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UEFI & EDK II Training

Platform Build Lab Up Xtreme - Windows

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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

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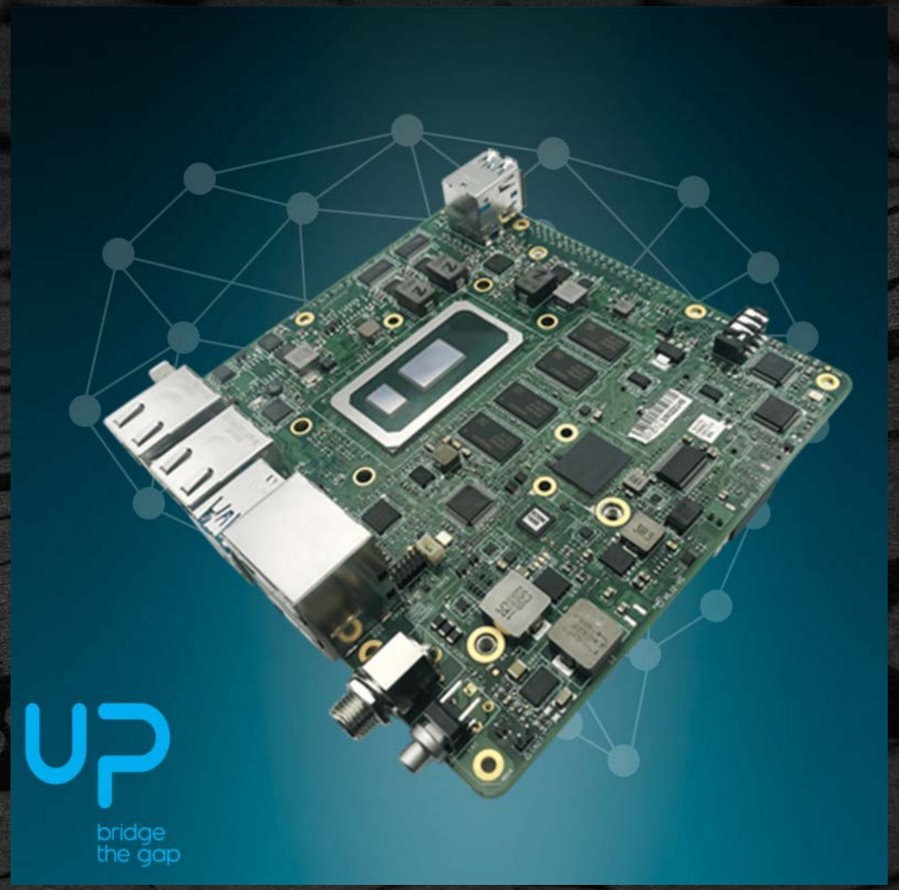
DOWNLOAD MINPLATFORM

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.

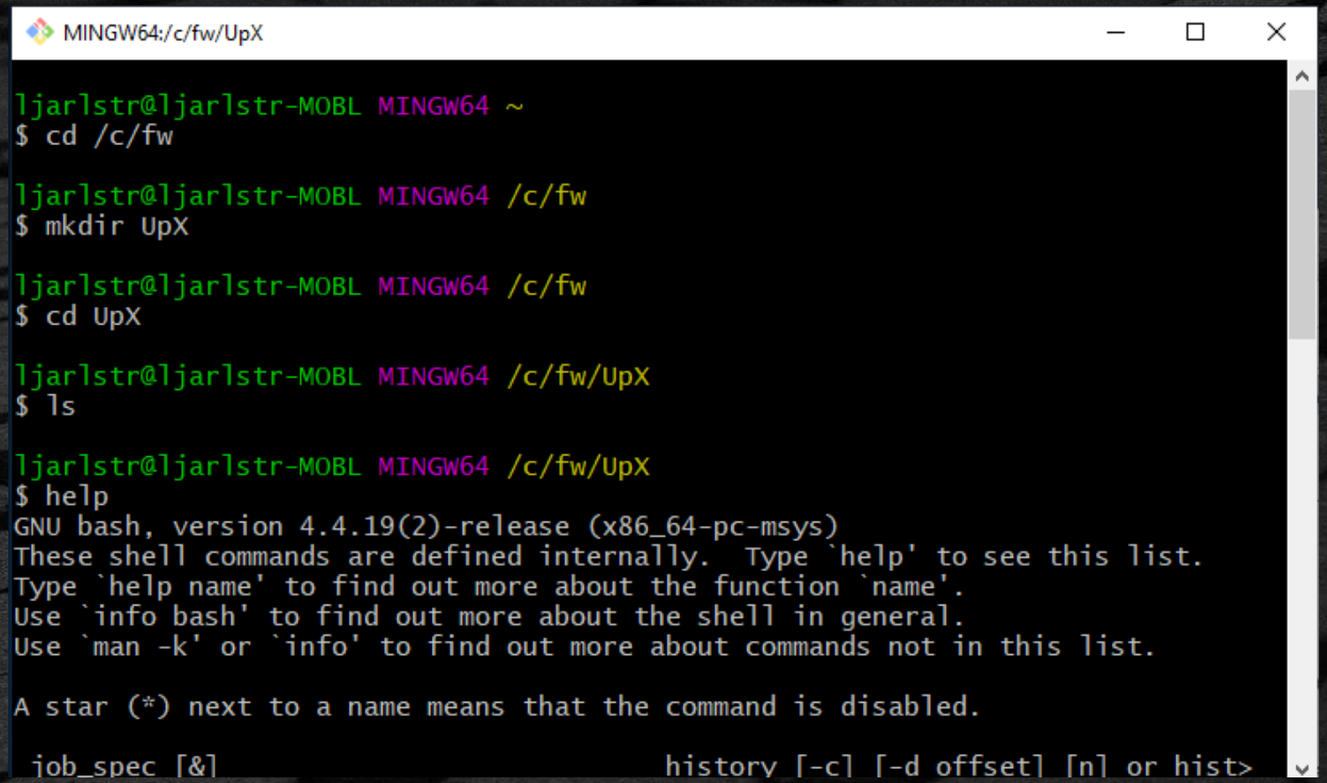
Cd to the Workspace:

```
$ cd /c/fw

$ mkdir UpX

$ help

$ cd UpX
```



Download the source for Edk II, MinPlatform and FSP

In the Git Bash command line window Do the following:

- Edk2

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

- Edk2-platforms

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

- Edk2-non-osi

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

- FSP

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

Takes about 6 minutes

Set PROXYS FIRST

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

Download MinPlatform Lab Material

Download the PlatformBuildLab_MinPlatform_FW.zip from : github.com 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 and Lab Guide
      - TeraTerm               - Terminal app                  - Readme has download info
      - Nasm                   - Nasm Assembler                - Readme has download info
```

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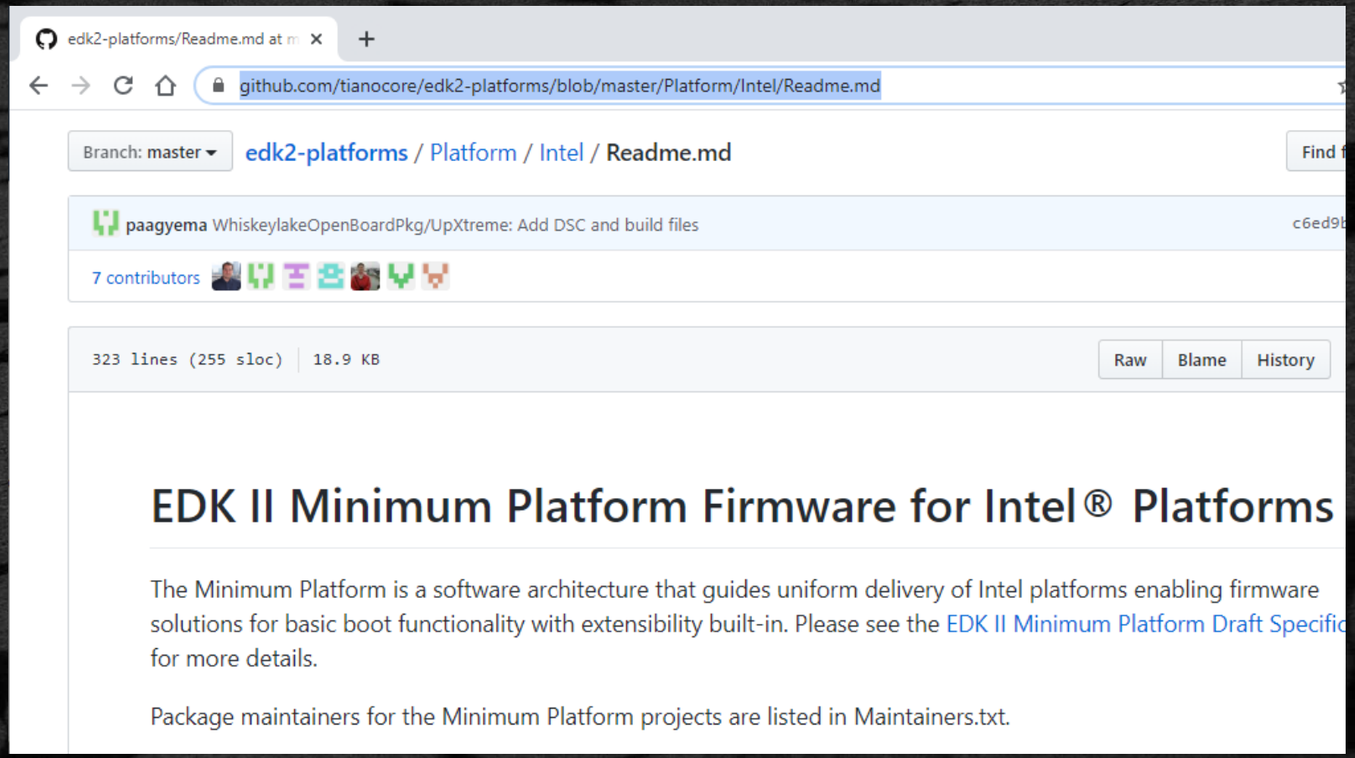
BUILD UP XTREME

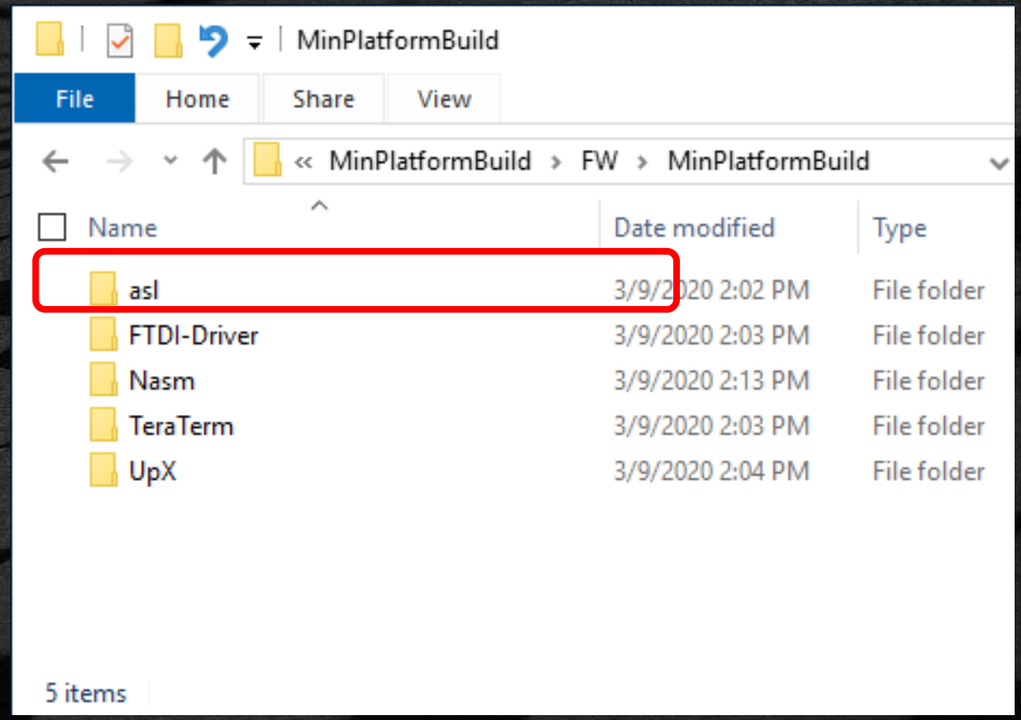
Where to get Open Source Up Xtreme

How to Download & Build: Open Source MinPlatform Readme.md



Preparing to Build

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

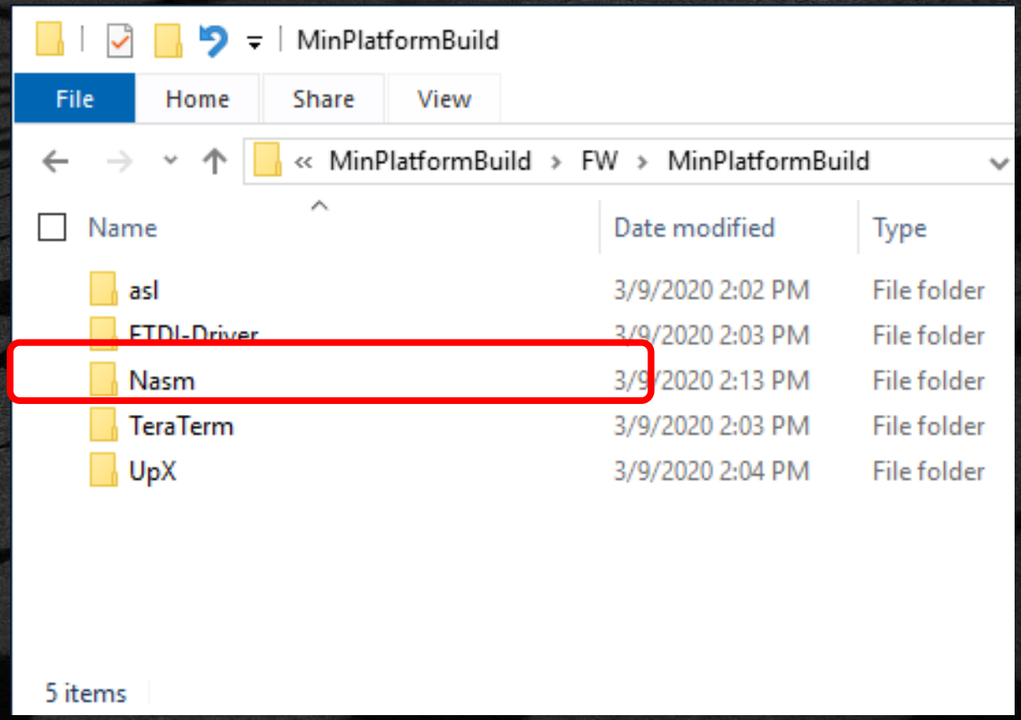


1. Copy \asl Folder to C:\

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-osi   https://github.com/tianocore/edk2-non-osi
    Silicon/
      Intel/
          CoffeelakeSiliconBinPkg
FSP    https://github.com/IntelFsp/FSP
      CoffeelakeFspBinPkg
```

Invoke the Build .py from here

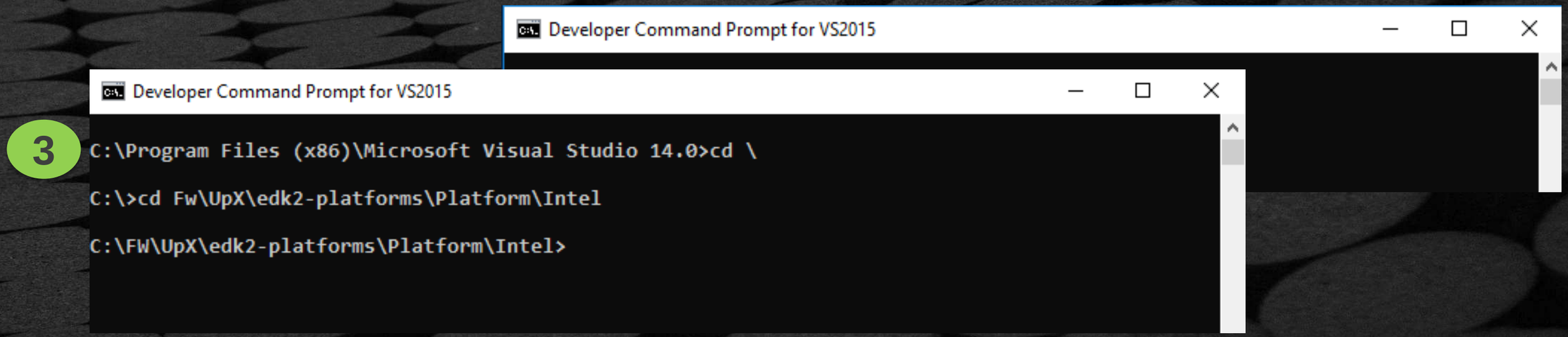
Platform DSC & FDF here

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
```



Build Environment

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

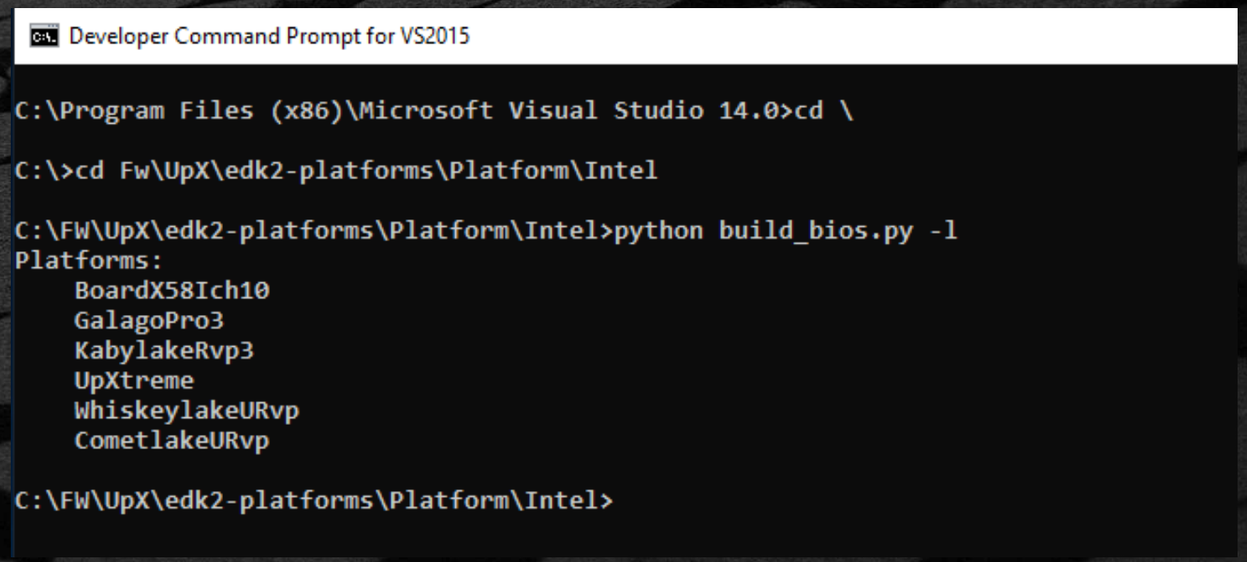
```
$>  python --version
Python 3.8.2
```

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
```



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

```
Developer Command Prompt for VS201

C:\FW\UpX\edk2-platforms\Platf
Set WORKSPACE as: C:\FW\UpX
Calling edk2\edksetup Rebuild
```

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

execute command "nmake all" in directory C:\FW\UpX\
Microsoft (R) Program Maintenance Utility Version 1
Copyright (C) Microsoft Corporation.  All rights re

execute command "nmake all" in directory C:\FW\UpX\
Microsoft (R) Program Maintenance Utility Version 1
Copyright (C) Microsoft Corporation.  All rights re

######################
# Install to C:\FW\UpX\edk2\BaseTools\Lib\Win32
# Install to C:\FW\UpX\edk2\BaseTools\Bin\Win32
######################
execute command "nmake all" in directory C:\FW\UpX\

Calling nmake
Microsoft (R) Program Maintenance Utility Version 1
Copyright (C) Microsoft Corporation.  All rights re

######################
# Build executables
```

```
Developer Command Prompt for VS2015 - 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
.....................
```

Platform Build Scripts

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	Build Mode
TARGET_ARCH	= IA32 X64	CPU Architecture
TOOL_CHAIN_TAG	= VS2015	VS Tool Chain
ACTIVE_PLATFORM	= ... \WhiskylakeOpenBoardPkg\ UpXtreme\OpenBoardPkg.dsc	Platform DSC file
Report file created (via python script)	= BuildReport.log	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\UpXtreme OpenBoardPkgPcd.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

4

Invoke the Python Build script for Up Xtreme

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

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 righ


######################
# Build executables
######################
Building FitGen

Microsoft (R) Program Maintenance Utility Vers
Copyright (C) Microsoft Corporation.  All righ

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-p
\RebaseFspBinBaseAddress.py C:\FW\UpX\edk2-pla
Xtreme\Include\Fdf\FlashMapInclude.fdf C:\FW\
```

```
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
treme\OpenBoardPkg.dsc
```

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

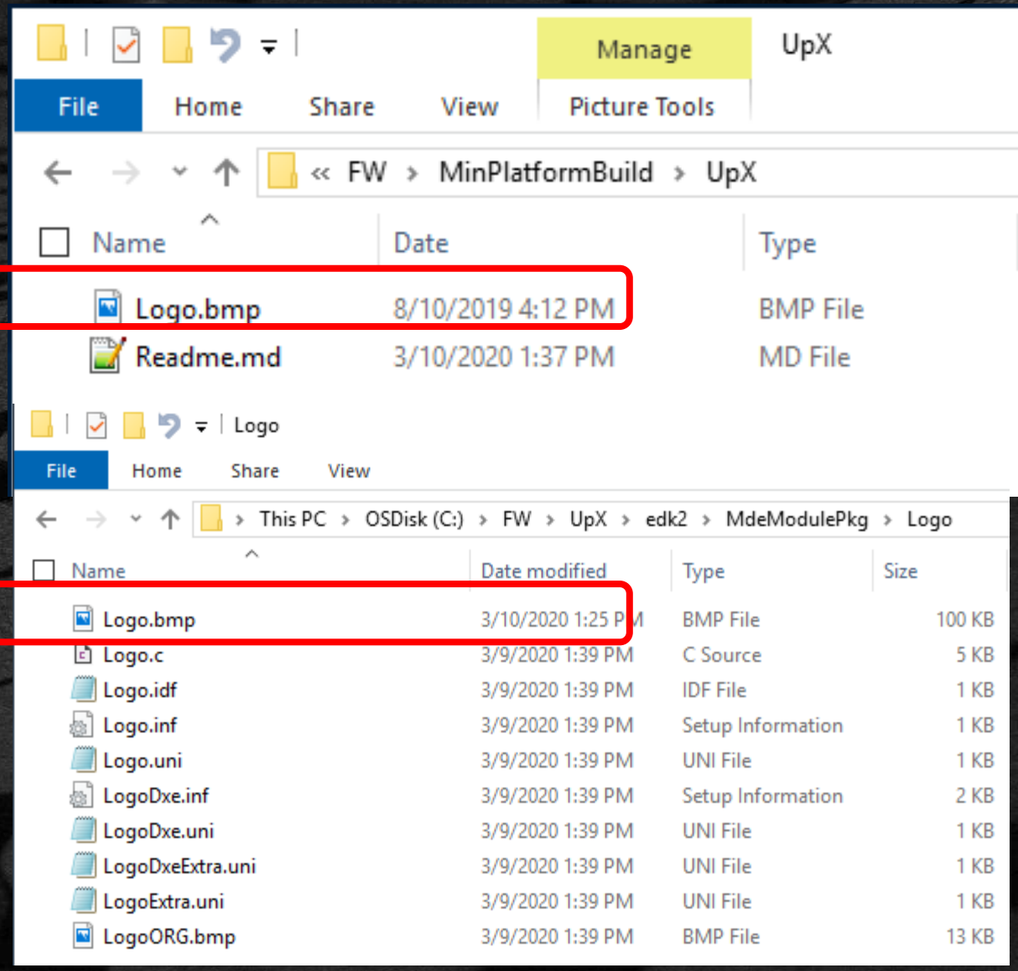
Make a Change

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

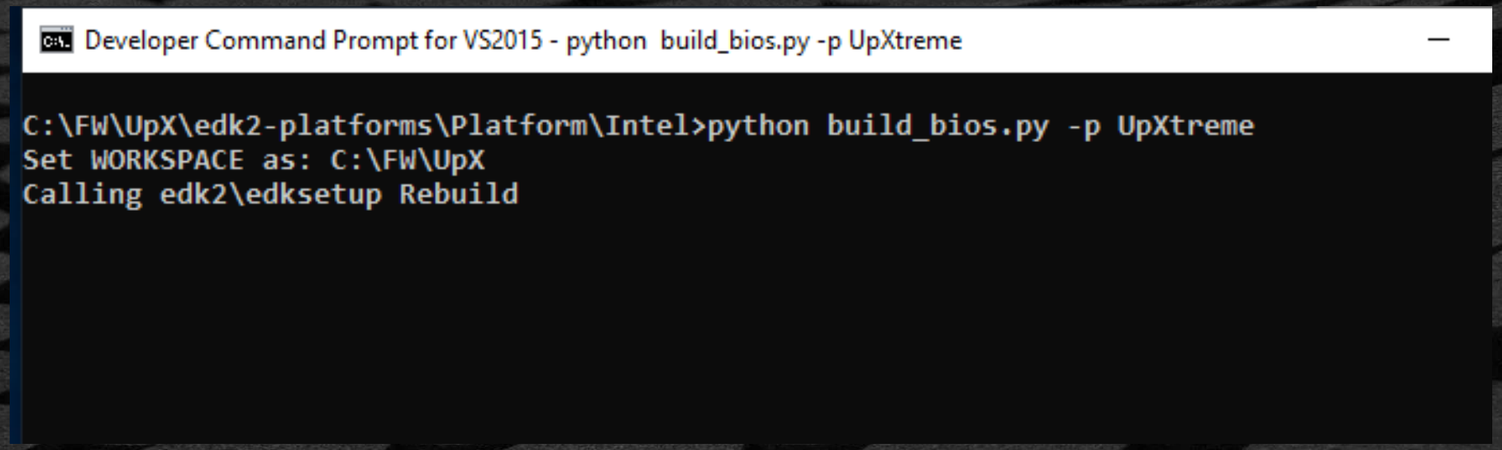


Build with new logo

Invoke the Python Build script for Up Xtreme

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

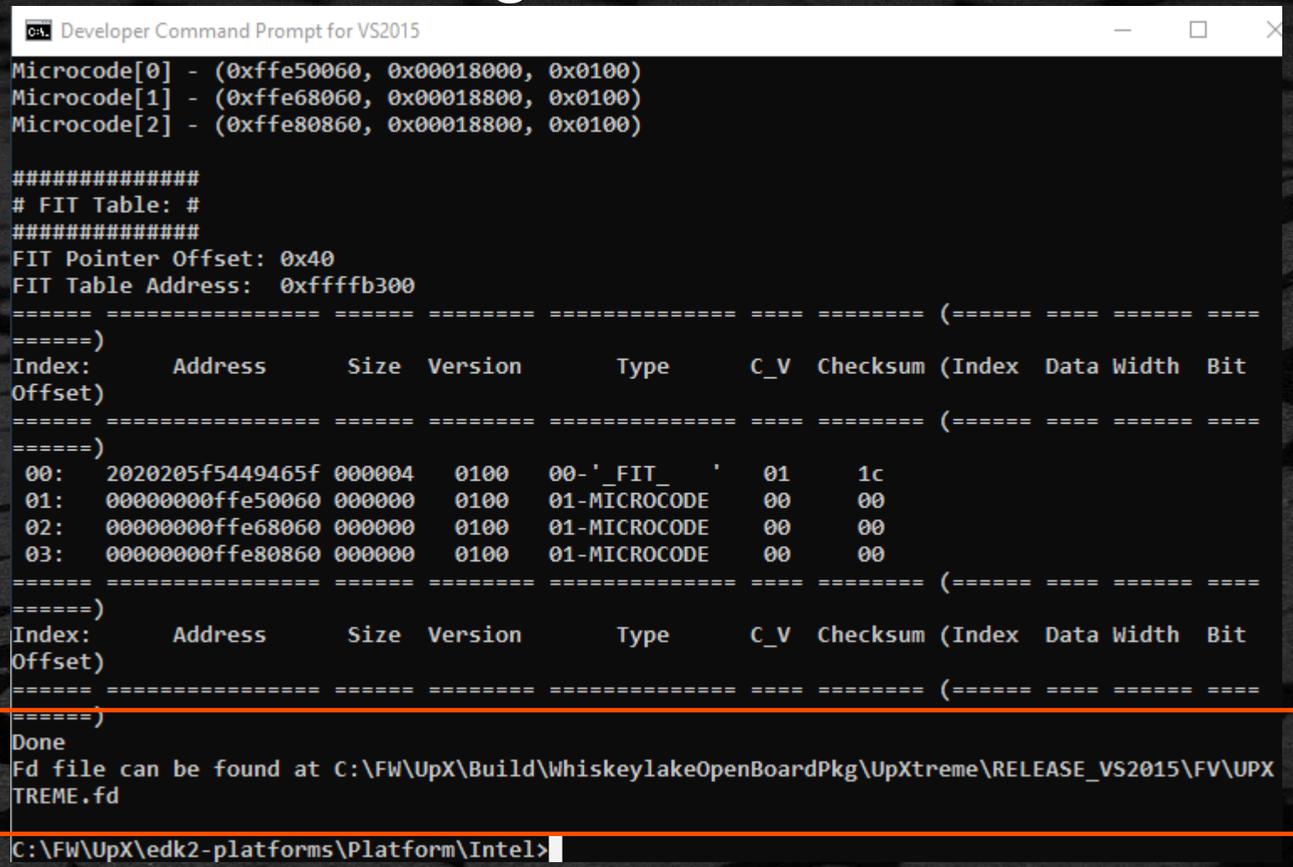
Takes about 2 minutes



Build Process Completed

5

Locate the build .fd images



The script displays the location of the final .fd files

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SUMMARY

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

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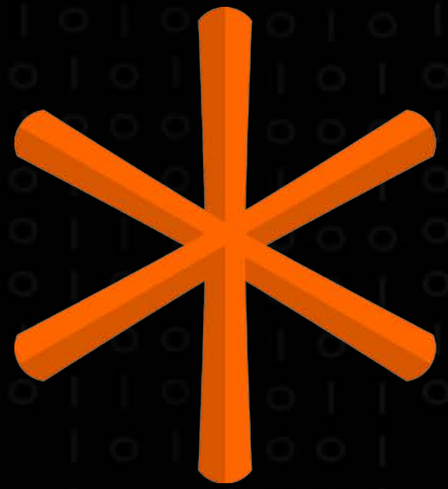
Questions?

Return to Main Training Page

Return to Training Table of contents for next presentation

Link



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Acknologegments

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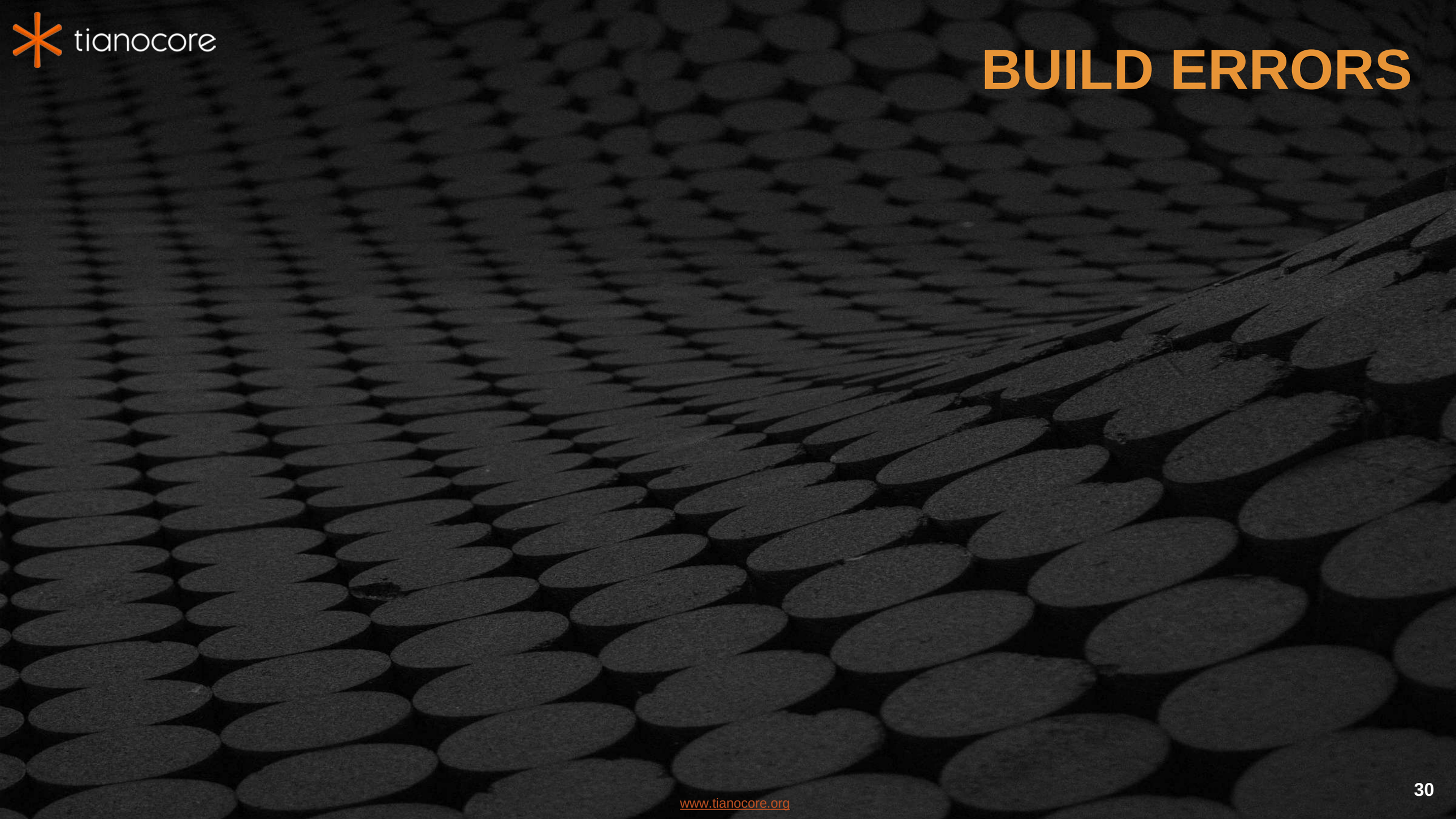
BACKUP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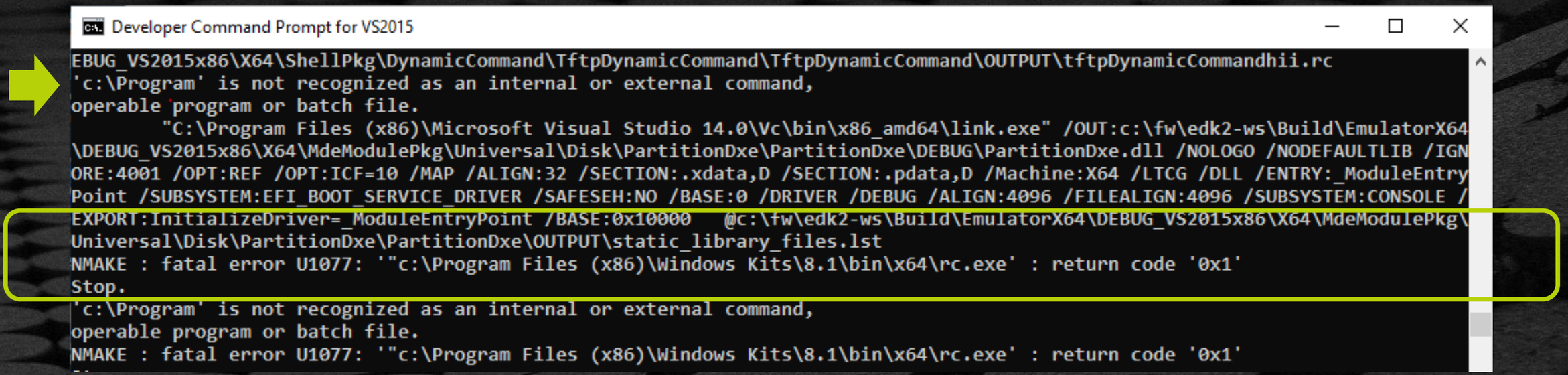
BUILD ERRORS

Build Error- RC.exe

Error message:



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

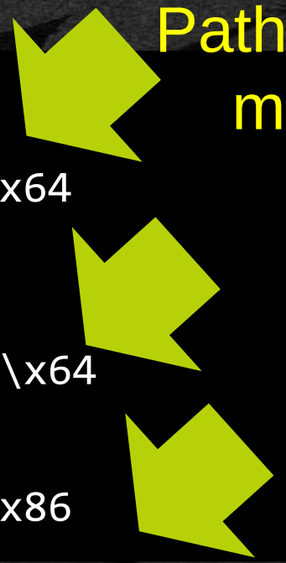
Search for your installation of Visual Studio (2013, 2015, 2017) “RC.EXE”
Probably in path C:\Program Files (x86)\Windows Kits\

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
```



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