Intel® One Boot Flash Update Utility

User Guide

Reference for using the Intel® One Boot Flash Update (Intel® OFU) utility.

Rev 1.03

July **2019**

Document Revision History

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July 2016	1.00	First version
November 2016	1.01	Removed version 13.1, update to version 14.0 Modified Linux installation note Added new command '`Clears BIOS customized settings`'
August 2017	1.02	Removed utility version Added new supported platform
July 2019	1.03	Added new supported platform

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1. Introduction

This User Guide serves as a reference document descripting the features of the Intel® One Boot Flash Update (Intel® OFU) and providing instruction on how to install and use the utility.

The Intel OFU utility is used to update the BIOS and firmware on Intel® Server Boards while the operating system is running, which may be launched from a command prompt in either the Windows* or Linux* operating systems. In addition, this utility can also be executed remotely through a secure network connection either using a Telnet Client and Terminal Services in Windows or a Telnet Client and Remote Shell under Linux.

The Intel Server Boards may also be updated using the Intel® Deployment Manager by VERITAS OpForce™. This utility is shipped with the Intel® Server Board and provides an easy-to-use graphical user interface that may be used not only to update the BIOS and firmware but to configure key BIOS and firmware settings.

The Intel OFU utility is available in English only.

The Intel OFU utility is only supported on the following Intel Server Boards:

- Intel® Server Board based on Intel® Xeon® Scalable Processor family
- Intel® Server Board based on 2nd Generation Intel® Xeon® Scalable Processor family
- Intel® Server Board based on Intel® Xeon® Platinum 9200 Processor Family

To find the latest Intel OFU update package for an Intel Server Board, refer to https://downloadcenter.intel.com/ .

1.1 Supported Firmware Components

The Intel® OFU Utility, with the update package for the specific platform, can be used to update the firmware components listed in Table 1.

Table 1. Supported firmware components

Component	Platforms
System BIOS	• Intel® Server Board based on Intel® Xeon® Scalable Processor family • Intel® Server Board based on 2nd Generation Intel® Xeon® Scalable Processor family • Intel® Server Board based on Intel® Xeon® Platinum 9200 Processor Family
Intel® Management Engine (Intel® ME) firmware	
Field Replaceable Unit (FRU) firmware	Components are supported on the following platforms with BMC: • Intel® Server Board based on Intel® Xeon® Scalable Processor family • Intel® Server Board based on 2nd Generation Intel® Xeon® Scalable Processor family • Intel® Server Board based on Intel® Xeon® Platinum 9200 Processor Family
Sensor Data Record (SDR) firmware	
Baseboard Management Controller (BMC) firmware	
Intel® Remote Management Module 4 (Intel® RMM4) firmware	The Component is supported on the following platforms with the Intel® RMM4 installed: • Intel® Server Board based on Intel® Xeon® Scalable Processor family • Intel® Server Board based on 2nd Generation Intel® Xeon® Scalable Processor family • Intel® Server Board based on Intel® Xeon® Platinum 9200 Processor Family

Firmware Update Packages (for IDA, Intel OFU, Windows PreEnvironment (Windows PE*), and EFI are available from http://support.intel.com under each platform.

1.2 When Updates Take Effect

Starting with Intel® Server Board platforms, the Intel® OFU updates the firmware 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 BMC firmware or BIOS will update the images by itself. When firmware update finishes:

- The firmware update takes take effect immediately.
- The BIOS update takes effect from the next reboot.

The FRU update has only one firmware area, so the update takes effect immediately when the utility executes. In some cases, the System BIOS, BMC firmware, 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 lists when the specific firmware updates take effect.

Table 2. When firmware updates take effect

Firmware Component	When Updates Take Effect
BIOS	Immediate
BMC	Immediate
SDR	Immediate
FRU	Immediate
HSC/PSoC	Depending on platform; mostly next boot
Intel® Remote Management Module 4 (Intel® RMM4)	Depending on platform; mostly next boot
Intel® ME Firmware Update	Depending on platform

1.3 Supported Operating Systems

The Intel® OFU Utility runs on 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 a specific Intel® Server Board listed in .Table 3.

Both IA-32 and Intel® 64 Architecture versions are supported for the operating systems listed in Table 3.

Table 3. Supported operating systems

Platforms	Operating Systems
• Intel® Server Board based on Intel® Xeon® Scalable Processor family • Intel® Server Board based on 2nd Generation Intel® Xeon® Scalable Processor family • Intel® Server Board based on Intel® Xeon® Platinum 9200 Processor Family	• • Windows* Server 2019 • Windows* Server 2016 • Windows* Server 2012 R2 • Windows* 10 • RHEL* 6.8 (x64) • RHEL* 7.3 • RHEL* 7.5 • RHEL* 7.6 • SLES* 11.4 (x64) • SLES* 12.2 • SLES* 15 • CentOS* 7.3 (x64) • Debian* 8.10

1.4 Support Information

For more information, visit Intel's support site at http://support.intel.com/support/.

For an updated support contact list, see http://www.intel.com/support/9089.htm/.

2. Installing and Uninstalling

Installing and uninstalling the Intel® One Boot Flash Update (Intel® OFU) utility are described in this section.

2.1 Prerequisites before Installing the Intel® OFU

1. Boot to Windows*, Red Hat*, CentOS, or SUSE* operating system.
2. To use the Intelligent Platform Management Interface (IPMI) driver from Microsoft* or the OpenIPMI driver for the Intel OFU to update the BIOS/BMC/FRU/SDR, enable the **Plug and Play BMC Detection** setting under **Server Management** in the BIOS setup.
3. Install all the development and optional packages during Red Hat, CentOS, and SUSE operating system installation.
   - In Red Hat operating systems:
     - If the utility fails with the following error message:

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

       Then install `libstdc++-xxx.rpm` and `ncurses-xxx.rpm` from the operating system CD using the following commands:

       ```
       #rpm -ivh libstdc++-xxx.rpm
       #rpm -ivh ncurses-xxx.rpm
       ```

       Example:

       ```
       rpm -ivh media\Packages\libstdc++-xxx.rpm
       ```

   - Where the CD/DVD is mounted to media directory.
     - If the utility fails with the following 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.
   - In Red Hat Enterprise Linux* 6.4 (or above), CentOS 6.x (or above), UEFI aware Linux*, or other Linux* operating systems:
     - There might be a driver confliction between internal driver and kernel. Enable the OpenIPMI driver.

     If the utility fails and reports the following error messages, start up an OpenIPMI driver and make sure the `/dev/ipmi0` device exists:

     - `FW interface failed` when updating BMC
     - `terminate called after throwing an instance of 'ResultStatus' Aborted (core dumped)`

     Example, use the command, `#modprobe ipmi_devintf` to start the OpenIPMI driver on Red Hat Enterprise Linux 6.4

     - After enabling the OpenIPMI driver, if the utility reports the following errors during the BMC, FRU and SDR updates there might be a BMC watchdog conflict with OpenIPMI driver.
       - `Failed to write SDR file`
       - `SDR auto-update failed`

- `Error : Error while parsing the cfg file`

If this is the case, the user needs to disable the BMC watch dog, complete the update, and then re-enable the BMC watch dog after the update is finished.

- In Windows operating system:
  - If the **Plug and Play BMC Detection** setting is disabled, the utility reports an error. In this case, install the IPMI driver from Intel manually.

    Example: `Devicesetup.exe -v install imbdrv.inf *IMBDRV` from the drivers folder.
  - Updating of BIOS, Intel ME, FRUSDR, and BMC is not supported by the utility if the BMC Firmware is in Transfer Mode.
  - It is recommended that the user complete a direct FRU update in EFI/Windows PreEnvironment* (Windows PE*) before completing a FRU Resize with a customized `.CFG` file.

2.2 Installing the Intel® OFU

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

2.2.1 Windows*

1. Copy the Intel OFU ZIP file to a local folder.
2. Unzip the `.ZIP` file 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 the `Win_x86` or `Win_x64` folder (depending on the operating system) to execute the `flashupdt` utility.
6. Now run the `flashupdt` command with options.

   Example: `flashupdt -u C:\tmp\flashupdt.cfg`.

2.2.2 Red Hat* Enterprise Linux*or SUSE* Linux* Enterprise Server

2.2.2.1 Regular Installation

1. Copy the Intel OFU `.ZIP` package (for Red Hat or SUSE) 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` and `# chmod 755 flashupdt`
4. Install the utility using the command: `#./install.sh`
5. Go to the `RHEL` or the `SLES` directory, depending on the operating system.
6. `# chmod 755 chaff2l.sh`
7. Unzip `flashupdt.zip` to find the `flashupdt` executable for Linux*.
8. Now run the `flashupdt` command with options.
   Example: `# ./flashupdt -u /tmp/flashupdt.cfg`

2.2.2.2 RPM Installation

1. Copy the `flashupdt` RPM from the Linux-RPM-package (for Red Hat or SUSE) to a local folder.
2. If another version is installed, uninstall that version first before installing the new version.
3. Install the `flasupdt` utility by using `rpm -ivh flashupdtxxx.rpm`.
   This installs the utility in `/usr/bin/flashupdt/`.
4. In `RHEL/SLES` after installing the RPM, close the terminal from which the RPM is installed and execute the utility from a new terminal.
   Example: `# flashupdt -u /tmp/flashupdt.cfg`
5. 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.

2.3 Uninstalling the Intel® OFU

2.3.1 Windows*

1. Run `uninstall.cmd` to uninstall all the drivers.
2. Remove the `flashupdt` folder structure.

2.3.2 Linux*

- Remove the `flashupdt` folder structure.
- Or uninstall the RPM using `rpm -e flashupdt`

3. Running Intel® One Boot Flash Update (Intel® OFU)

Start Intel® One Boot Flash Update (Intel® OFU) utility by using the `flashupdt` command from a command prompt.

Notes:

- To run this utility, set the working directory to the directory where the utility is installed. The utility depends on certain files that are located in the working directory.
- Intel OFU requires Windows* administrative or Linux* root permissions.
- If the system reports a Segment Fault error message or that the update has failed, verify that the BIOS, firmware, FRU, and SDR update operates in UEFI mode to isolate hardware issues. Otherwise, reference the Intel OFU release notes to manually start the OpenIPMI driver or update the BIOS, firmware, FRU, and SDR one more time to isolate the Intel OFU software issues.

Command Line Syntax

```
flashupdt [-i] [-u <URL or path>] [-nac] [-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.

Table 4. Command line syntax – options

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:
	Specifies the current local directory: `–u` Specifies an HTTP server. `–u http://<IP address or URL>/<path>` Specifies an FTP server: `–u ftp://<login:password>@<server name or IP address>/<path>`
	If `–u` is used in conjunction with `–i`, no update is performed. Only the package information is displayed.
[-nac]	This parameter is only supported after Intel Xeon Processor E5-2600 v3/v4 product family. When updating with CFG file, SDR data is, by default, automatically configured and updated in BMC, which do not need further user interactions. You can disable the default mode and use legacy SDR update process with the `/nac` option.
[–h|?]	Displays command line help information.

Option	Description

[-set]	Sets different FRU area as below (for BMC systems)
	`flashupdt /set "areaname" "frufield" "value"`
	Where areaname can be "`product`", "`chassis`" or "`board`" depending on the FRU area to be modified.
	The following are the frufield parameters.
	`Pn` – Product name
	`Pnum` – Part number
	`Pver` – Product version
	`Snum` – Serial number
	`Mn` – Manufacturer name
	`At` – Asset tag
	Note: For the chassis area, these fields are not supported:
	`At`
	`Pn`
	`Pver`
	Note: For the board area, the `pn` field is supported.

[-u] fru <FRU file name>	Performs a direct FRU update of platform with specific FRU file.
-ccs	Clears BIOS customized settings.

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` is in the Firmware Update Package for Intel® OFU, Windows PreEnvironment (Windows PE*), and EFI under http://support.intel.com for each platform.

4. Updating the Server from a Remote Client

The Intel® One Boot Flash Update (Intel® OFU) 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 the operating system documentation for further information on the remote login and how to execute commands.

Once a remote login is completed the syntax described in section 3 can be used. This process can be scripted to allow remote updates of multiple servers.

Notes:

- After performing a `.cfg` file update using the `flashupdt` utility, complete a power cycle. Completing continuous updates through the `.cfg` file without a power cycle or a reboot in between updates can cause system instability.
- Starting from Intel® Server Board platforms, the `flashupdt` utility (also known as the Intel OFU) 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 a `.cfg` file update, assume that the HTTP/FTP server does not require a username and a password.
  To access password-protected servers, change the `chaff2l.sh` or the batch file and include the username and 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 `pswd` are the username and password.

Appendix A. Error Exit Codes

The following error codes in Table 5 can be used when the Intel® One Boot Flash Update (Intel® OFU) utility is run from a script.

Note: The update configuration file (.CFG) may use the ERRORLEVEL command to override the values for the Error Exit Codes.

Table 5. Error exit codes

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

Appendix B. Glossary

Term	Definition
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)
EFI	Extensible Firmware Interface
FRU	Field Replaceable Unit
HSC	Hot-Swap Controller
IA	Intel® Architecture
ID	Identification
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
Intel® ME	Intel® Management Engine
OEM	Original Equipment Manufacturer
RPM	Red Hat* Package Manager
SDR	Sensor Data Record
SEL	System Event Log
URL	Universal Resource Locator