

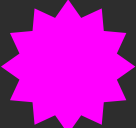

UEFI & EDK II Training

Platform Build Lab Up Xtreme - Windows

tianocore.org

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

PLATFORM BUILD LABS

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

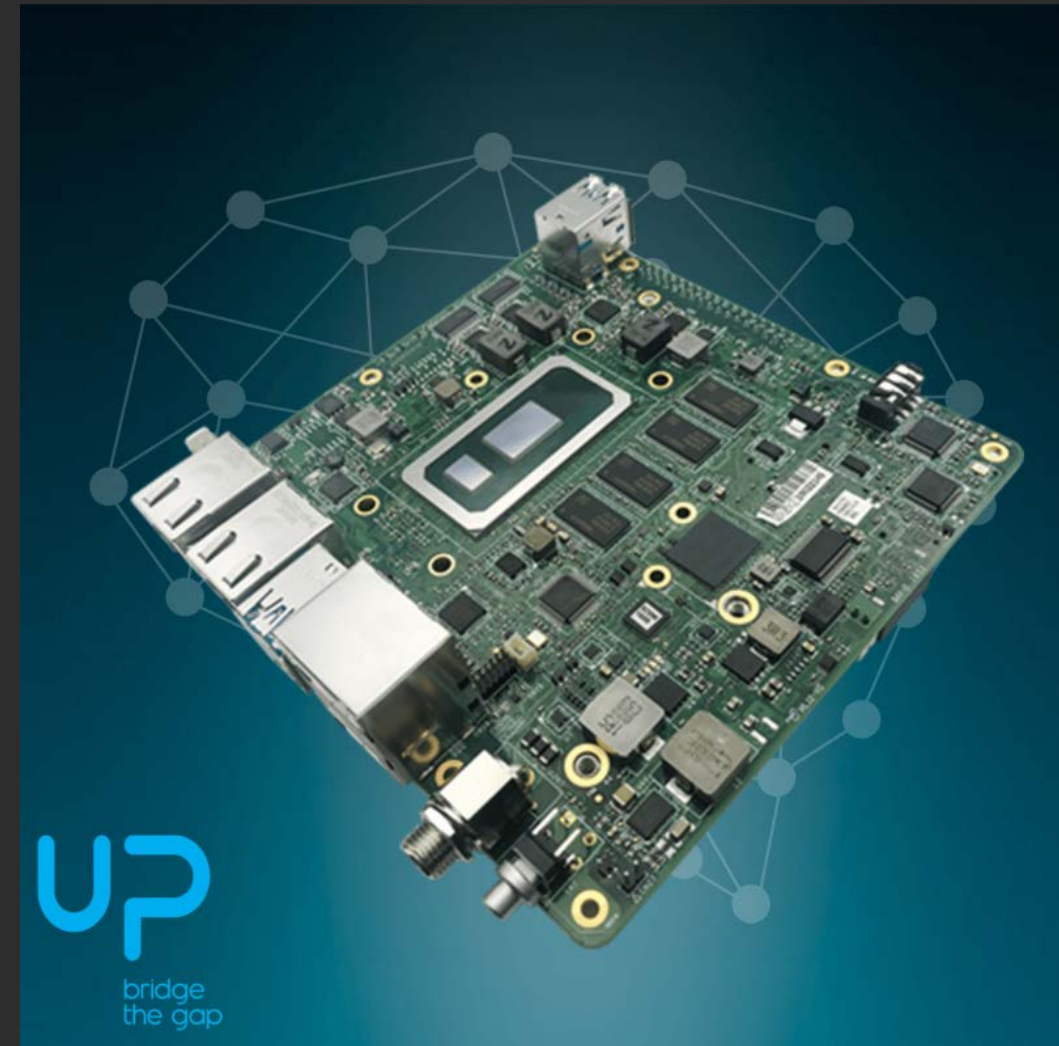
DOWNLOAD MINPLATFORM

Use Git Bash 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

Git Bash



Open “Git Bash”

Linux like commands “/” for dirs.

Use “/c” to go to C: in Windows, etc.

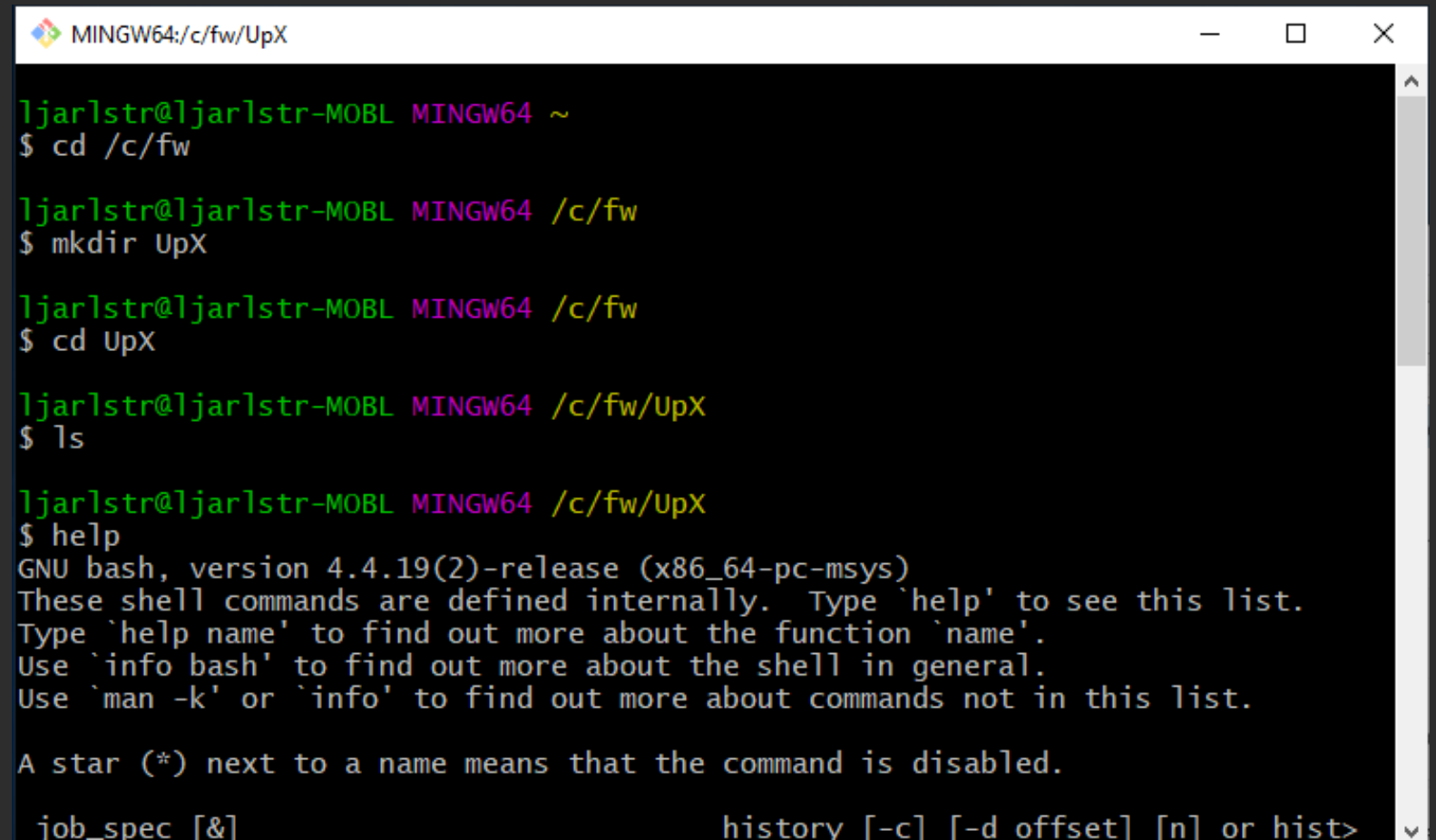
Cd to the Workspace:

```
$ cd /c/fw
```

```
$ mkdir UpX
```

```
$ help
```

```
$ cd UpX
```

A screenshot of a Git Bash terminal window. The title bar shows "MINGW64:/c/fw/UpX". The terminal content shows a series of commands and their outputs: the user is at the home directory, then changes to /c/fw, creates a directory UpX, changes to UpX, lists files (showing only . and ..), and then types the help command. The help output lists various GNU bash commands and their usage. The terminal is running on a system named ljarlstr-MOBL.

```
MINGW64:/c/fw/UpX
ljarlstr@ljarlstr-MOBL MINGW64 ~
$ cd /c/fw

ljarlstr@ljarlstr-MOBL MINGW64 /c/fw
$ mkdir UpX

ljarlstr@ljarlstr-MOBL MINGW64 /c/fw
$ cd UpX

ljarlstr@ljarlstr-MOBL MINGW64 /c/fw/UpX
$ ls

ljarlstr@ljarlstr-MOBL MINGW64 /c/fw/UpX
$ help
GNU bash, version 4.4.19(2)-release (x86_64-pc-msys)
These shell commands are defined internally.  Type `help' to see this list.
Type `help name' to find out more about the function `name'.
Use `info bash' to find out more about the shell in general.
Use `man -k' or `info' to find out more about commands not in this list.

A star (*) next to a name means that the command is disabled.

job_spec [&]                                history [-c] [-d offset] [n] or hist>
```

Download the source for Edk II, MinPlatform and FSP

In the Git Bash command line window 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-dmz.intel.com:912  
$ git config --global http.proxy proxy-dmz.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/PlatformBuildLab_MinPlatform_FW.git)
[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

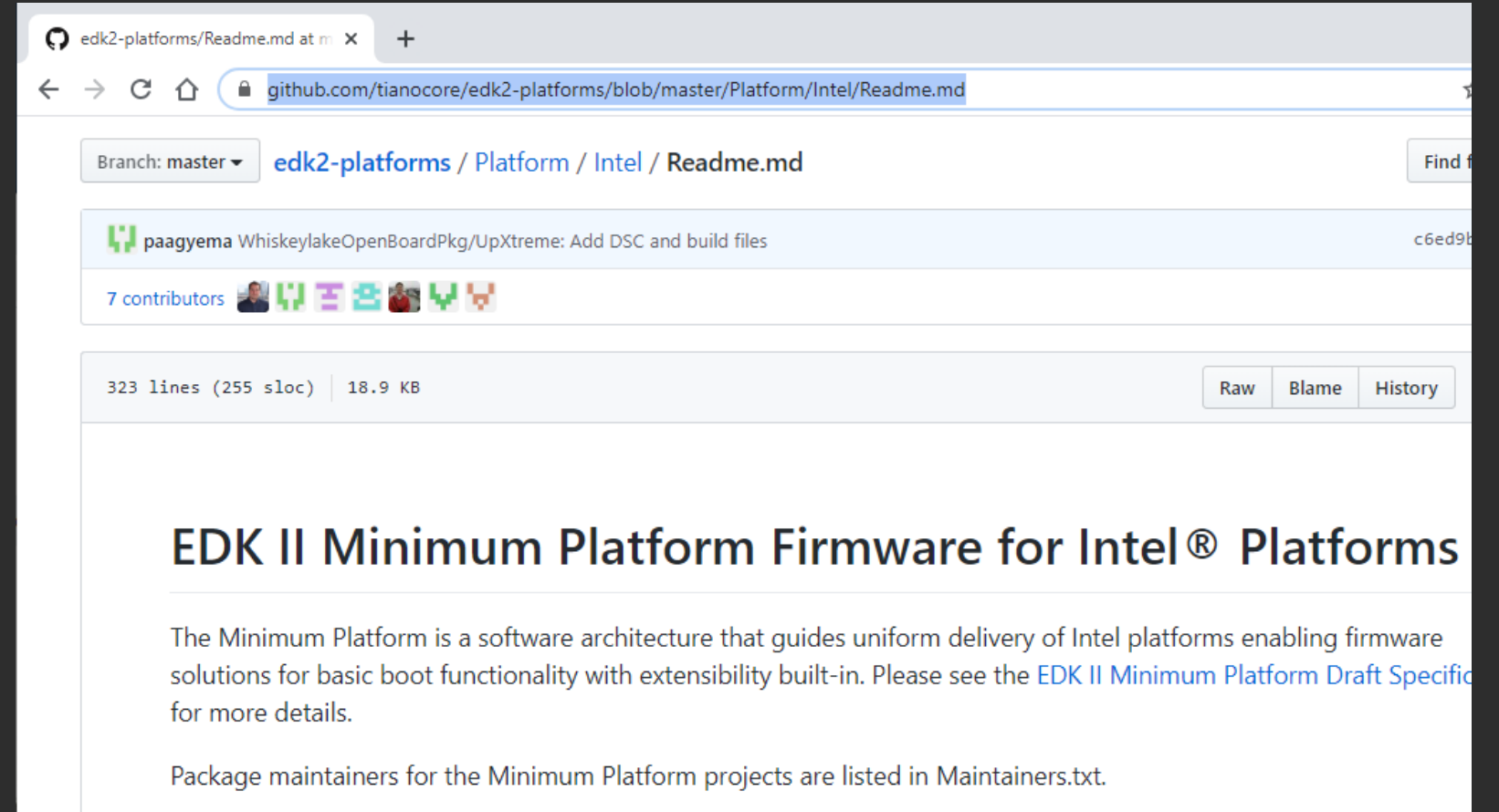
/MinPlatformBuild

- | | | |
|---------------|----------------------|----------------------------|
| - asl | - Asl Compiler | - Readme has download info |
| - FTDI-Driver | - Serial / USB cable | - Readme has download info |
| - UpX_Lab | - Lab Material | |
| - TeraTerm | - Terminal app | - Readme has download info |
| - Nasm | - Nasm Assembler | - Readme has download info |

BUILD UP XTREME

Where to get Open Source Up Xtreme

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

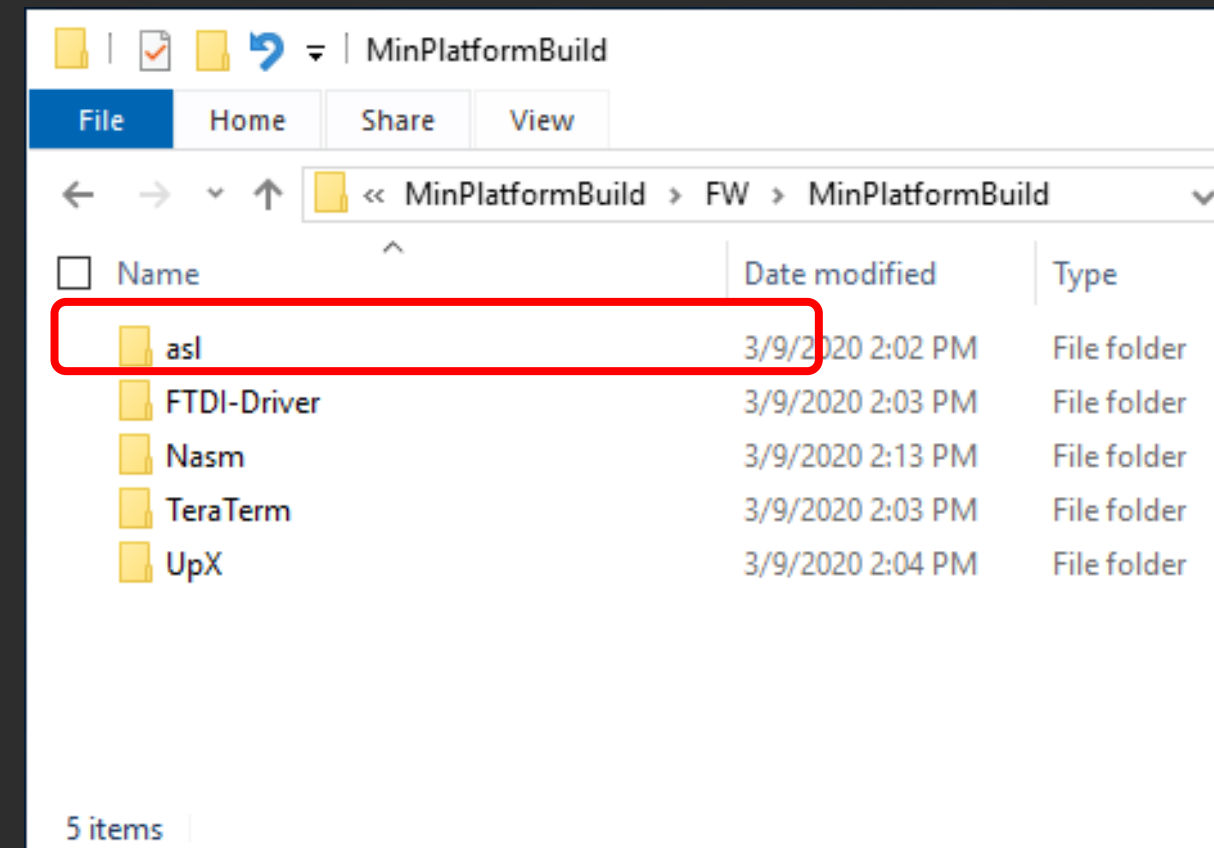


Preparing to Build

Directory C:\MinPlatformBuildLab_FW\FW\MinPlatformBuildLab
from Download or zip

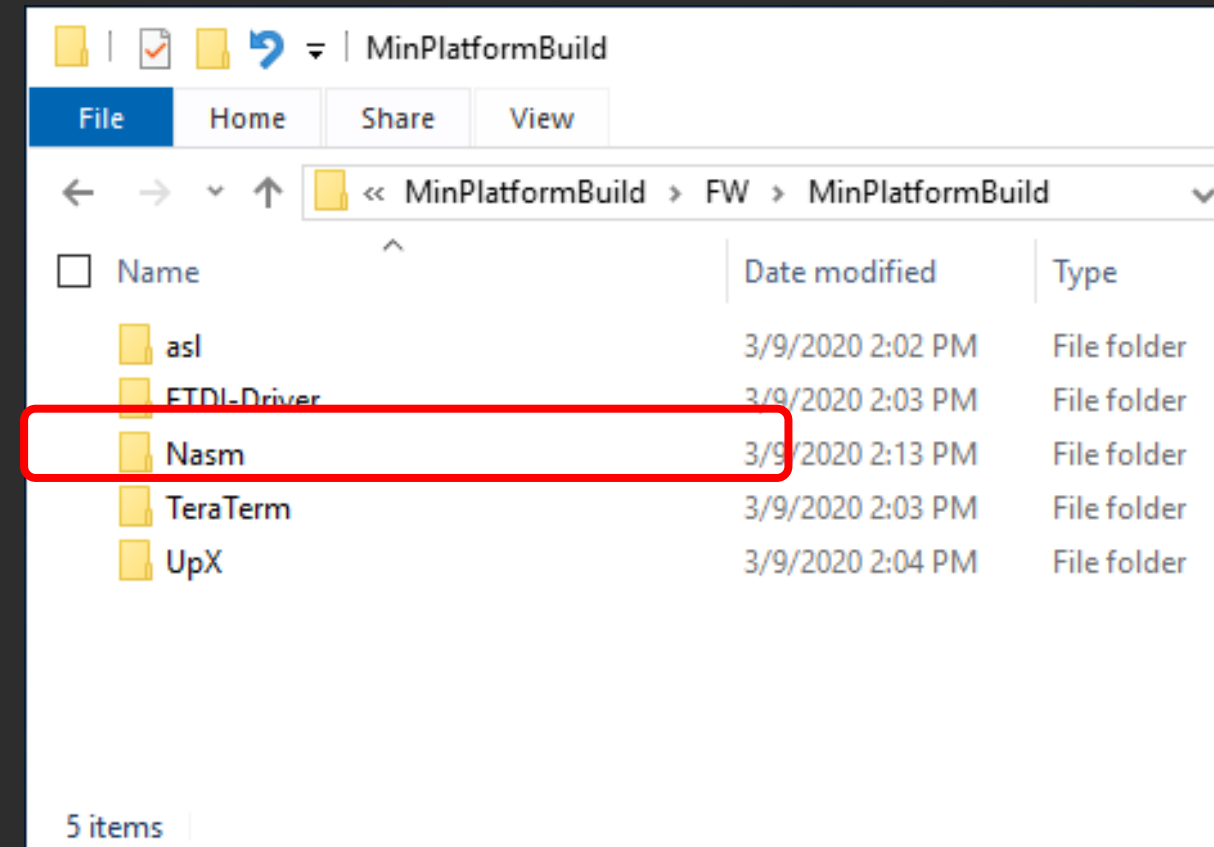
1 Copy \asl Folder to C:\

Note: Download Asl compiler described in the Readme.txt



Preparing to Build

Directory C:\MinPlatformBuildLab_FW\FW\MinPlatformBuildLab
from Download or zip



2 Copy \Nasm Folder to C:\

Note: Download Nasm compiler described in the Readme.txt

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 .py from here

Platform DSC & FDF here

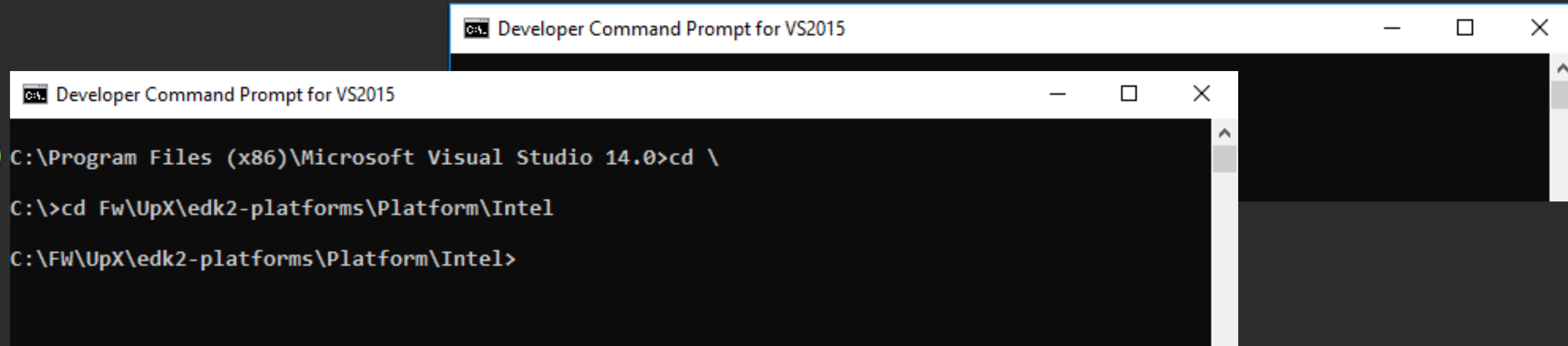
Open a VS Command Prompt

Follow Steps from [here](#) to Pin the Visual Studio Command Prompt to the Windows Task Bar

Open a Visual Studio Command Prompt &

```
> cd C:\FW\UpX\edk2-platforms\Platform\Intel
```

3



```
C:\Program Files (x86)\Microsoft Visual Studio 14.0>cd \  
C:\>cd Fw\UpX\edk2-platforms\Platform\Intel  
C:\FW\UpX\edk2-platforms\Platform\Intel>
```


Check if Python okay (may also need to set PYTHON_HOME)

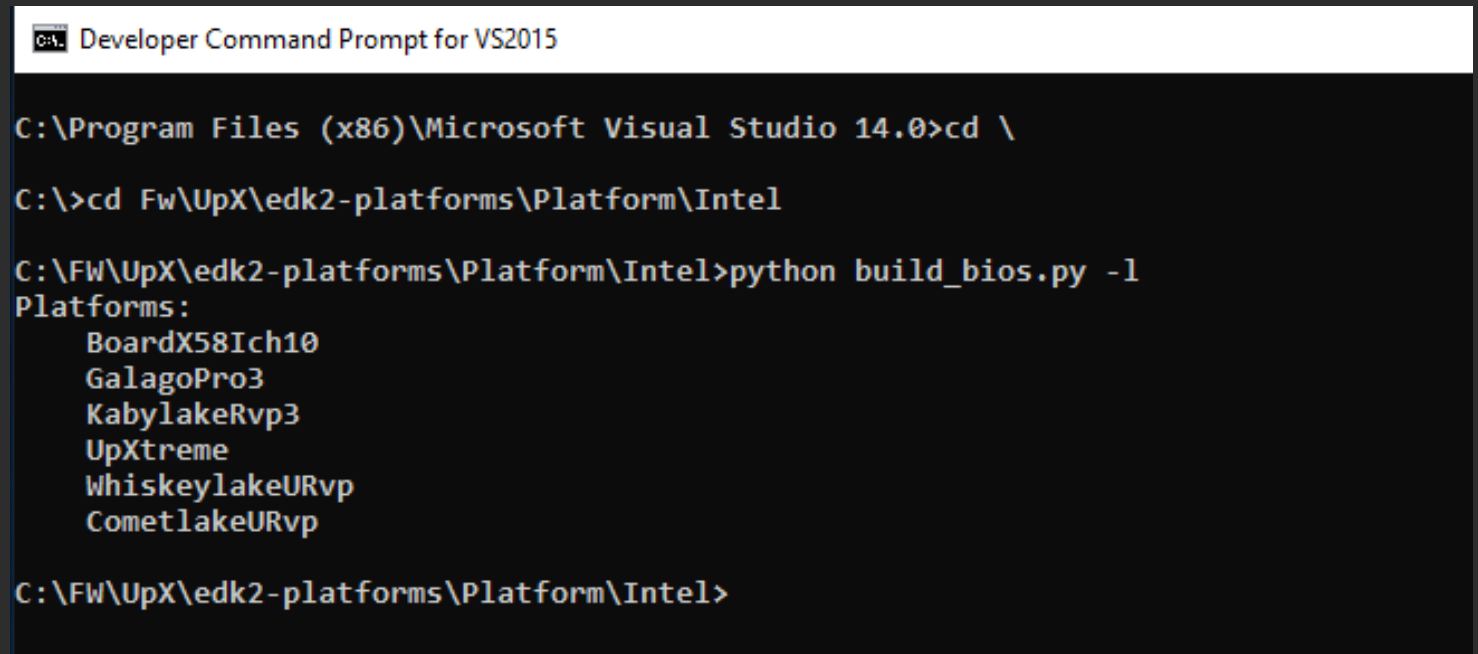
```
$> python --version  
Python 3.8.2
```

Check for PYTHON_HOME Variable and set if not declared (note Python v 3.8.n)

```
$> set PYTHON_HOME=%USERPROFILE%\AppData\Local\Programs\Python\Python38-32
```

Check for available MinPlatform Boards

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



```
Developer Command Prompt for VS2015  
  
C:\Program Files (x86)\Microsoft Visual Studio 14.0>cd \  
  
C:\>cd Fw\UpX\edk2-platforms\Platform\Intel  
  
C:\FW\UpX\edk2-platforms\Platform\Intel>python build_bios.py -l  
Platforms:  
BoardX58Ich10  
GalagoPro3  
KabylakeRvp3  
UpXtreme  
WhiskeylakeURvp  
CometlakeURvp  
  
C:\FW\UpX\edk2-platforms\Platform\Intel>
```

Invoke the Build

4

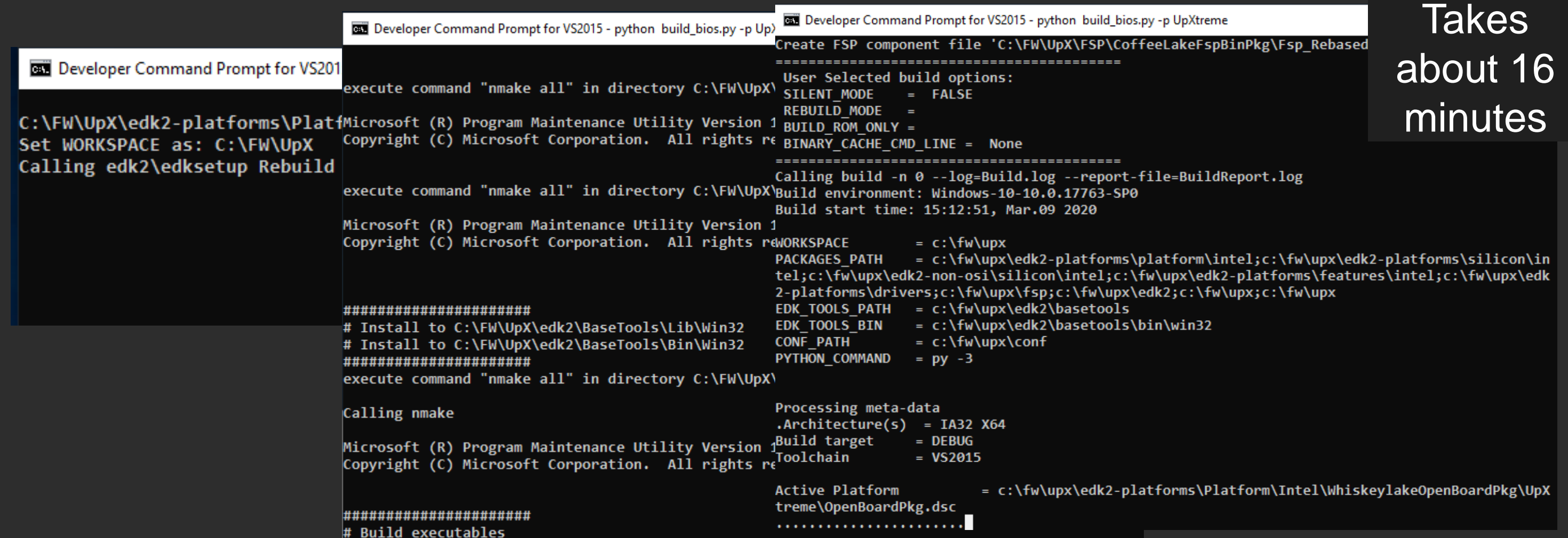
Invoke the Python Build script for Up Xtreme

```
$> python build_bios.py -p UpXtreme -t VS20XX
```

Where XX is 15 or 17 or 19



Takes
about 16
minutes



```

C:\FW\UpX\edk2-platforms\Platform\Intel\WhiskeylakeOpenBoardPkg\UpXtreme\OpenBoardPkg.dsc
Set WORKSPACE as: C:\FW\UpX
Calling edk2\edksetup Rebuild

Developer Command Prompt for VS2015 - python build_bios.py -p UpXtreme
C:\FW\UpX> python build_bios.py -p UpXtreme

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: 15:12:51, 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

Processing meta-data
Architecture(s) = IA32 X64
Build target    = DEBUG
Toolchain       = VS2015

Active Platform      = c:\fw\upx\edk2-platforms\Platform\Intel\WhiskeylakeOpenBoardPkg\UpX
treme\OpenBoardPkg.dsc
.....
# Build executables

```

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	= VS2015
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

```
$> python build_bios.py -p UpXtreme -r -t VS20XX
```



Takes
about 16
minutes

```

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)

=====
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  =

Calling C:\Python37-32\python C:\FW\UpX\edk2-plat
\RebaseFspBinBaseAddress.py C:\FW\UpX\edk2-plat
Xtreme\Include\Fdf\FlashMapInclude.fdf C:\FW\UpX

Developer Command Prompt for VS2015 - python build_bios.py -p UpXtreme -r
Create FSP component file 'C:\FW\UpX\FSP\CoffeeLakeFspBinPkg\Fsp_Rebase
=====
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

Processing meta-data .
Architecture(s)   = IA32 X64
Build target      = RELEASE
Toolchain         = VS2015

Active Platform    = c:\fw\upx\edk2-platforms\Platform\Intel\WhiskeylakeOpenBoardPkg\UpX

```

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

Make a Change

Directory C:\MinPlatformBuildLab_FW\FW\MinPlatformBuildLab\UpX_Lab

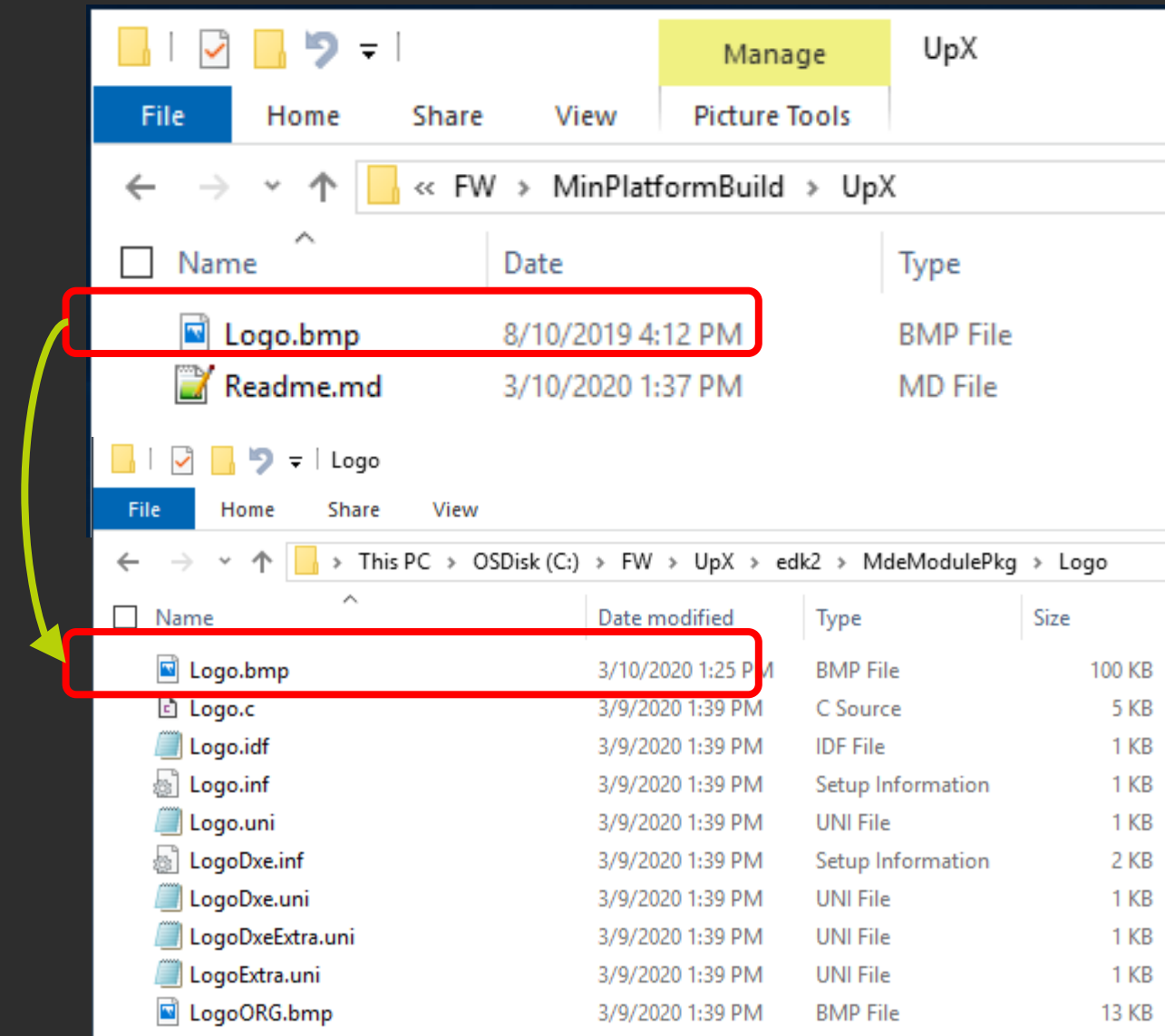
Copy Logo.bmp to
C:\FW\UpX\edk2\MdeModulePkg\Logo

Or create a .BMP with Windows Paint



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 VS20XX
```



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
```

Build Process Completed

5

Locate the build .fd images

```

C:\> Developer Command Prompt for VS2015
Microcode[0] - (0xffe50060, 0x00018000, 0x0100)
Microcode[1] - (0xffe68060, 0x00018800, 0x0100)
Microcode[2] - (0xffe80860, 0x00018800, 0x0100)

#####
# FIT Table: #
#####
FIT Pointer Offset: 0x40
FIT Table Address: 0xfffffb300
=====
Index:      Address      Size  Version      Type      C_V  Checksum (Index  Data Width  Bit
Offset)
=====
00:  2020205f5449465f 000004  0100  00-'_FIT_'  01    1c
01:  00000000ffe50060 000000  0100  01-MICROCODE 00    00
02:  00000000ffe68060 000000  0100  01-MICROCODE 00    00
03:  00000000ffe80860 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 C:\FW\UpX\Build\WhiskeylakeOpenBoardPkg\UpXtreme\RELEASE_VS2015\FV\UPX
TREME.fd
C:\FW\UpX\edk2-platforms\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

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BACKUP

BUILD ERRORS

Build Error- RC.exe

Error message:



```

Developer Command Prompt for VS2015
DEBUG_VS2015x86\X64\ShellPkg\DynamicCommand\TftpDynamicCommand\TftpDynamicCommand\OUTPUT\tftpDynamicCommandhii.rc
'c:\Program' is not recognized as an internal or external command,
operable program or batch file.
"C:\Program Files (x86)\Microsoft Visual Studio 14.0\VC\bin\x86_amd64\link.exe" /OUT:c:\fw\edk2-ws\Build\EmulatorX64
\DEBUG_VS2015x86\X64\MdeModulePkg\Universal\Disk\PartitionDxe\PartitionDxe\DEBUG\PartitionDxe.dll /NOLOGO /NODEFAULTLIB /IGN
ORE:4001 /OPT:REF /OPT:ICF=10 /MAP /ALIGN:32 /SECTION:.xdata,D /SECTION:.pdata,D /Machine:X64 /LTCG /DLL /ENTRY:_ModuleEntry
Point /SUBSYSTEM:EFI_BOOT_SERVICE_DRIVER /SAFESEH:NO /BASE:0 /DRIVER /DEBUG /ALIGN:4096 /FILEALIGN:4096 /SUBSYSTEM:CONSOLE /
EXPORT:InitializeDriver=_ModuleEntryPoint /BASE:0x10000 @c:\fw\edk2-ws\Build\EmulatorX64\DEBUG_VS2015x86\X64\MdeModulePkg\
Universal\Disk\PartitionDxe\PartitionDxe\OUTPUT\static_library_files.lst
NMAKE : fatal error U1077: '"c:\Program Files (x86)\Windows Kits\8.1\bin\x64\rc.exe' : return code '0x1'
Stop.
'c:\Program' is not recognized as an internal or external command,
operable program or batch file.
NMAKE : fatal error U1077: '"c:\Program Files (x86)\Windows Kits\8.1\bin\x64\rc.exe' : return code '0x1'

```

Find where the RC.EXE is located on your VS Installation:

Example (VS 2015): The RC.exe is located on this machine:

C:\Program Files (x86)\Windows Kits\8.1\bin\x64

Edit Conf\tools_def.txt

Build Error- RC.exe Cont.

Edit `Conf\tools_def.txt`

Search for your installation of Visual Studio (2013, 2015, 2017) “RC.EXE”

Probably in path `C:\Program Files (x86)\Windows Kits\`

Update according to the path for where the RC.EXE is found

```
# Microsoft Visual Studio 2013 Professional Edition
DEFINE WINSDK8_BIN      = c:\Program Files\Windows Kits\8.1\bin\x86\
DEFINE WINSDK8x86_BIN   = c:\Program Files (x86)\Windows Kits\8.1\bin\x64

# Microsoft Visual Studio 2015 Professional Edition
DEFINE WINSDK81_BIN     = c:\Program Files\Windows Kits\8.1\bin\x86\
DEFINE WINSDK81x86_BIN  = c:\Program Files (x86)\Windows Kits\8.1\bin\x64

# Microsoft Visual Studio 2017 Professional Edition
DEFINE WINSDK10_BIN     = C:\Program Files (x86)\Windows Kits\10\bin\x86
```

Paths on your
machine



Build Error: fatal error C1041:

Build Error from fatal error C1041: cannot open program database

This Error is usually because the location you are building is being shared by another application in Windows. Example: Syncplicity may cause this

Error Message:

```
k:\fw\edk2\MdePkg\Library\BaseLib\LinkedList.c : fatal error C1041: cannot open program
database
'k:\fw\edk2\build\nt32ia32\debug_vs2013x86\ia32\mdepkg\library\baselib\baselib\vc120.pdb'; if
multiple CL.EXE write to the same .PDB file, please use /FS
NMAKE : fatal error U1077: '"C:\Program Files (x86)\Microsoft Visual Studio
12.0\VC\bin\cl.exe"' : return code '0x2'
Stop.
```

Solution: Try using a Workspace that is not shared