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UEFI & EDK II Training

PLATFORM BUILD LAB - OVMF

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PLATFORM BUILD LABS

- Build a EDK II Platform using OVMF package 
- Run Ovmf using Qemu

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BUILD OVMFPKG

Setup OvmfPkg to build and run w/ QEMU

Pre-requisites Ubuntu 20.04

Example Ubuntu 20.04
The following need to be accessible for building Edk2, From the terminal prompt (Cnt-Alt-T):

```
bash$ sudo apt install build-essential uuid-dev iasl git nasm  python-is-python3
```

- build-essential - Informational list of build-essential packages
- uuid-dev - Universally Unique ID library (headers and static libraries)
- iasl - Intel ASL compiler/decompiler (also provided by acpica-tools)
- git - support for git revision control system
- nasm - General-purpose x86 assembler
- python-is-python3 - Ubuntu 20.04 python command is 'python3' but edk2 tools use 'python'

The following will install the QEMU for Intel X86 & 64 bit

```
bash$ sudo apt install qemu-system-x86-64
```

- Qemu – Emulation with Intel architecture with UEFI Shell

See Lab guide for Ubuntu 16.04 pre-requisites

Pre-requisites Clear Linux* Project

Example Using Clear Linux* Project
The following need to be accessible for building Edk2, From the terminal prompt (Cnt-Alt-T):

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

Devpkg-util-linux – includes bundles for developer tools for writing "C" Applications included:
gcc, nasm, uuid, etc.

```
bash$  sudo swupd bundle-add kvm-host
```

Qemu – Emulation with Intel architecture with UEFI Shell

Clear Linux* Project

Create QEMU Run Script

1. Create a run-ovmf directory under the home directory

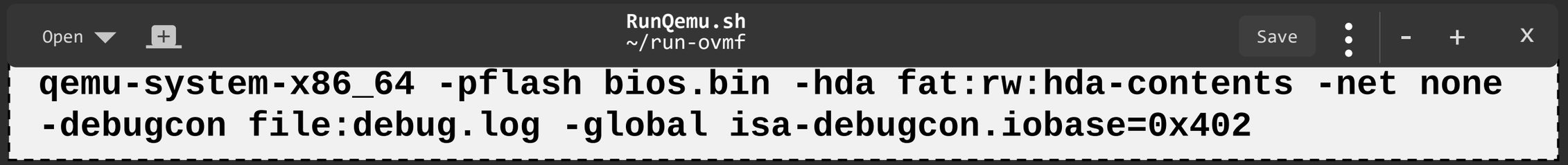
```
bash$ cd ~
bash$ mkdir ~run-ovmf
bash$ cd run-ovmf
```

2. Create a directory to use as a hard disk image

```
bash$ mkdir hda-contents
```

3. Create a Linux shell script to run the QEMU from the run-ovmf directory

```
bash$ gedit RunQemu.sh
```



4. Save and Exit

DOWNLOAD the EDK II Source

Open a terminal prompt and create a source working directory

```
bash$ mkdir ~/src
bash$ cd ~/src
bash$ mkdir edk2-ws
```

Internet Proxies – (company Firewall used for example)

```
bash$ export http_proxy=http://proxy-us.company.com:911
bash$ export ftp_proxy=$http_proxy
```

Download edk2 source tree using Git

```
bash$ git clone -b Edk2Lab_22Q1 https://github.com/tianocore-training/edk2.git
Bash$ git clone https://github.com/tianocore/edk2-libc.git
```

Download the Submodules and Checkout the Lab Branch

```
bash$  cd edk2
bash$ submodule update –init
bash$  cd ..
```

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SETUP LAB MATERIAL

Lab_Material_FW.zip

DOWNLOAD LAB MATERIAL

Download the Lab_Material_FW.zip from :  github.com Lab_Matrial_FW.zip

OR

Use git clone to download the Lab_Material_FW

```
bash$ cd $HOME
bash$ git clone https://github.com/tianocore-training/Lab_Material_FW.git
```

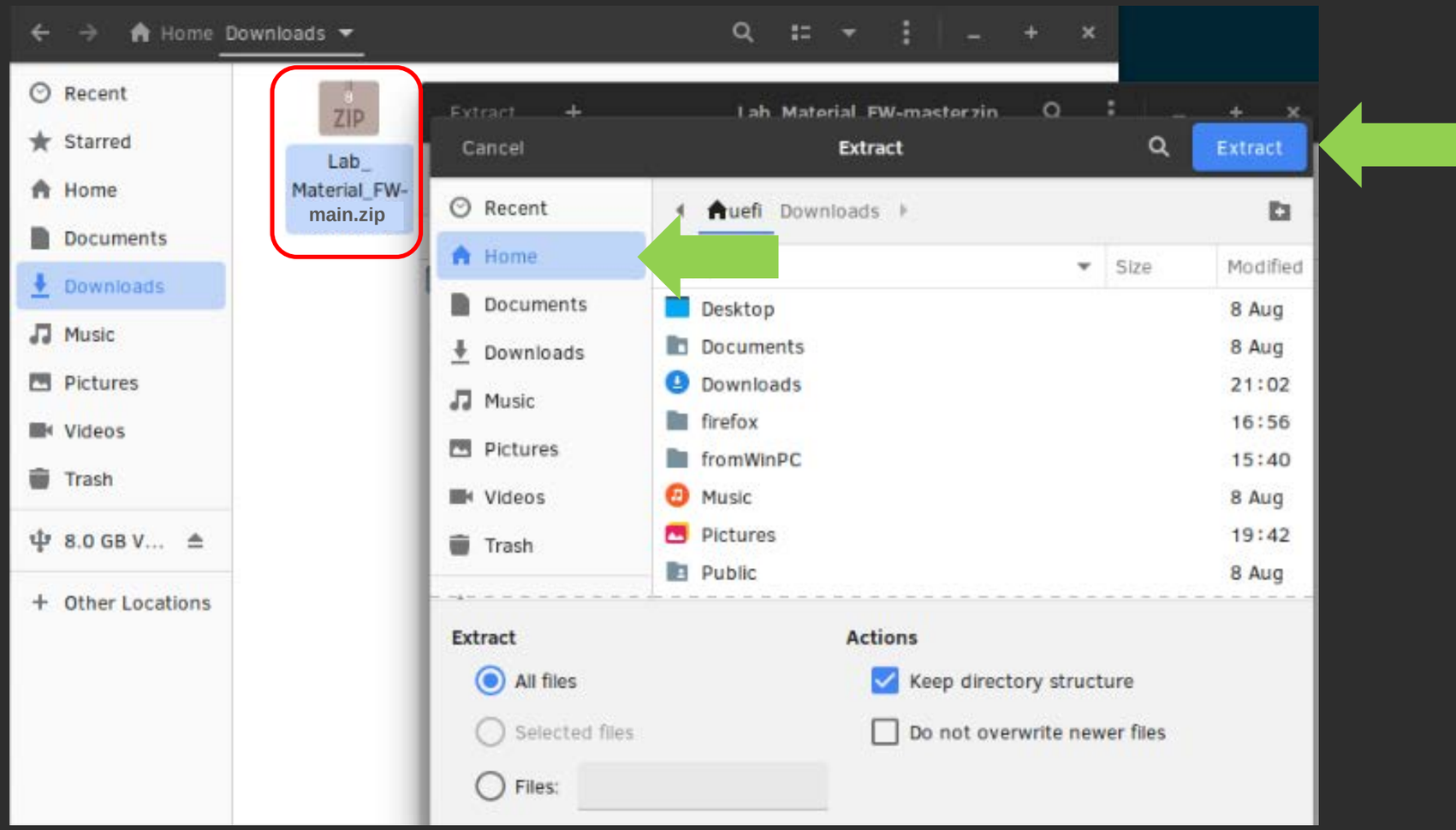
Directory Lab_Material_FW will be created

```
FW
 - Documentation
 - DriverWizard
 - edk2-ws
 - edk2Linux
 - LabSampleCode
```

BUILD EDK II OVMF

-Extract the Source

1. Extract the Downloaded **`Lab_Material_FW-main.zip`** to `Home` (this will create a directory `~/FW`)

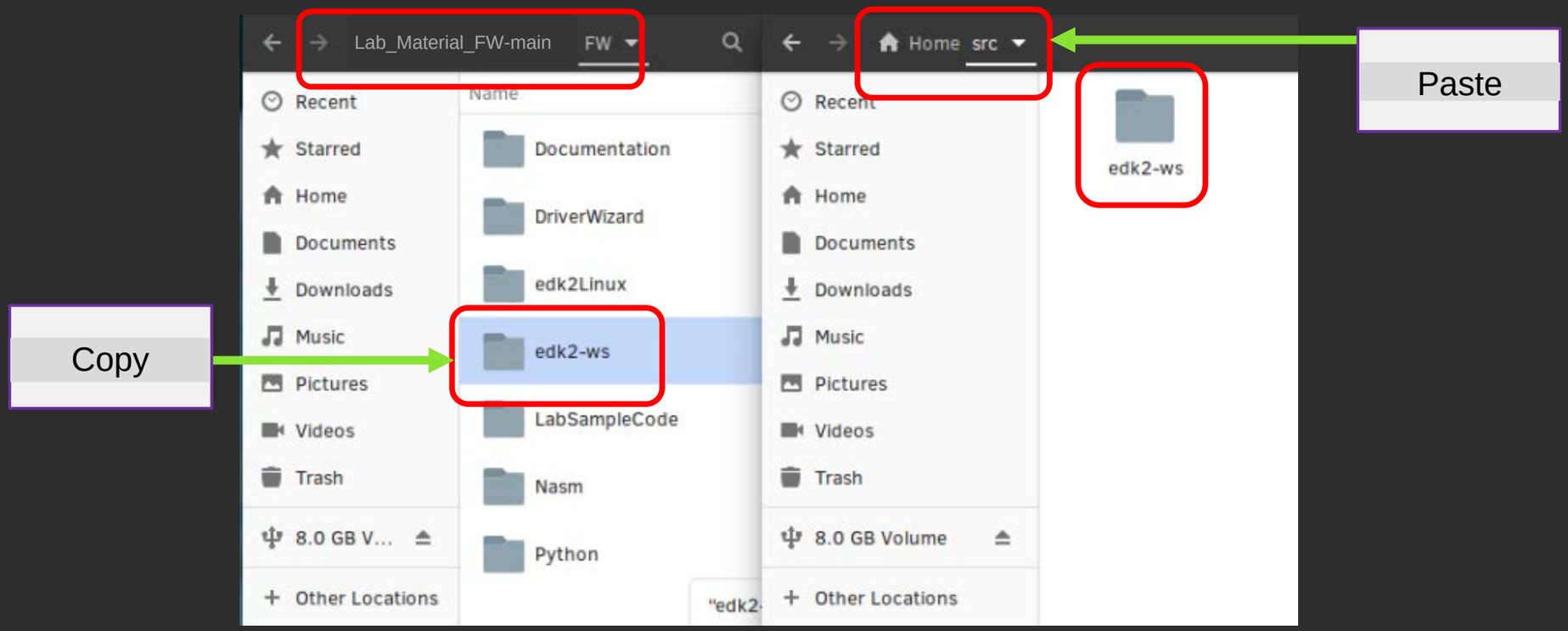


BUILD EDK II OVMF
- Copy the Source

2. Open a terminal prompt (Alt-Cnt-T)
3. Create a working space source directory under the home directory

```
bash$ cd ~src
```

4. From the FW folder, copy and paste folder “~…/FW/edk2-ws” to ~src



BUILD EDK II OVMF
- Building BaseTools

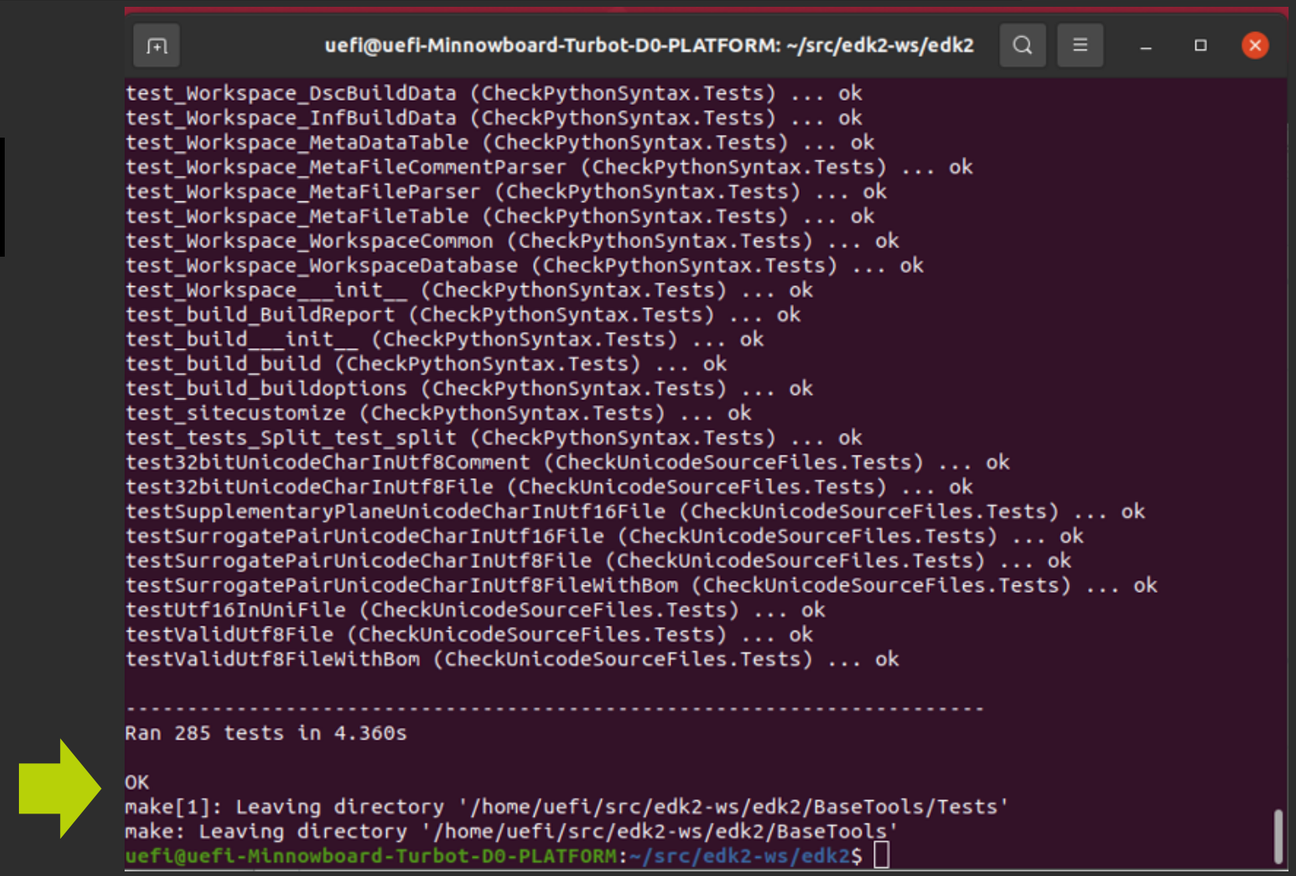
5. Export work space & platform path

```
bash$ cd ~src/edk2-ws
bash$ export WORKSPACE=$PWD
bash$ export PACKAGES_PATH=$WORKSPACE/edk2:$WORKSPACE/edk2-libc
```

6. Run Make

```
bash$ cd edk2
bash$ make –C BaseTools/
```

7. Make sure the tests pass OK



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BUILD OVMF PLATFORM

BUILD EDK II OVMF
-Update Target.txt

What is OVMF?
Open Virtual Machine Firmware - Build with edk2

```
bash$ cd ~/src/edk-ws/edk2
bash$ . edksetup.sh
```

```
uefi@clr-0~/src/edk2-ws/edk2 $ . edksetup.sh
Loading previous configuration from /home/uefi/src/edk2-ws/edk2/Conf/Build
WORKSPACE: /home/uefi/src/edk2-ws
EDK_TOOLS_PATH: /home/uefi/src/edk2-ws/edk2/BaseTools
CONF_PATH: /home/uefi/src/edk2-ws/edk2/Conf
uefi@clr-0~/src/edk2-ws/edk2 $
```

Edit the file Conf/target.txt

```
bash$ gedit Conf/target.txt
```

Open | Target.txt ~/src/edk2-ws/edk2/Conf | Save | - + X

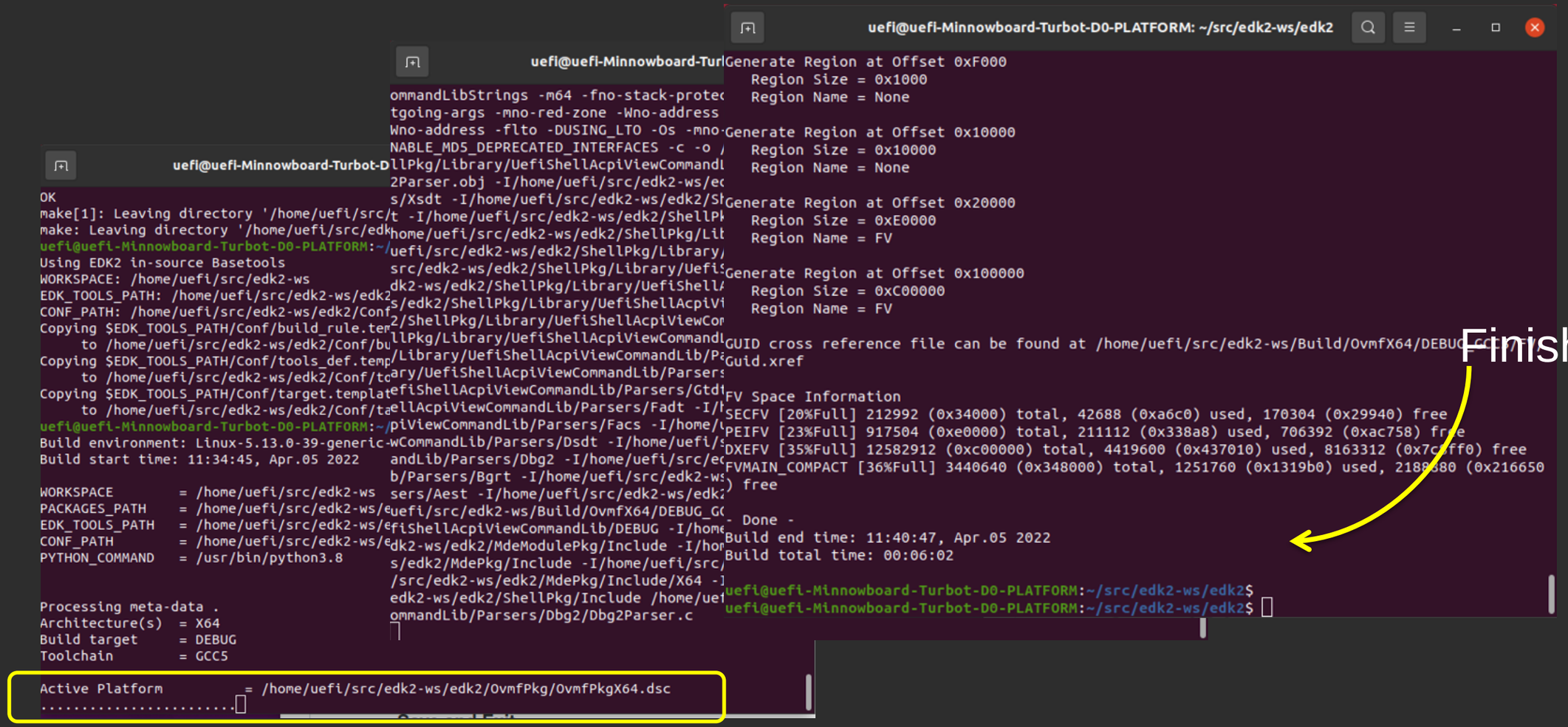
```
1.  ACTIVE_PLATFORM       = OvmfPkg/OvmfPkgX64.dsc
    #. . .
2.  TARGET_ARCH           = X64
    #. . .
3.  TOOL_CHAIN_TAG        = GCC5
```

Save and build

```
bash$ build -D ADD_SHELL_STRING
```

More info: tianocore - wiki/OVMF

BUILD EDK II OVMF
-Inside Terminal



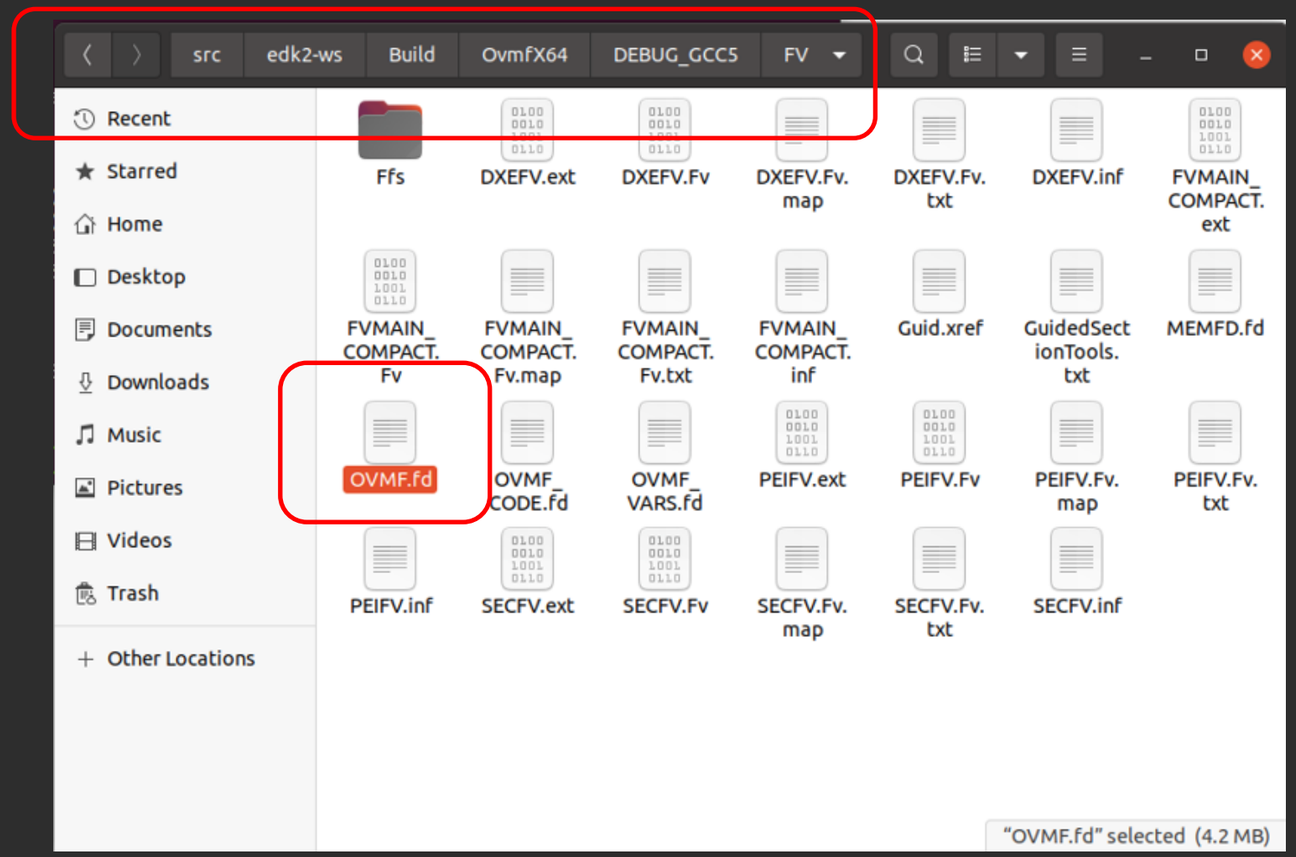
Finished build

BUILD EDK II OVMF
-Verify Build Succeeded

OVMF.fd should be in the Build directory

- For GCC5 with X64, it should be located at

```
~/src/edk2-ws/Build/OvmfX64/DEBUG_GCC5/FV/OVMF.fd
```



INVOKE QEMU

Change to run-ovmf directory under the home directory

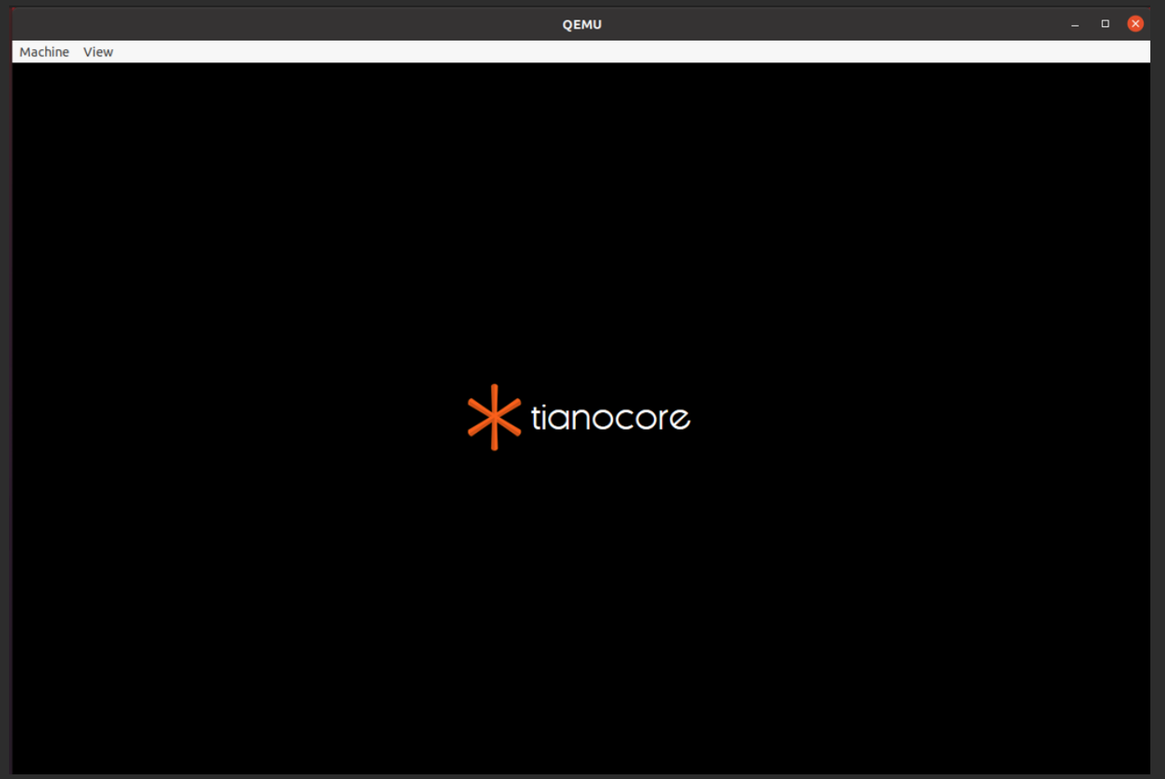
```
bash$ cd $HOME/run-ovmf
```

Copy the OVMF.fd BIOS image created from the build to the run-ovmf directory naming it bios.bin

```
bash$ cp ~/src/edk2-ws/Build/OvmfX64/DEBUG_GCC5/FV/OVMF.fd bios.bin
```

Run the RunQemu.sh Linux shell script

```
bash$ . RunQemu.sh
```



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SUMMARY

- Build a EDK II Platform using OVMF package
- Run Ovmf using Qemu 

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Questions?

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ACKNOWLEDGEMENTS

BACKUP

Pre-requisites Ubuntu 16.04

Instructions from: tianocore wiki Ubuntu_1610
Example Ubuntu 16.04
The following need to be accessible for building Edk2, From the terminal prompt (Cnt-Alt-T):

```
bash$ sudo apt-get install build-essential uuid-dev iasl git gcc-5 nasm  python3-distutils
```

```
build-essential - Informational list of build-essential packages
uuid-dev - Universally Unique ID library (headers and static libraries)
iasl - Intel ASL compiler/decompiler (also provided by acpica-tools)
git - support for git revision control system
gcc-5 - GNU C compiler (v5.4.0 as of Ubuntu 16.04 LTS)
nasm - General-purpose x86 assembler
python3 - distutils - distutils module from the Python standard library
```

```
bash$ sudo apt-get install qemu
```

Qemu – Emulation with Intel architecture with UEFI Shell