



Intel® One Boot Flash Update Utility

User Guide

OFU version 11.0/12.0/13.0

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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:

Table 1. Supported Component

Component	Platforms
System BIOS	S1200BT, S1200V3RP, S1400, S1600, S2400, S2600, S4600, and S2600 (Intel® Xeon® processor E5-2600 v3) platforms
Management Engine (ME) firmware	S1200BT, S1200V3RP, S1400, S1600, S2400, S2600, S4600, and S2600 (Intel® Xeon® processor E5-2600 v3) platforms
Field Replaceable Unit (FRU) firmware	S1200BT, S1200V3RP, S1400, S1600, S2400, S2600, S4600, and S2600 (Intel® Xeon® processor E5-2600 v3) platforms with BMC
Sensor Data Record (SDR) firmware	S1200BT, S1200V3RP, S1400, S1600, S2400, S2600, S4600, and S2600 (Intel® Xeon® processor E5-2600 v3) platforms with BMC
Intel® Remote Management Module 4 (Intel® RMM4) firmware	S1200BT, S1200V3RP, S1400, S1600, S2400, S2600, and S4600 server families with the Intel® RMM4 module installed
Baseboard Management Controller (BMC) firmware	S1200BT, S1200V3RP, S1400, S1600, S2400, S2600, S4600, and S2600 (Intel® Xeon® processor E5-2600 v3) platforms with BMC

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, S4600, and S2600 (Intel® Xeon® processor E5-2600 v3) 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 2. When Firmware Updates Take Effect by Platform

Firmware Component	Intel® Server Board
	Intel® S1200BT, S1200V3RP, S1400, S1600, S2400, S2600, S4600, and S2600 (Intel® Xeon® processor E5-2600 v3)
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, CentOS*, 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 3. Supported Operating Systems

Platforms	OFU Utility Version	Operating Systems
S1400/S1600/S2400/S2600/S4600	11.0	Windows Server 2008* (32 bit & EM64T) Windows Server 2003* Enterprise SP2 (32 bit & EM64T) Windows 7* (32 bit & EM64T) for work station SKU's RHEL* 6.0/Update 1/Update 2 (32 bit & EM64T) SuSE* Linux 11 SP1 (32 bit & EM64T)
S1200R platform series	12.0	Windows Server 2008* (32 bit & EM64T) Windows Server 2003* Enterprise SP2 (32 bit & EM64T) Windows 7* (32 bit & EM64T) for work station SKU's RHEL* 6.0/Update 1/Update 2/Update 3/Update 4 (32 bit & EM64T) SuSE* Linux 11 SP1 (32 bit & EM64T)
Intel® Server Board S2600 series (Intel® Xeon® processor E5-2600 v3 product family)	13.0	Windows Server 2012* (32 bit & EM64T) Windows Server 2012* R2 (EM64T) Windows Server 2008* R2 SP1 EM64T Windows Server 2008* (32 bit & EM64T) Windows Server 2003* Enterprise SP2 (32 bit & EM64T) Windows 7* (32 bit & EM64T) for work station SKU's Windows 8* (32 bit & EM64T) for work station SKU's RHEL* 6.0/Update 1/Update 2/Update 3/Update 4/Update 5 (32 bit & EM64T) CentOS* 6.x (32 bit & EM64T) SuSE* Linux 11 SP1/SP2/SP3 (32 bit & EM64T)

Installation and Uninstallation

Prerequisites before Installing the Intel® OFU

1. Boot to Windows 2008* (R2/SP1) or Red Hat* 6, CentOS* 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*, CentOS*, 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 RHEL* 6.4 (or above), CentOS* 6.x, UEFI-aware Linux, or other Linux:
 - a. There might be a driver confliction between internal driver and kernel. You need to start up the OpenIPMI driver. If the utility fails with an error message "FW interface failed" when updating the BMC or "terminate called after throwing an instance of 'ResultStatus' Aborted (core dumped)" when updating the SDR with a CFG file, then start up the OpenIPMI driver and make sure "/dev/ipmi0" device exists.
Example, you can use the below command to start up the OpenIPMI driver on RHEL* 6.4:
#modprobe ipmi_devintf

- b. After enabling the OpenIPMI, if the utility still reports errors during BMC, FRU, and SDR update, for example, "Failed to write SDR file.", "SDR auto-update failed", and "Error: Error while parsing the cfg file", there might be a BMC watchdog conflict with the OpenIPMI driver.
You need to disable the BMC watchdog, do the update, and enable it after the update is finished.
6. 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.
7. Updating the BIOS, ME, FRUSDR, and BMC is not supported by the utility if the BMC Firmware is in Transfer Mode.
8. It's recommended to do a direct FRU update in EFI/WinPE before doing an FRU Resize with a customized CFG file.

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 C:\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
# chmod 755 flashupdt
```
4. Install the utility using the command:

```
#./install.sh
```

5. Go to the RHEL or SLES directory (based on operating system).
6. `# chmod 755 chaff21.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 flashupdtxxx.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 `chaff21.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>] [-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.

Option	Description
[-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 (including primary BIOS, backup BIOS, and NVRAM) 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>@<server name or IP address>/<path> Specifies an FTP server. 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

Option	Description
	At – Asset tag Note: For the chassis area, the fields “at”, “pn”, and “Pver” are not supported.
[-u] fru <FRU file name>	Performs a direct FRU update of platform with specific FRU file.

Syntax examples:

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

flashupdt -u
ftp://Kevin:87w09@ftp.example.com/UpdatePkg/ServerName/flashupdt.cfg
```

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 instability.
- Starting from S1200BT, S1200V3RP, S1400, S1600, S2400, S2600, S4600, and S2600 (Intel® Xeon® processor E5-2600 v3) 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 `chaff21.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
- Intel® Server Board S2600 (Intel® Xeon® processor E5-2600 v3 product family)

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