600, and S4600
SuSE* Linux Enterprise Server 11 SP2	S1200BT, S1400, S1600, S2400, S2600, and S4600
Red Hat* Enterprise Linux 6 update 1 x64 and x32	S1200BT, S1400, S1600, S2400, S2600, and S4600
Red Hat* Enterprise Linux 6 update 2 x64 and x32	S1200BT, S1400, S1600, S2400, S2600, and S4600
Red Hat* Enterprise Linux 6 update 3 x64 and x32	S1200BT, S1400, S1600, S2400, S2600, and S4600
Red Hat* Enterprise Linux 6 update 4 x64 and x32	S1200V3RP

Installation and Uninstallation

Prerequisites before Installing the Intel° OFU

1. Boot to Windows 2008* (R2/SP1) or Red Hat* 6 or SuSE* 11 operating system.

2. In order to use the Microsoft IPMI* driver or Open IPMI driver for the OFU to update the BIOS/BMC/FRUSDR, enable the **Plug and Play BMC Detection** setting under **Server Management** in the BIOS F2 screen.

3. Install all the development and optional packages during RHEL* and SuSE* operating system installation.

4. In Red Hat* 6 OSes:

    a. If the utility fails with the error message

    "`Error while loading shared libraries: libncurses.so.5: cannot open shared object file: No such file or directory`"

    Then install `libstdc++-4.4.4-13.el6.i686.rpm` and `ncurses-libs-5.7-3.20090208.el6.i686.rpm` from the OS CD itself using the following commands:
    `#rpm -ivh libstdc++-4.4.4-13.el6.i686.rpm`
    `#rpm -ivh ncurses-libs-5.7-3.20090208.el6.i686.rpm`

    Example:
    `rpm -ivh media\Packages\libstdc++-4.4.4-13.el6.i686.rpm`
    where the CD/DVD is mounted to `media` directory.

    b. If the utility fails with error message

    "`Error: /lib/ld-linux.so.2: Bad ELF interpreter: No such file or directory`"
    This indicates the development and optional packages are not installed. Install the necessary packages accordingly.

5. In Windows Server 2008* OSes:

    The utility will error out if the **Plug and Play BMC Detection** setting is disabled. In this case, install the Intel IPMI driver manually.

    Example: `Devicesetup.exe -v install imbdrv.inf` *IMBDRV from the drivers folder.

Installing the Intel® OFU

If you downloaded the Intel® OFU package from the Intel support website, use one of the following procedures:

In Windows* Operating Systems

1. Copy the OFU zip package to a local folder.
2. Unzip the package to the local folder (example: `.\flashupdt`). Go to the `flashupdt` folder (`cd flashupdt`).
3. Go to the `Drivers\Win` folder. Choose x86 or x64 (depending on the operating system).
4. Run `install.cmd` . to install the drivers.
5. Go to `Win_x86` folder to execute flashupdt utility; the binaries are common for both x86 and x64 versions of Windows* operating system.
6. Now you can run the command with options (example: `flashupdt -u /tmp/flashupdt.cfg`).

In Red Hat* Enterprise Linux or SuSE* Enterprise Server Linux Operating Systems

A. Regular Installation

1. Copy the OFU zip package (for RHEL or SLES) to a local folder.
2. Unzip the package to the local folder (example: `.\flashupdt`). Go to the `flashupdt` folder (`cd flashupdt`).
3. `# chmod 755 install.sh`
4. Install the utility using the command:
   `#./install.sh`
5. Go to the RHEL or SLES directory (based on operating system).
6. `# chmod 755 chaff2l.sh`
7. Unzip the `flashupdt.zip` file to get flashupdt executable for Linux* OS.
8. Now you can run the command with options (example: `# ./flashupdt -u /tmp/flashupdt.cfg`).

B. RPM Installation

1. Copy flashupdt rpm from Linux-RPM-package (for RHEL or SLES) to a local folder.
2. Install flasupdt utility by using `rpm -Uvh flashupdt-Vxx.x-Bxx.ixxx.rpm`. This will install the utility in `/usr/bin/flashupdt/`.
3. In RHEL/SLES after installing the rpm, close the terminal from which rpm was installed and then execute the utility from a new terminal (example: `# flashupdt -u /tmp/flashupdt.cfg`).
   For HTTP and FTP based updates, execute the utility from `/usr/bin/flashupdt/` because `curl` and `chaff2l.sh` files are needed for HTTP and FTP based updates.

Uninstalling the Intel® OFU

In Windows*

1. Run `uninstall.cmd` to uninstall all the drivers.

2. Remove the flashupdt folder structure.

In Linux*

1. Remove the flashupdt folder structure. Or unintsall the rpm using:

   `rpm –e flashupdt`

Running the Intel® One Boot Flash Update

The Intel® OFU utility is run by executing the flashupdt command from a command prompt.

NOTES

In order to run this utility, you must first set the working directory to the directory where the utility is installed. This is required because the utility depends on certain files that are expected to be located in the working directory.

The Intel® OFU requires Windows* administrative or Linux* root permissions.

In case you see "Segment Fault" information or update failed related information, you are expected to verify whether the BIOS/BMC/FRUSDR update works in UEFI mode to isolate hardware issue first. Otherwise, you are required to reference the OFU release notes to manually start the Open IPMI driver or update the BIOS/FW/FRUSDR one more time to isolate OFU software issue.

Command Line Syntax

Syntax:
```
flashupdt [-i] [-u <URL or path>] [-c] [-h|?]
```

Description:

Updates the System BIOS or firmware on the local server with the System BIOS or firmware specified in the Intel® OFU configuration file provided with the update package.

Options:

[–i]	Displays the version information for the currently running System BIOS, BMC, and SDR. If the –i option is specified with the –u option, the utility displays the version information of the update package files.
[–u]	Performs the System BIOS and firmware update. The *<URL or path>* parameter specifies the location where the files required for the update are located. The value of *<URL or path>* can be a local file system path, an FTP server, or an HTTP server. Examples of using the –u option: –u Specifies the current local directory. –u http://*<IP address or URL>*/*<path>* Specifies an HTTP server. –u ftp://*<login:password>*@ Specifies an FTP server. *<server name or IP address>*/*<path>* If –u is used in conjunction with –i, no update is performed. Only the package information is displayed.
[–h|?]	Displays command line help information.

[-set]	Sets different FRU area as below (for BMC systems)
	flashupdt /set "areaname" "frufield" "value"
	Where areaname can be "product" or "chassis" depending on the FRU area to be modified.
	The following are the frufield parameters.
	      Pn – Indicates product name
	      Pnum – Indicates the part number
	      Pver – Indicates the product version
	      Snum – Indicates the serial number
	      Mn – Indicates the manufacturer name
	      At – Asset tag
	Note: For the chassis area, the fields "at", "pn", and "Pver" are not supported.

Syntax examples:

```
flashupdt –u
ftp://ftp.example.com/UpdatePkg/ServerName/flashupdt.cfg

flashupdt –u
ftp://Kevin:87w09@ftp.example.com/UpdatePkg/ServerName/flashupdt.c
fg
```

For Windows*:

```
flashupdt –u flashupdt.cfg
```

For Linux*:

```
flashupdt –u /flashupdt.cfg

flashupdt -set product Pn intelco

flashupdt -set product At xx123456

flashupdt -set chassis Mn intelco
```

Note: `flashupdt.cfg` can be found from Firmware Update Package for IDA, OFU, WinPE*, and EFI under http://support.intel.com for each platform.

Updating the Server from a Remote Client

This utility can be executed remotely via a secure network connection using a Telnet Client and Terminal Services in Windows*, or using a Telnet Client and Remote Shell under Linux*. See your operating system documentation for further information on remotely logging-in and executing commands.

Once you have logged-in remotely, you can use the syntax described above. This process can be scripted to allow remote updates of multiple servers.

Notes to Users:

- After performing CFG based update using flashupdt utility, it is highly recommended to perform a power cycle. Continuous updates through CFG file without power cycle/reboot in between could cause system unstability.

- Starting from S1200BT, S1200V3RP, S1400, S1600, S2400, S2600, and S4600 platforms, the flashupdt utility or otherwise known as OFU utility supports preserving OEM data through CFG file based update. For details of usage and command refer to the white paper "*Supporting OEM Activation 2.x on Intel® Server Boards*".

- For CFG based update, it is assumed that the HTTP/FTP server does not require any username/password. In order to access password protected servers, change the `chaff2l.sh` or the batch file and include the username/password.

  The default in the .sh file:

  ```
  ./curl $1 –o $2 –s
  ```

  For password protected server, change the line above as follows:

```
./curl $1 --user admin:pwd -o $2 -s
```

where admin and pwd are the username and password respectively.

Error Exit Codes

The following error codes may be used when the Intel® OFU utility is run from a script.

Note: the update configuration file (.cfg) may use the ERRORLEVEL command to override these values.

Value	Description
0	Successful termination
1	Invalid invocation or unknown command line argument
2	File was not found
3	Unable to read a file
4	A file in the update package is incompatible with the target server
5	A file in the update package is invalid or unsupported
6	Firmware interface failure (an error occurred when reading or writing to the BMC, setting the update notification, or updating the BMC, FRU, HSC, Intel® Local Control Panel, or SDR)
7	BIOS interface failure (an error occurred when reading the BIOS ID, setting the update notification, or updating the System BIOS)
8	Insufficient rights (the user must have Administrator or root rights)
9	Instance of another utility already running. If so, wait for the instance to finish and then start again.
10	Unknown error

Supported Intel® Server Boards

This version of the Intel® OFU utility supports the Intel® Server Boards listed below. (Intel® Server Systems based on the Intel® Server Boards listed below are also supported unless otherwise noted in the product documentation for the Intel® Server System.)

- Intel® Server Board S1200BT

- Intel® Server Board S1200V3RP

- Intel® Server Board S1400

- Intel® Server Board S1600

- Intel® Server Board S2400

- Intel® Server Board S2600

- Intel® Server Board S4600

To find the latest Intel® OFU update package for your server, refer to http://support.intel.com/motherboards/server/.

Glossary

The following abbreviations are used in this document:

Term	Definition
BCD	Binary Coded Decimal
BIOS	Basic Input Output System
BMC	Baseboard Management Controller. The primary microcontroller that controls the operation of the Intel® server management subsystem.
CFG	Configuration (file)
CHAFF2L	Copy HTTP And FTP Files To Local – program used by the One-Boot Flash Update utility to download files from http and ftp servers.
EPS	External Product Specification
FRU	Field Replaceable Unit
FUD	Flash Update Driver
FW	Firmware
HSC	Hot-Swap Controller
HW	Hardware
IA	Intel® Architecture
ID	Identification
IMB	Intelligent Management Bus
IPMB	Intelligent Platform Management Bus. Name for the architecture, protocol, and implementation of a special bus that interconnects the baseboard and chassis electronics and provides a communications media for system platform management information.
IPMI	Intelligent Platform Management Interface
ME	Management Engine
OEM	Original Equipment Manufacturer
Op Code	Operational Code
PIA	Platform Information Area
POST	Power On Self Test
RPM	Red Hat* Package Manager
SDR	Sensor Data Record
SEL	System Event Log
SM	Server Management
SMS	Server Management Software
URL	Universal Resource Locator