

# UEFI & EDK II Training

Platform Build Lab Up Xtreme- Linux

[tianocore.org](https://tianocore.org)

Copy and Paste see [Lab Guide.md](#)

# PLATFORM BUILD LABS

- ★ Download Minplatform Using Git from [tianocore.org](https://tianocore.org)
- ★ Build a EDK II Platform using Up Xtreme Aaeon board

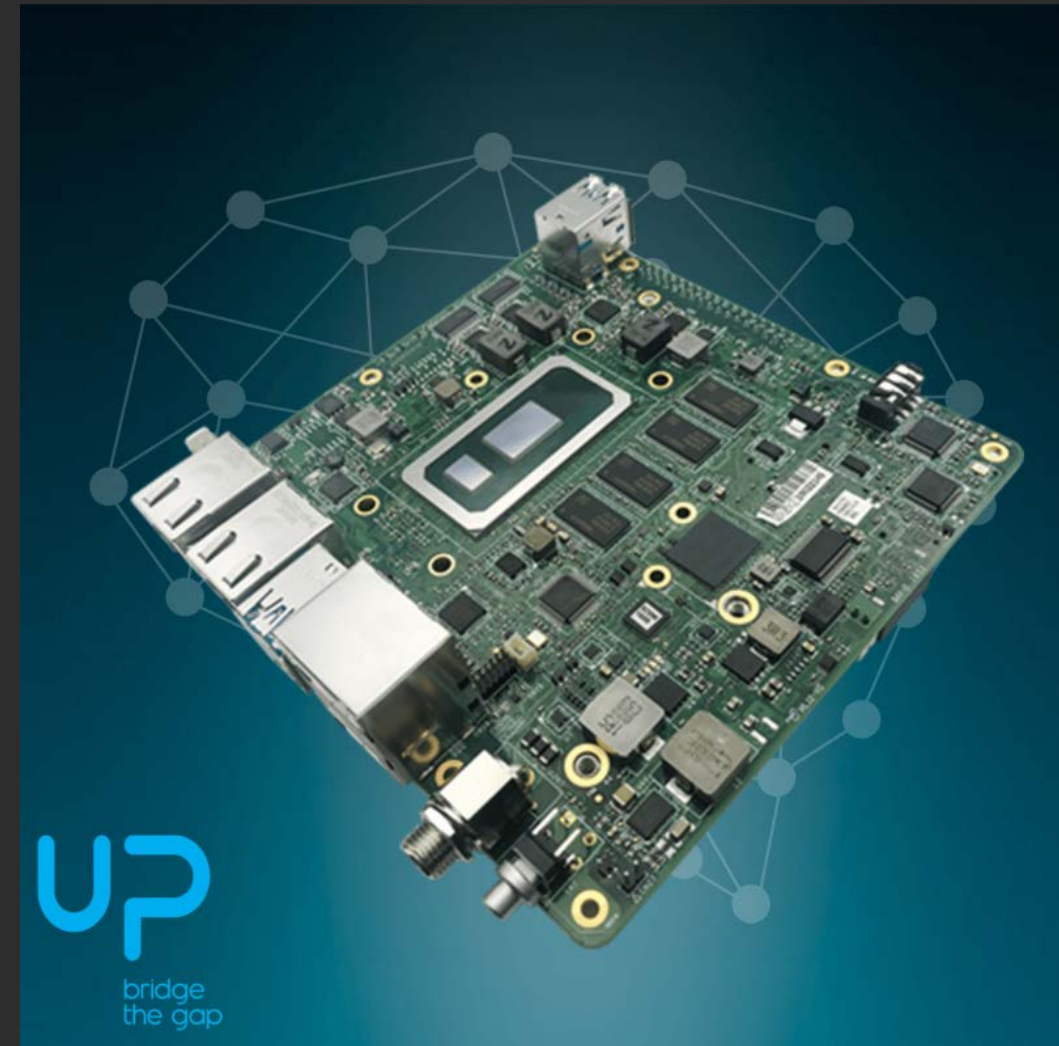
# DOWNLOAD MINPLATFORM

Use Git to download EDK II and MinPlatform

# EDK II Platform – Up Xtreme by Aaeon



8th Generation Intel® Core™  
U-Series processors  
(Formerly Whiskey Lake)



UP Board products  
Up Shop

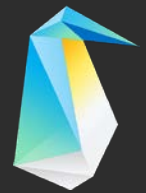
# Linux setup for Up Xtreme Lab



ubuntu

## Lab Setup Requirements – Ubuntu 16.04

```
bash$ sudo apt-get install build-essential uuid-dev iasl git gcc-5 nasm
bash$ sudo apt-get install screen
bash$ sudo apt-get install gcab
```



Clear  
Linux\*  
Project

## Lab Setup Requirements – Clear Linux\* Project

```
bash$ sudo swupd bundle-add devpkg-util-linux
bash$ sudo swupd bundle-add devpkg-gcab
```

Open Terminal Prompt.

Cd to the Workspace and create the Up Xtreme build directory “UpX”

```
bash$ cd ~/src
bash$ mkdir UpX
bash$ cd UpX
```



# Download the source for Edk II, MinPlatform and FSP

From a terminal prompt at ~/src/Upx , do the following:

- Edk2 For SHA to checkout see [Lab Guide.md](#)

```
$ git clone --recursive https://github.com/tianocore/edk2
```

- Edk2-platforms

```
$ git clone https://github.com/tianocore/edk2-platforms.git
```

- Edk2-non-os

```
$ git clone https://github.com/tianocore/edk2-non-os.git
```

- FSP

```
$ git clone https://github.com/IntelFsp/FSP.git
```


## Set PROXYS FIRST

```
$ git config --global https.proxy=proxy.hf.intel.com:911  
$ git config --global http.proxy=proxy.hf.intel.com:911
```



Takes  
about 6  
minutes

# Download MinPlatform Lab Material

Download the PlatformBuildLab\_MinPlatform\_FW.zip from :  [github.com](https://github.com/tianocore-training/PlatformBuildLab2_FW.zip)  
[PlatformBuildLab2\\_FW.zip](https://github.com/tianocore-training/PlatformBuildLab2_FW.zip)

OR

Use `git clone` to download the PlatformBuildLab\_MinPlatform\_FW

```
C:/> git clone https://github.com/tianocore-training/PlatformBuildLab\_MinPlatform\_FW.git
```

Directory PlatformBuildLab\_MinPlatform\_FW will be created

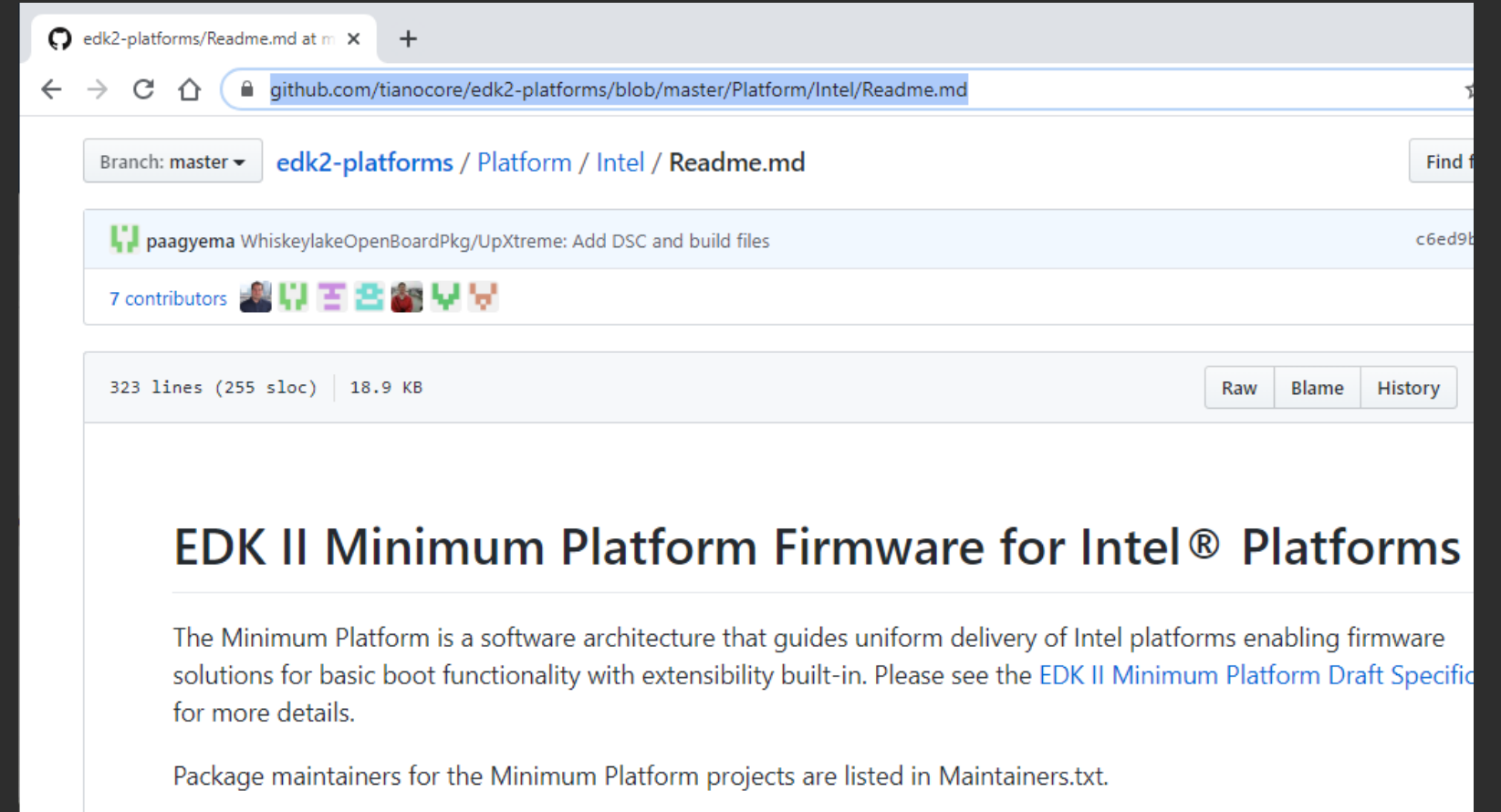
```
/FW
/MinPlatformBuild
- UpX_Lab          - Lab Material
. . .
```

# BUILD UP XTREME



# Where to get Open Source Up Xtreme

How to Download & Build: Open Source MinPlatform [Readme.md](#)



# MinPlatform Open Board Tree Structure

edk2/ <https://github.com/tianocore/edk2>

...

edk2-platforms/ <https://github.com/tianocore/edk2-platforms>

Platform/

Intel/

BoardModulePkg

WhiskeylakeOpenBoardPkg

UpXtreme

MinPlatformPkg

Silicon/

Intel/

CoffeelakeSiliconPkg

...

Features/Intel

AdvancedFeaturePkg

edk2-non-os/ <https://github.com/tianocore/edk2-non-os>

Silicon/

Intel/

CoffeelakeSiliconBinPkg

FSP/ <https://github.com/IntelFsp/FSP>

CoffeelakeFspBinPkg

Invoke the build\_bios.py from  
here

Platform DSC & FDF here

## Open a Terminal Command Prompt

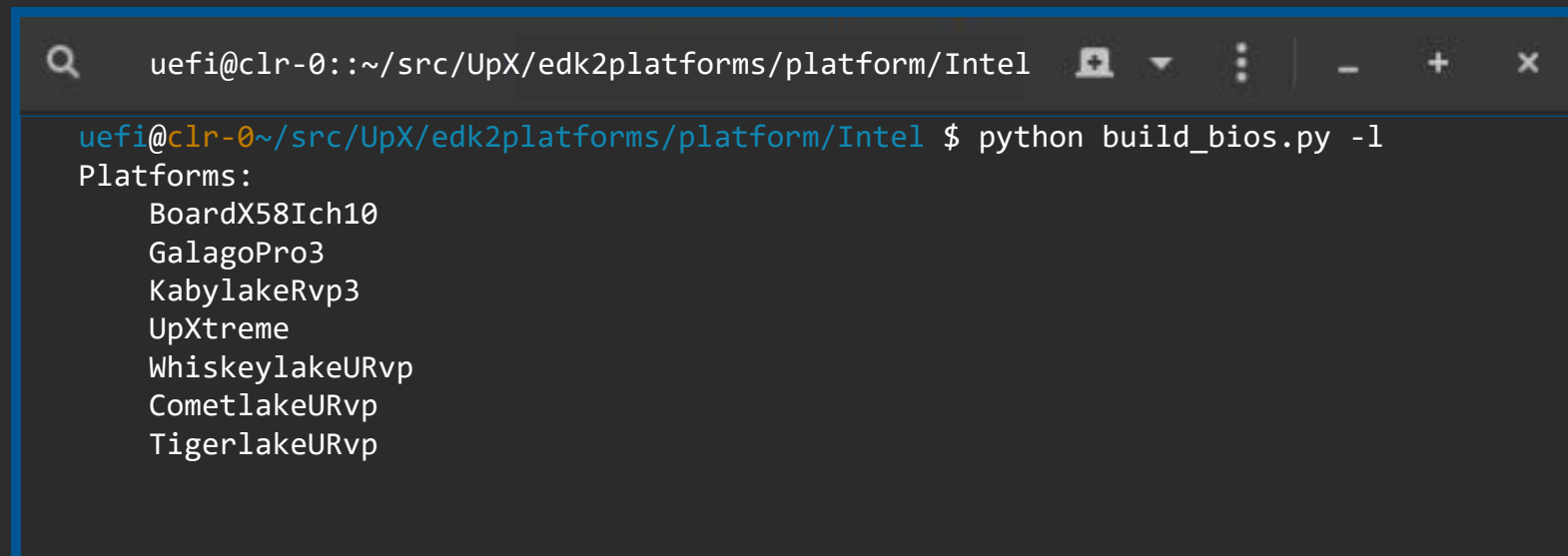
```
bash$ cd ~/src/UpX/edk2
bash$ source edksetup.sh
bash$ cd ..
bash$ cd edk2-platforms/Platform/Intel
```

## Check if Python okay (may also need to set PYTHON\_HOME)

```
bash$ python --version
Python 3.8.2
```

## Check for available MinPlatform Boards

```
bash$ python build_bios.py -l
```

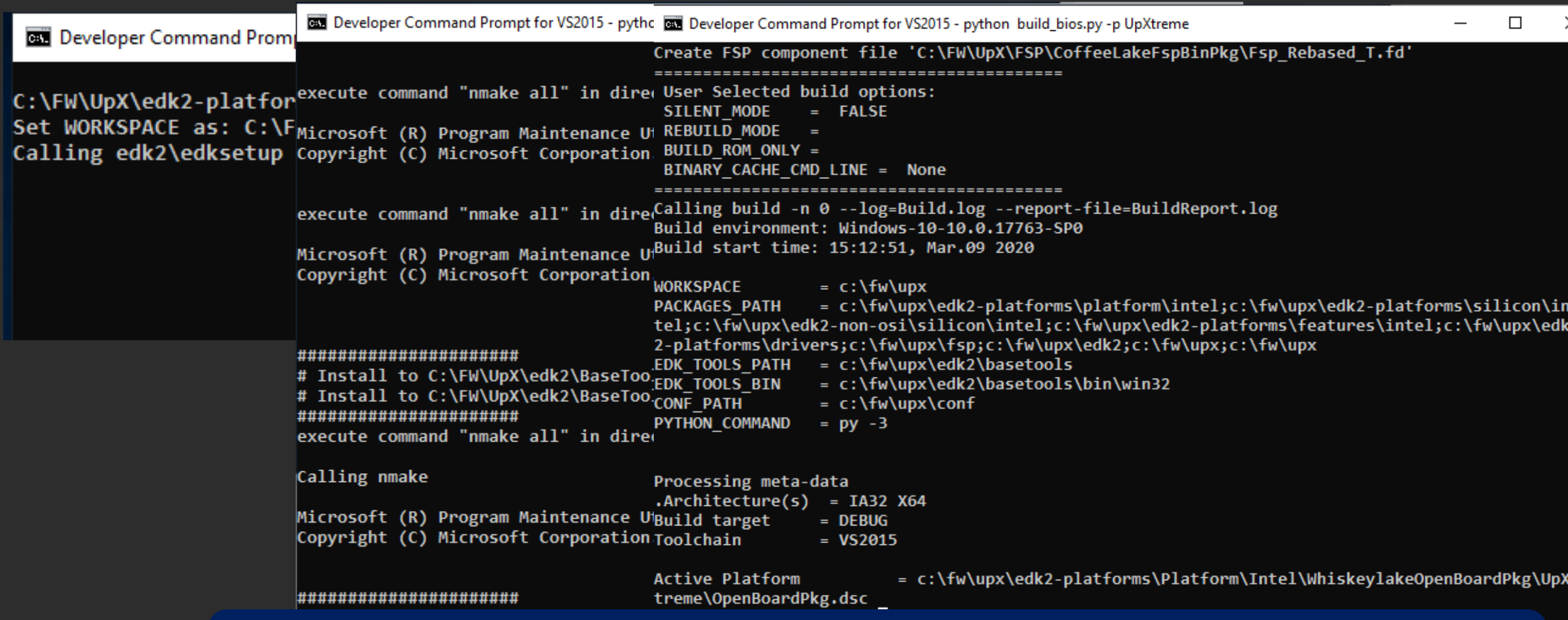


```
uefi@clr-0:~/src/UpX/edk2platforms/platform/Intel
uefi@clr-0~/src/UpX/edk2platforms/platform/Intel $ python build_bios.py -l
Platforms:
BoardX58Ich10
GalagoPro3
KabylakeRvp3
UpXtreme
WhiskeylakeURvp
CometlakeURvp
TigerlakeURvp
```

# Invoke the Build

Invoke the Python Build script for Up Xtreme

```
$> python build_bios.py -p UpXtreme -t GCC5
```



```

C:\FW\UpX\edk2-platforms>
Set WORKSPACE as: C:\FW\UpX\edk2-platforms
Calling edk2\edksetup

C:\FW\UpX\edk2-platforms>python build_bios.py -p UpXtreme -t GCC5

Create FSP component file 'C:\FW\UpX\FSP\CoffeeLakeFspBinPkg\Fsp_Rebased_T.fd'
=====
User Selected build options:
SILENT_MODE      = FALSE
REBUILD_MODE     = 
BUILD_ROM_ONLY   = 
BINARY_CACHE_CMD_LINE = None
=====
Calling build -n 0 --log=Build.log --report-file=BuildReport.log
Build environment: Windows-10-10.0.17763-SP0
Build start time: 15:12:51, Mar.09 2020
Workspace
Workspace          = c:\fw\upx
PACKAGES_PATH      = c:\fw\upx\edk2-platforms\platform\intel;c:\fw\upx\edk2-platforms\silicon\intel;c:\fw\upx\edk2-non-os\silicon\intel;c:\fw\upx\edk2-platforms\features\intel;c:\fw\upx\edk2-platforms\drivers;c:\fw\upx\fsp;c:\fw\upx\edk2;c:\fw\upx;c:\fw\upx
EDK_TOOLS_PATH      = c:\fw\upx\edk2\basetools
EDK_TOOLS_BIN       = c:\fw\upx\edk2\basetools\bin\win32
CONF_PATH           = c:\fw\upx\conf
PYTHON_COMMAND      = py -3
execute command "nmake all" in directory
Calling nmake
Processing meta-data
Architecture(s)    = IA32 X64
Build target       = DEBUG
Toolchain          = VS2015
Active Platform    = c:\fw\upx\edk2-platforms\Platform\Intel\WhiskeylakeOpenBoardPkg\UpXtreme\OpenBoardPkg.dsc

```



Takes  
about 16  
minutes

Note example screen shots are from windows but same information would be on the terminal screen for Linux

## Platform Config

Many Platforms have a bash, bat or Python script file to pre or post process the EDK II build process

For MinPlatform platform specific config

**Build processing:**

Build\_config.cfg – Lists directories required for the build and build settings

Link to Up Xtreme [Build\\_config.cfg](#)

# Examine Build Parameters

```
Python build_bios.py -p UpXtreme
```

...

```
Calling build -n 0 --log=Build.log --report-file=BuildReport.log  
and from UpX\conf\target.txt
```

TARGET	= DEBUG
TARGET_ARCH	= IA32 X64
TOOL_CHAIN_TAG	= GCC5
ACTIVE_PLATFORM	= ... /WhiskylakeOpenBoardPkg/ UpXtreme/OpenBoardPkg.dsc
Report file created (via python script)	= BuildReport.log

Build Mode

CPU Architecture

VS Tool Chain

Platform DSC file

PCDs, Libs, etc.



# Platform Build and PCD Parameters

## Platform Parameters

Many Platform Parameters are defined in a top .DSC file that controls PCD and build switches

For Up Xtreme : edk2-platforms/Platform/Intel/WhiskeylakeOpenBoardPkg/UpXtremeOpenBoardPkgPcd.dsc and OpenBoardPkgBuildOption.dsc

Example:

```
# Define Build Options both for EDK and EDKII drivers.
```

```
DEFINE DSC_S3_BUILD_OPTIONS =  
DEFINE DSC_CSM_BUILD_OPTIONS =
```

```
!if gSiPkgTokenSpaceGuid.PcdAcpiEnable == TRUE  
  DEFINE DSC_ACPI_BUILD_OPTIONS = -DACPI_SUPPORT=1  
!else  
  DEFINE DSC_ACPI_BUILD_OPTIONS =  
!endif
```

```
DEFINE BIOS_GUARD_BUILD_OPTIONS =  
DEFINE OVERCLOCKING_BUILD_OPTION =
```

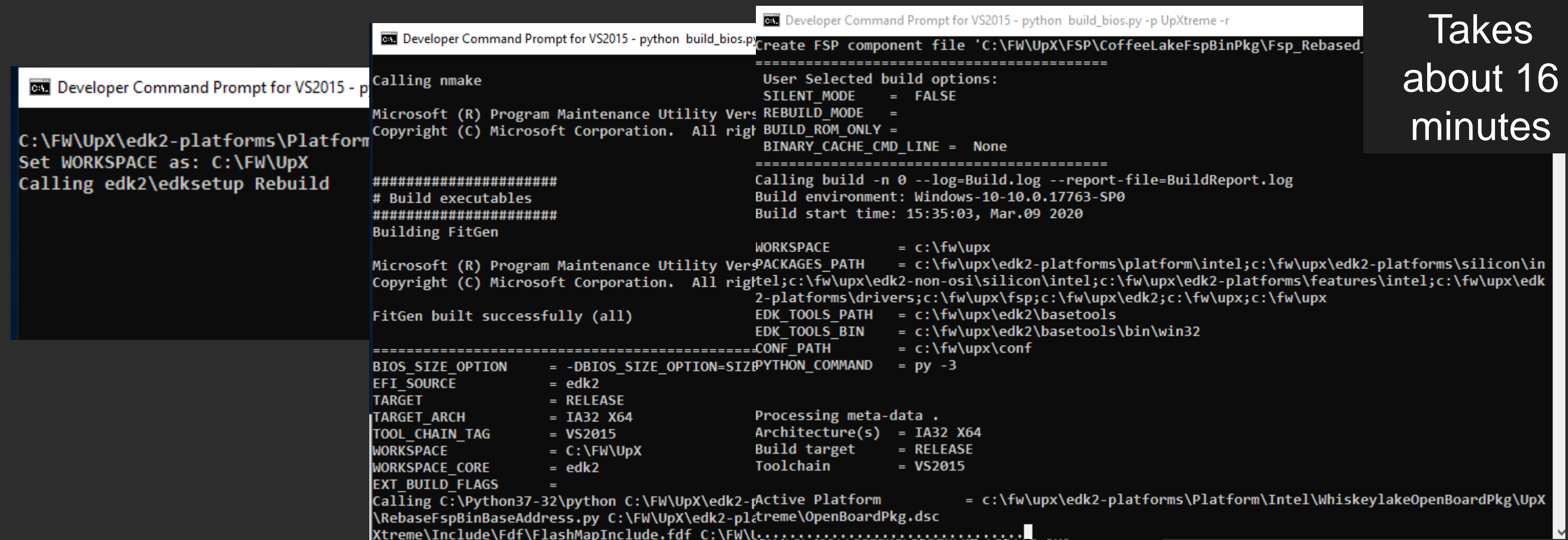
# Build Process for RELEASE Target

Invoke the Python Build script for Up Xtreme

```
bash$ python build_bios.py -p UpXtreme -r -t GCC5
```



Takes  
about 16  
minutes



```

Developer Command Prompt for VS2015 - p
C:\FW\UpX\edk2-platforms\Platform
Set WORKSPACE as: C:\FW\UpX
Calling edk2\edksetup Rebuild

Developer Command Prompt for VS2015 - python build_bios.py
Calling nmake
Microsoft (R) Program Maintenance Utility Vers
Copyright (C) Microsoft Corporation. All right
#####
# Build executables
#####
Building FitGen
Microsoft (R) Program Maintenance Utility Vers
Copyright (C) Microsoft Corporation. All right
FitGen built successfully (all)

Developer Command Prompt for VS2015 - python build_bios.py -p UpXtreme -r
Create FSP component file 'C:\FW\UpX\FSP\CoffeeLakeFspBinPkg\Fsp_Rebased_
=====
User Selected build options:
SILENT_MODE      = FALSE
REBUILD_MODE     =
BUILD_ROM_ONLY   =
BINARY_CACHE_CMD_LINE = None
=====
Calling build -n 0 --log=Build.log --report-file=BuildReport.log
Build environment: Windows-10-10.0.17763-SP0
Build start time: 15:35:03, Mar.09 2020
=====
Workspace          = c:\fw\upx
Packages Path      = c:\fw\upx\edk2-platforms\platform\intel;c:\fw\upx\edk2-platforms\silicon\in
tel;c:\fw\upx\edk2-non-osi\silicon\intel;c:\fw\upx\edk2-platforms\features\intel;c:\fw\upx\edk
2-platforms\drivers;c:\fw\upx\fsp;c:\fw\upx\edk2;c:\fw\upx;c:\fw\upx
Edk Tools Path     = c:\fw\upx\edk2\basetools
Edk Tools Bin      = c:\fw\upx\edk2\basetools\bin\win32
Conf Path          = c:\fw\upx\conf
Python Command     = py -3
=====
BIOS_SIZE_OPTION   = -DBIOS_SIZE_OPTION=SIZE#
EFI_SOURCE         = edk2
TARGET             = RELEASE
TARGET_ARCH        = IA32 X64
Tool Chain Tag     = VS2015
Workspace          = C:\FW\UpX
Workspace Core     = edk2
Ext Build Flags    =
Processing meta-data .
Architecture(s)   = IA32 X64
Build target      = RELEASE
Toolchain         = VS2015
Active Platform   = c:\fw\upx\edk2-platforms\Platform\Intel\WhiskeylakeOpenBoardPkg\UpX
RebaseFspBinBaseAddress.py C:\FW\UpX\edk2-plat
treme\OpenBoardPkg.dsc
Xtreme\Include\Fdf\FlashMapInclude.fdf C:\FW\U

```

Note example screen shots are from windows but same information would be on the terminal screen for Linux

# DEBUG & RELEASE Differences

Slower boot because the time it takes to display debug info

Larger image because of debug code & embedded info

Uses the serial port for debug string output

Contains detailed debug strings that show the boot process and various ASSERT/TRACE errors

**Directory:** `~/MinPlatformBuildLab_FW/FW/MinPlatformBuildLab/UpX_Lab`

Copy `Logo.bmp` to `~/src/UpX/edk2/MdeModulePkg/Logo`

Or create a `.BMP` with your favorite Paint application



See . . . `WhiskeylakeOpenBoardPkg/UpXtreme/OpenBoardPkg.fdf` line 285

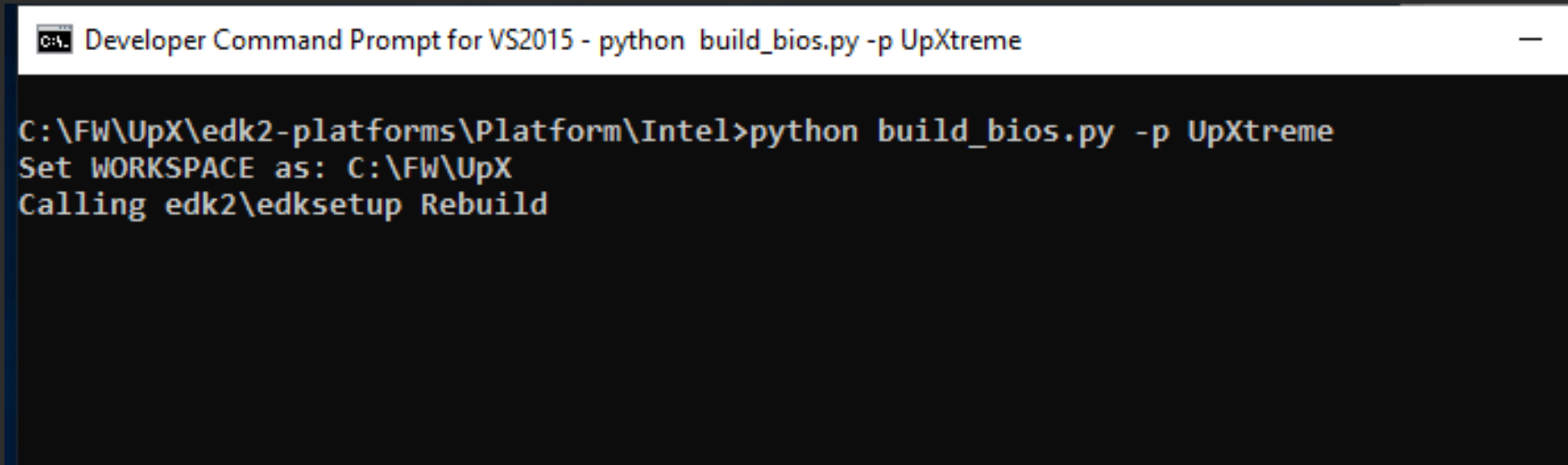
# Build with new logo

Invoke the Python Build script for Up Xtreme

```
$> python build_bios.py -p UpXtreme -t GCC5
```



Takes  
about 2  
minutes



```
Developer Command Prompt for VS2015 - python build_bios.py -p UpXtreme

C:\FW\UpX\edk2-platforms\Platform\Intel>python build_bios.py -p UpXtreme
Set WORKSPACE as: C:\FW\UpX
Calling edk2\edksetup Rebuild
```

Note example screen shots are from windows but same information would be on the terminal screen for Linux

# Build Process Completed

## Locate the build .fd images

```

uefi@clr-0:~/src/UpX/edk2platforms/platform/Intel

#####
# FIT Table: #
#####
FIT Pointer Offset: 0x40
FIT Table Address: 0xffff6b80
=====
Index:      Address      Size  Version      Type      C_V  Checksum (Index  Data Width Bit  Offset)
=====
00:  2020205f5449465f 000004   0100   00-'_FIT_'   01     e8
01:  00000000ffe50060 000000   0100   01-MICROCODE 00     00
02:  00000000ffe69460 000000   0100   01-MICROCODE 00     00
03:  00000000ffe82860 000000   0100   01-MICROCODE 00     00
=====
Index:      Address      Size  Version      Type      C_V  Checksum (Index  Data Width Bit  Offset)
=====
Done
Fd file can be found at ~/src/UpX/Build/WhiskeylakeOpenBoardPkg/UpXtreme/DEBUG_GCC5/FV/UPXTREME.fd

uefi@clr-0~/src/UpX/edk2platforms/platform/Intel $

```

The script displays the location of the final .fd files



- ✱ Download Minplatform Using Git Bash
- ✱ Build a EDK II Platform using Up Xtreme Aaeon board

# Questions?



# Return to Main Training Page



Return to Training Table of contents for next presentation [link](#)





# ACKNOWLEDGEMENTS

Redistribution and use in source (original document form) and 'compiled' forms (converted to PDF, epub, HTML and other formats) with or without modification, are permitted provided that the following conditions are met:

Redistributions of source code (original document form) must retain the above copyright notice, this list of conditions and the following disclaimer as the first lines of this file unmodified.

Redistributions in compiled form (transformed to other DTDs, converted to PDF, epub, HTML and other formats) must reproduce the above copyright notice, this list of conditions and the following disclaimer in the documentation and/or other materials provided with the distribution.

THIS DOCUMENTATION IS PROVIDED BY TIANOCORE PROJECT "AS IS" AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE DISCLAIMED. IN NO EVENT SHALL TIANOCORE PROJECT BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS DOCUMENTATION, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

Copyright (c) 2021, Intel Corporation. All rights reserved.