


UEFI & EDK II Training

PLATFORM BUILD LAB - OVMF

tianocore.org

PLATFORM BUILD LABS

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

BUILD OVMFPKG

Setup OvmfPkg to build and run w/ QEMU

Pre-requisites Ubuntu 16.04

Instructions from: [tianocore wiki Ubuntu 16.04](#)

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



ubuntu

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



Create QEMU Run Script

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

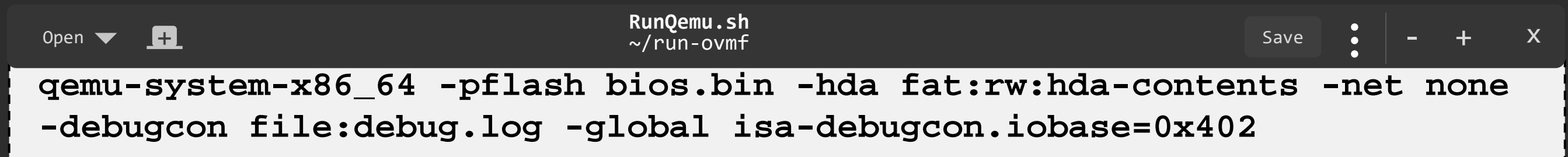
```
bash$ cd ~  
bash$ mkdir ~run-ovmf  
bash$ cd run-ovmf
```

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
```



The screenshot shows a text editor window titled "RunQemu.sh" with the path "~/run-ovmf". The window has a menu bar with "Open", a "+" icon, and a "Save" button. The main text area contains the following command:

```
qemu-system-x86_64 -pflash bios.bin -hda fat:rw:hda-contents -net none  
-debugcon file:debug.log -global isa-debugcon.iobase=0x402
```

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-libs.git
```


Download the Submodules and Checkout the Lab Branch

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

SETUP LAB MATERIAL

Lab_Material_FW.zip

DOWNLOAD LAB MATERIAL

Download the Lab_Material_FW.zip from :  [github.com](https://github.com/tianocore-training/Lab_Material_FW.zip)
[Lab_Material_FW.zip](https://github.com/tianocore-training/Lab_Material_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

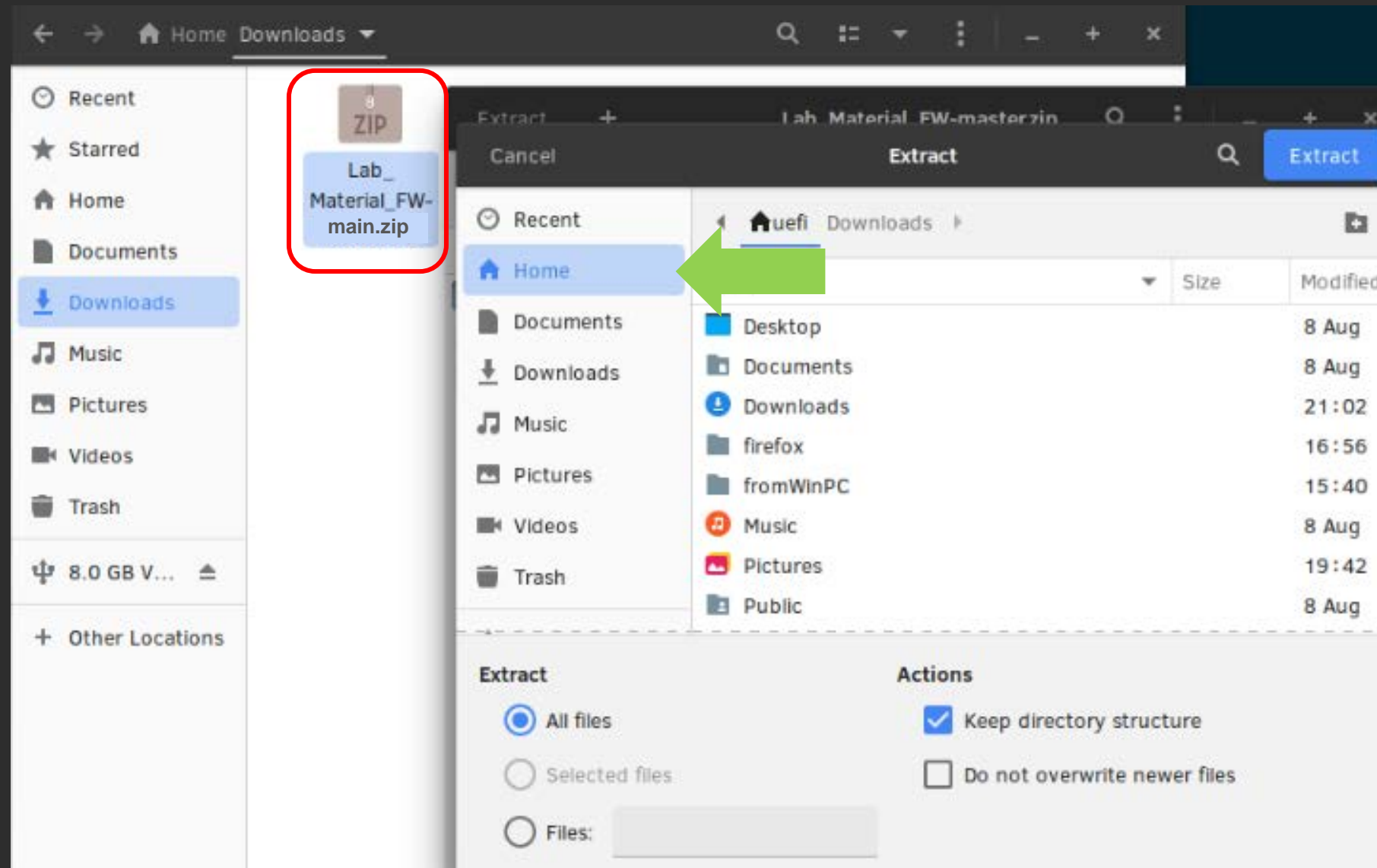
FW

- 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)



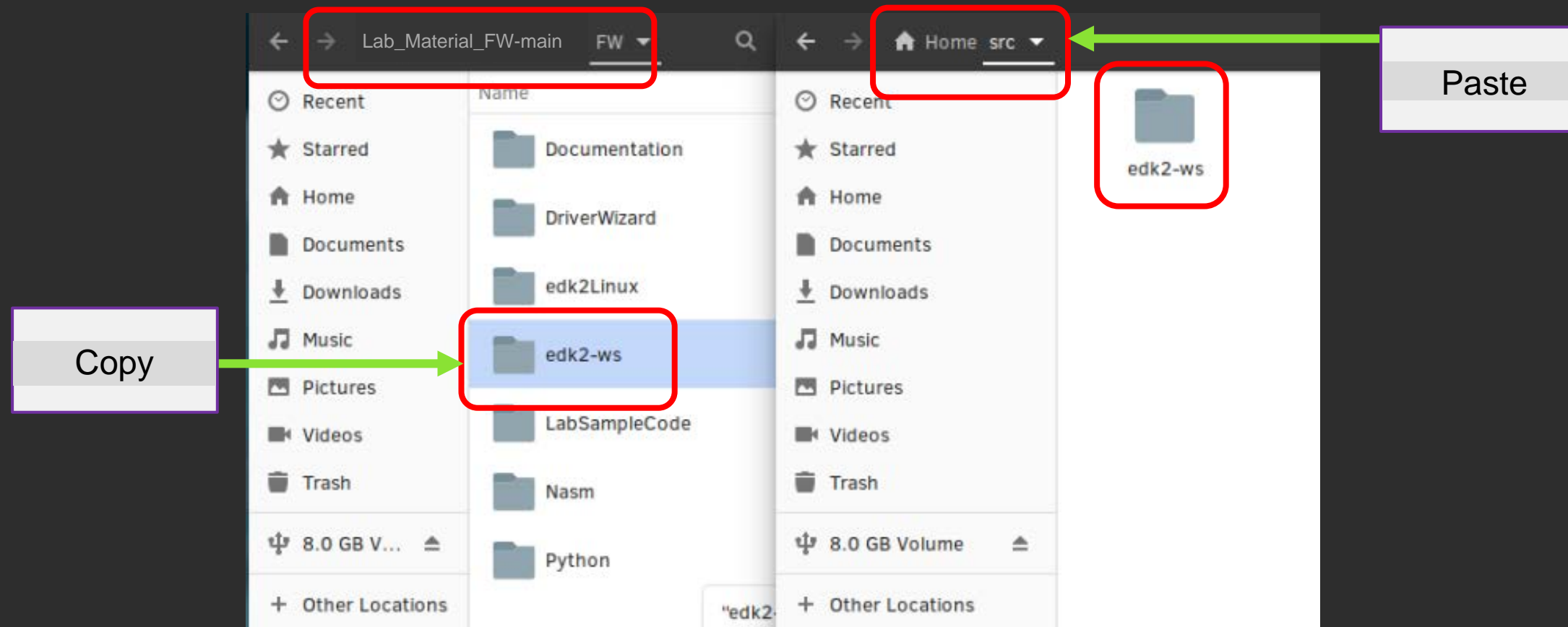
BUILD EDK II OVMF

- 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

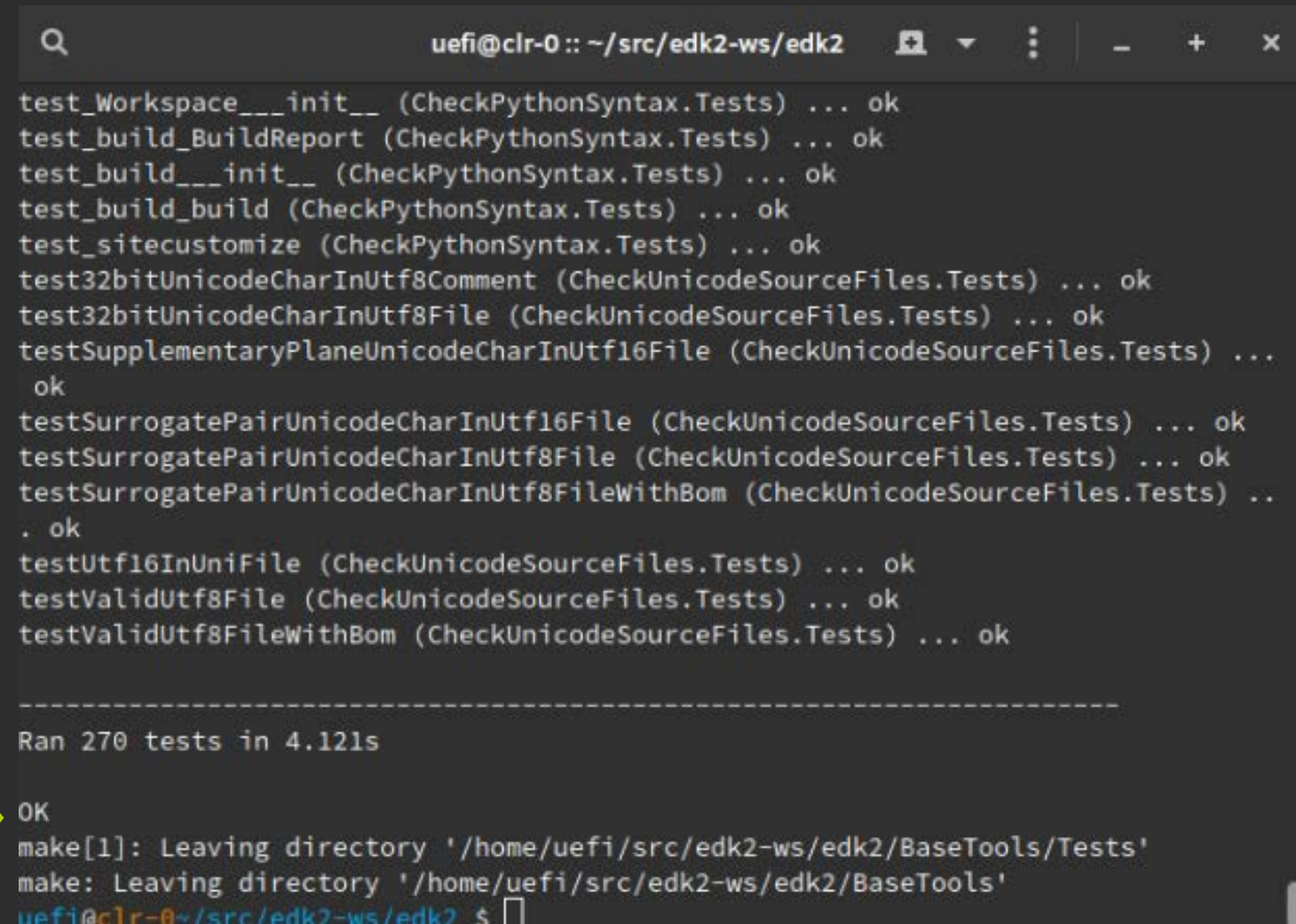
5. Export work space & platform path

```
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



```
uefi@clr-0: ~/src/edk2-ws/edk2
test_Workspace___init__ (CheckPythonSyntax.Tests) ... ok
test_build_BuildReport (CheckPythonSyntax.Tests) ... ok
test_build___init__ (CheckPythonSyntax.Tests) ... ok
test_build_build (CheckPythonSyntax.Tests) ... ok
test_sitecustomize (CheckPythonSyntax.Tests) ... ok
test32bitUnicodeCharInUtf8Comment (CheckUnicodeSourceFiles.Tests) ... ok
test32bitUnicodeCharInUtf8File (CheckUnicodeSourceFiles.Tests) ... ok
testSupplementaryPlaneUnicodeCharInUtf16File (CheckUnicodeSourceFiles.Tests) ...
ok
testSurrogatePairUnicodeCharInUtf16File (CheckUnicodeSourceFiles.Tests) ... ok
testSurrogatePairUnicodeCharInUtf8File (CheckUnicodeSourceFiles.Tests) ... ok
testSurrogatePairUnicodeCharInUtf8FileWithBom (CheckUnicodeSourceFiles.Tests) ..
. ok
testUtf16InUniFile (CheckUnicodeSourceFiles.Tests) ... ok
testValidUtf8File (CheckUnicodeSourceFiles.Tests) ... ok
testValidUtf8FileWithBom (CheckUnicodeSourceFiles.Tests) ... ok

-----
Ran 270 tests in 4.121s

OK
make[1]: Leaving directory '/home/uefi/src/edk2-ws/edk2/BaseTools/Tests'
make: Leaving directory '/home/uefi/src/edk2-ws/edk2/BaseTools'
uefi@clr-0:~/src/edk2-ws/edk2$
```

BUILD OVMF PLATFORM

BUILD EDK II OVMF

-Update Target.txt

What is OVMF?

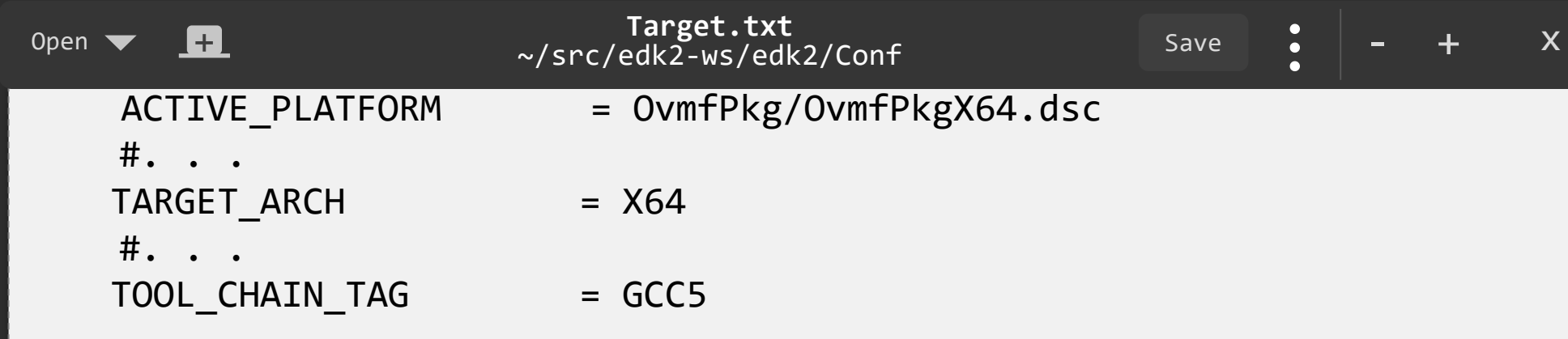
Open Virtual Machine Firmware - Build with edk2

```
bash$ cd ~/src/edk2-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](https://tianocore.org/wiki/OVMF)

Finished build

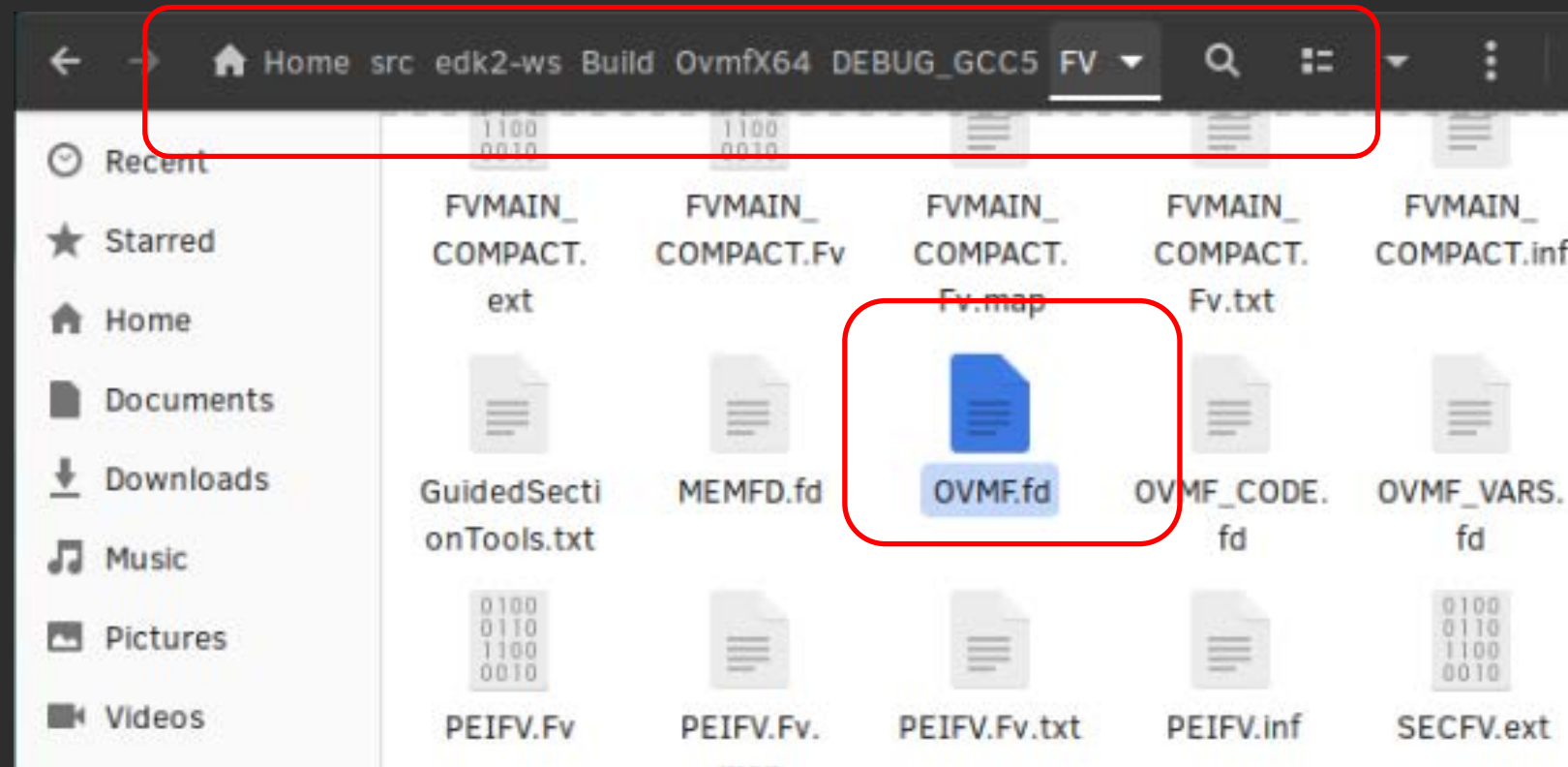
BUILD EDK II OVMF

-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
```





Change to run-ovmf directory under the home directory

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

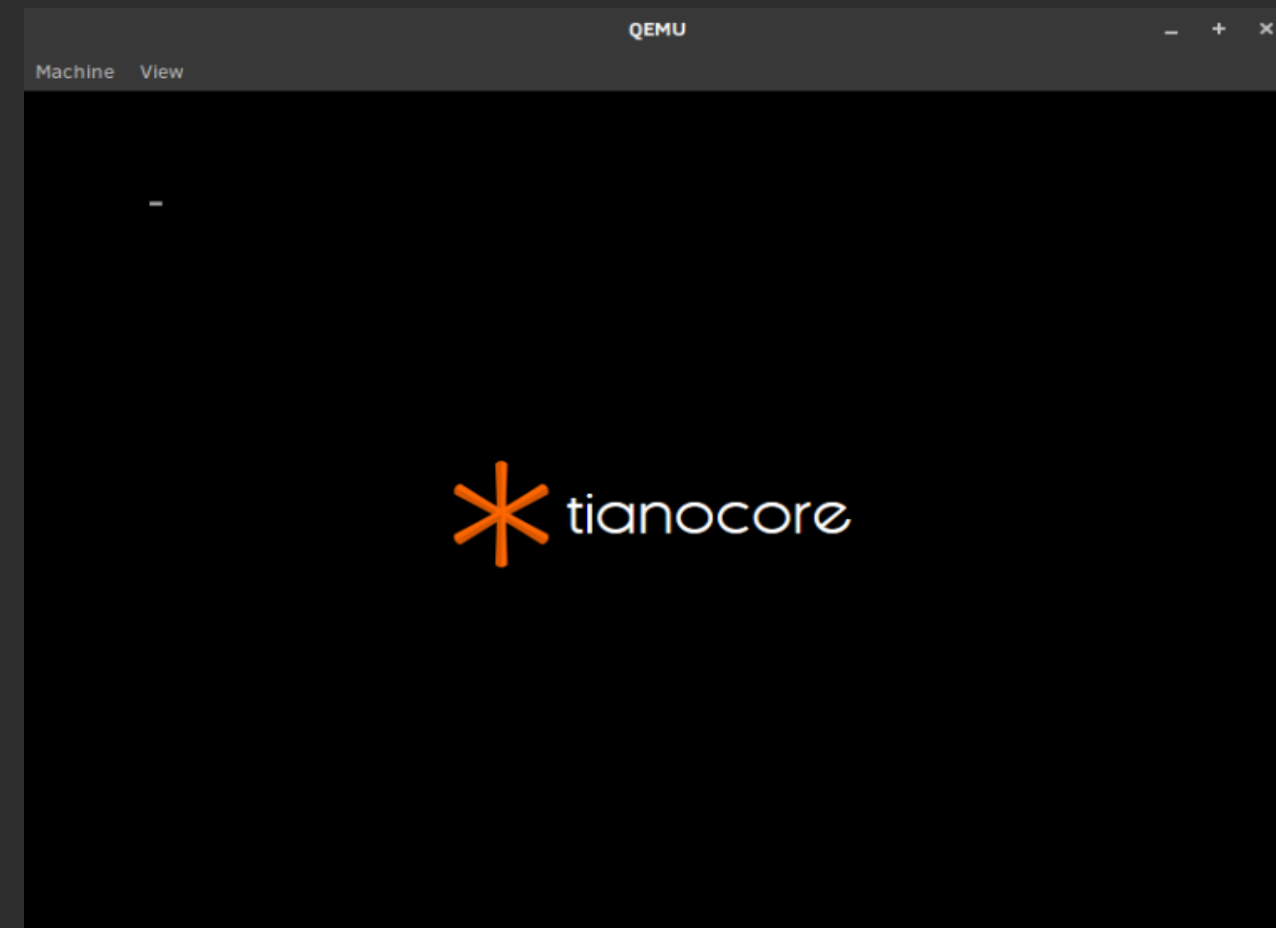
Copy the OVMF.fd BIOS image created from the build to the run-ovmf directory naming it bios.bin

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

Run the RunQemu.sh Linux shell script

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

Exit QEMU



SUMMARY

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



Questions?



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ACKNOWLEDGEMENTS

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