


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

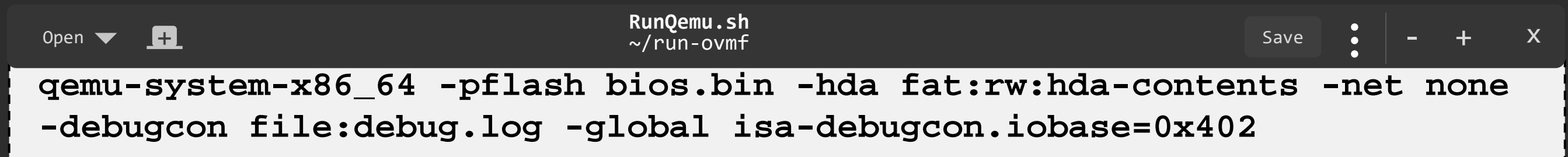
```
bash$ cd ~  
bash$ mkdir ~run-ovmf  
bash$ cd run-ovmf
```

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 plus icon, and "Save". 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_21Q3 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.git)
[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

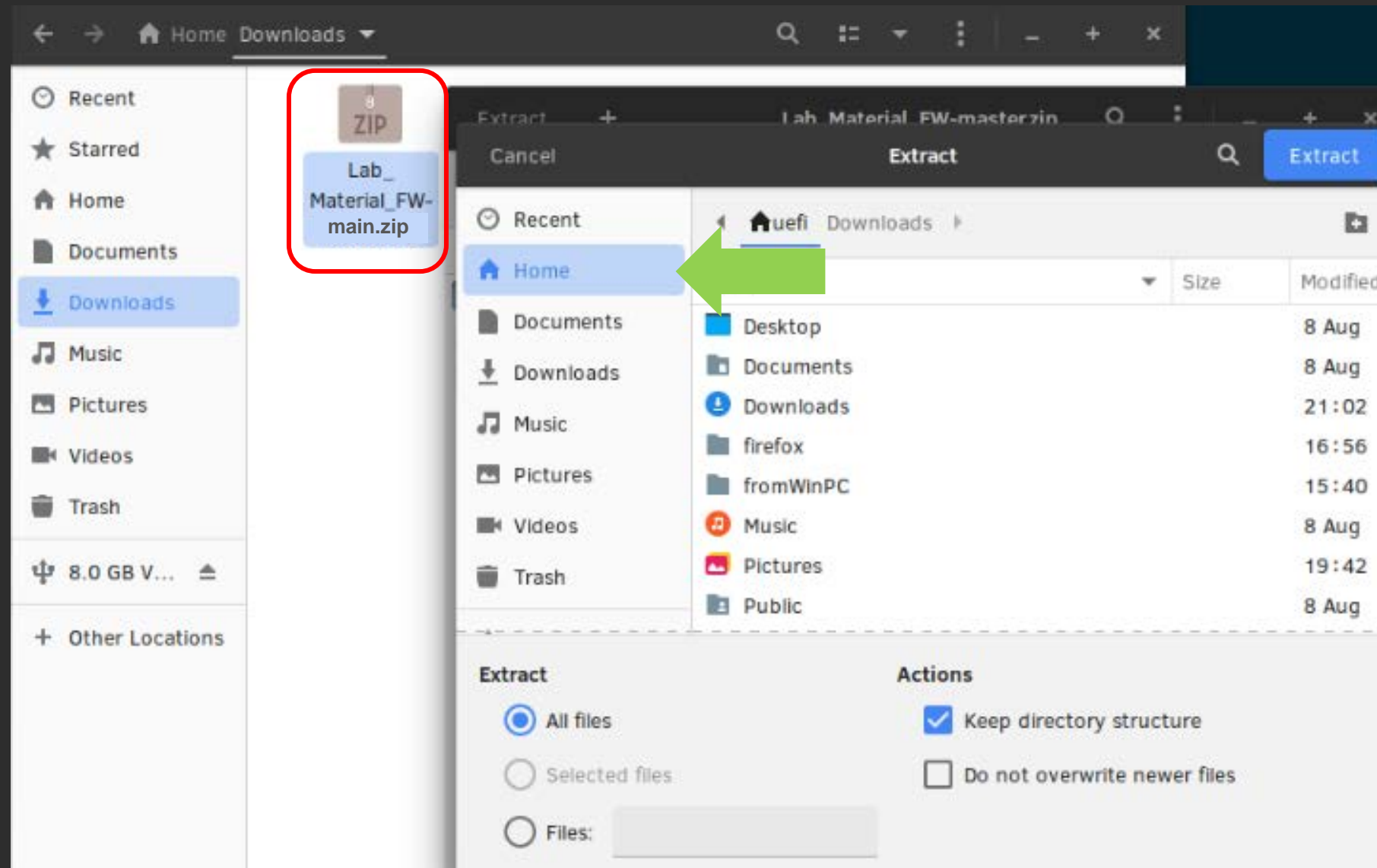
FW

- 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)



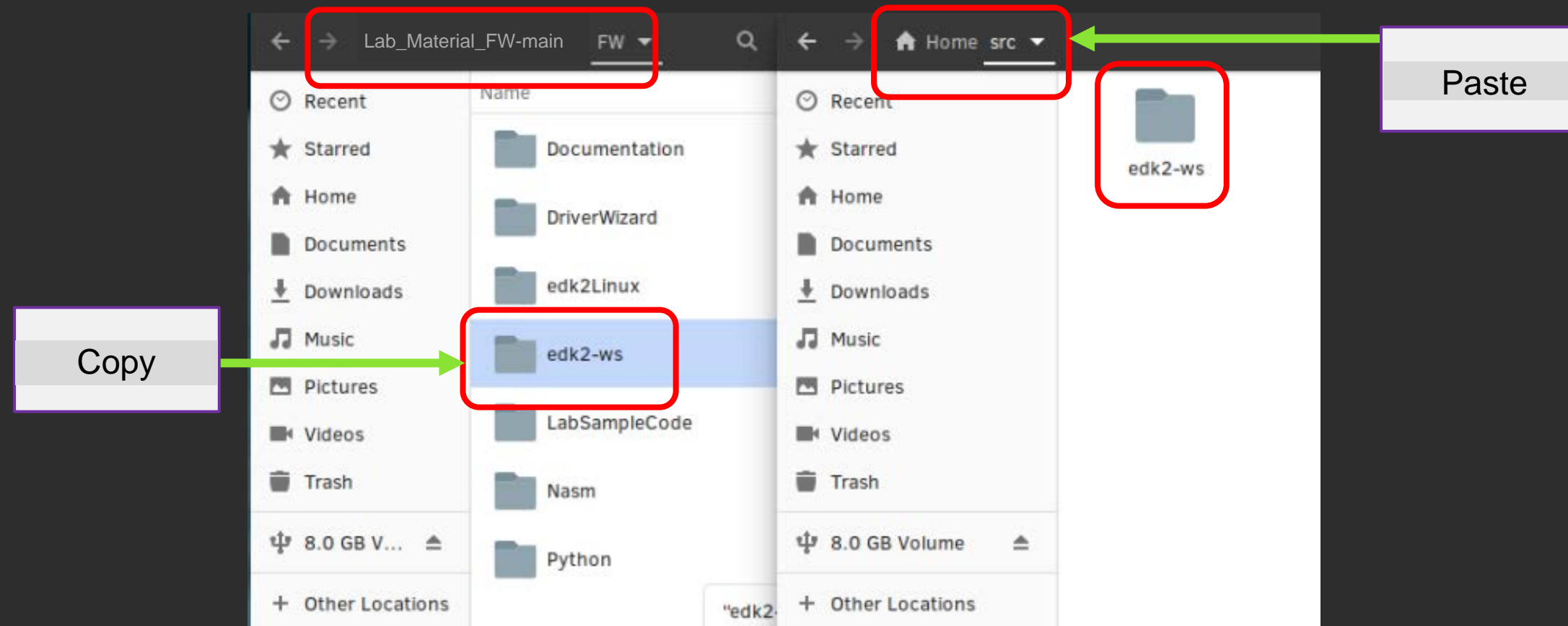
BUILD EDK II OVMF

- 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

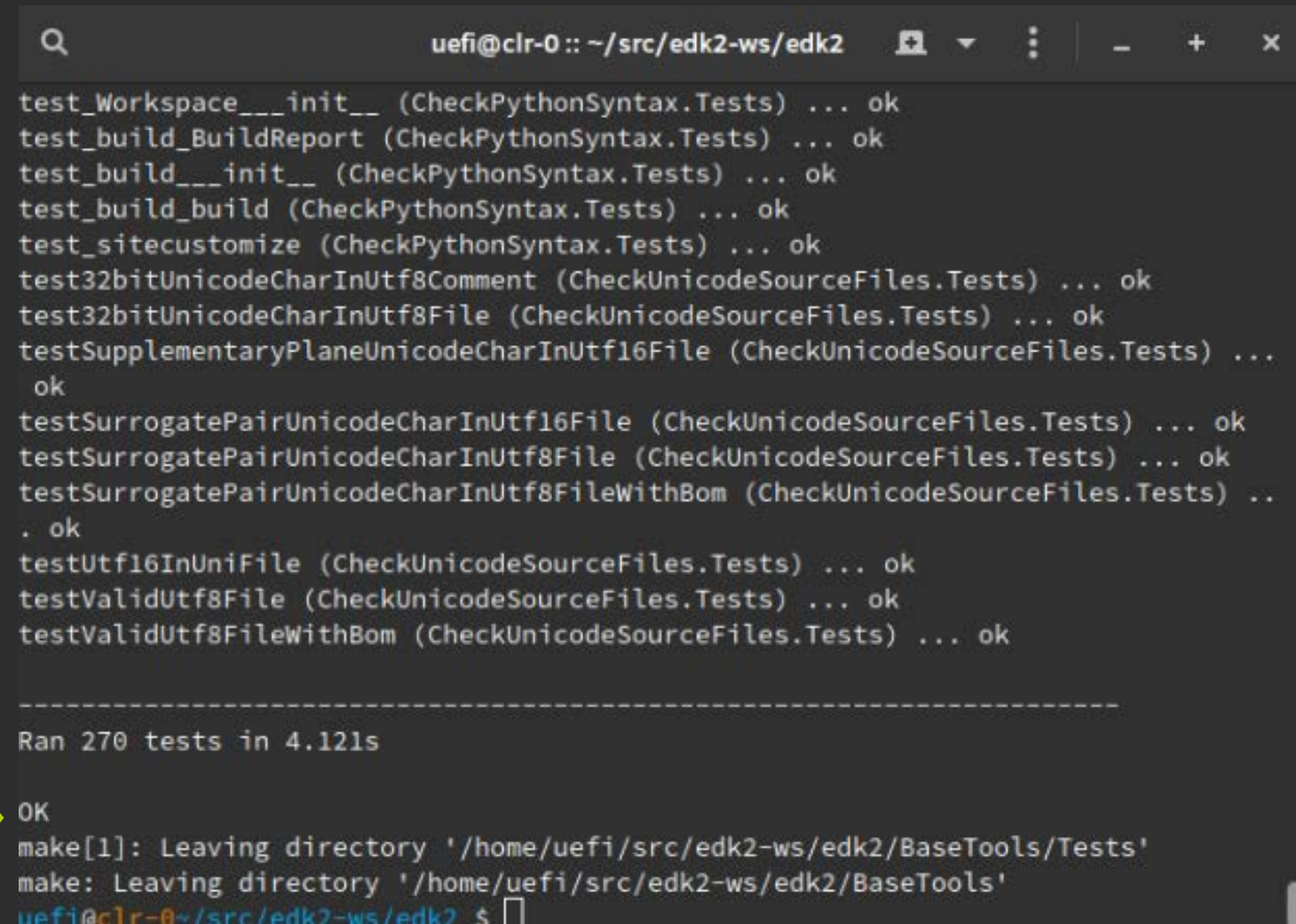
5. Export work space & platform path

```
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



A terminal window titled 'uefi@clr-0 :: ~/src/edk2-ws/edk2' displays the output of running tests. The output lists 20 individual tests, all of which passed with '... ok'. The tests include checks for Python syntax, Unicode source files, and UTF-8/UTF-16 file handling. A separator line of dashes precedes the summary 'Ran 270 tests in 4.121s'. A large green arrow points from the text 'Make sure the tests pass OK' to the 'OK' status line. The final output shows the make process leaving the directory and returning to the prompt.

```
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?

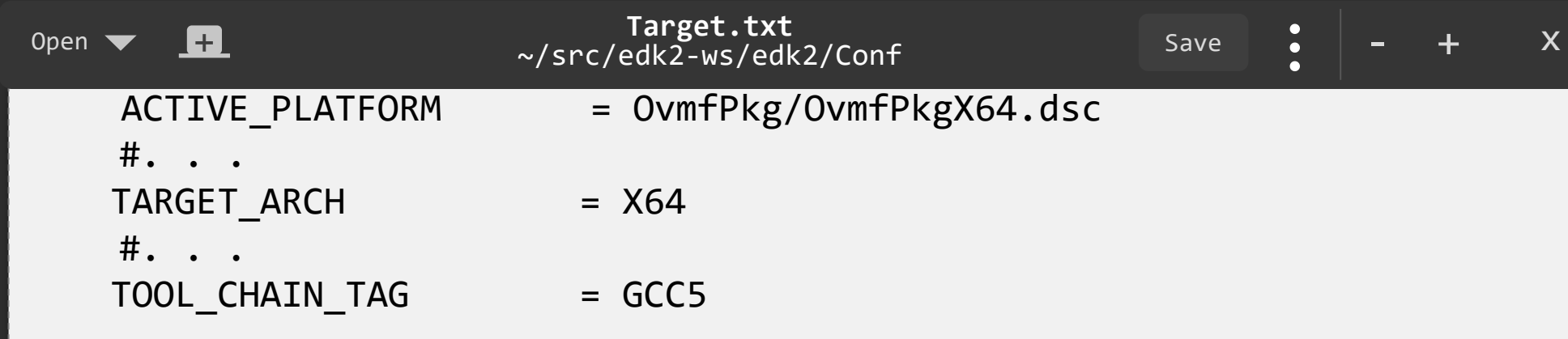
Open Virtual Machine Firmware - Build with edk2

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

Finished build

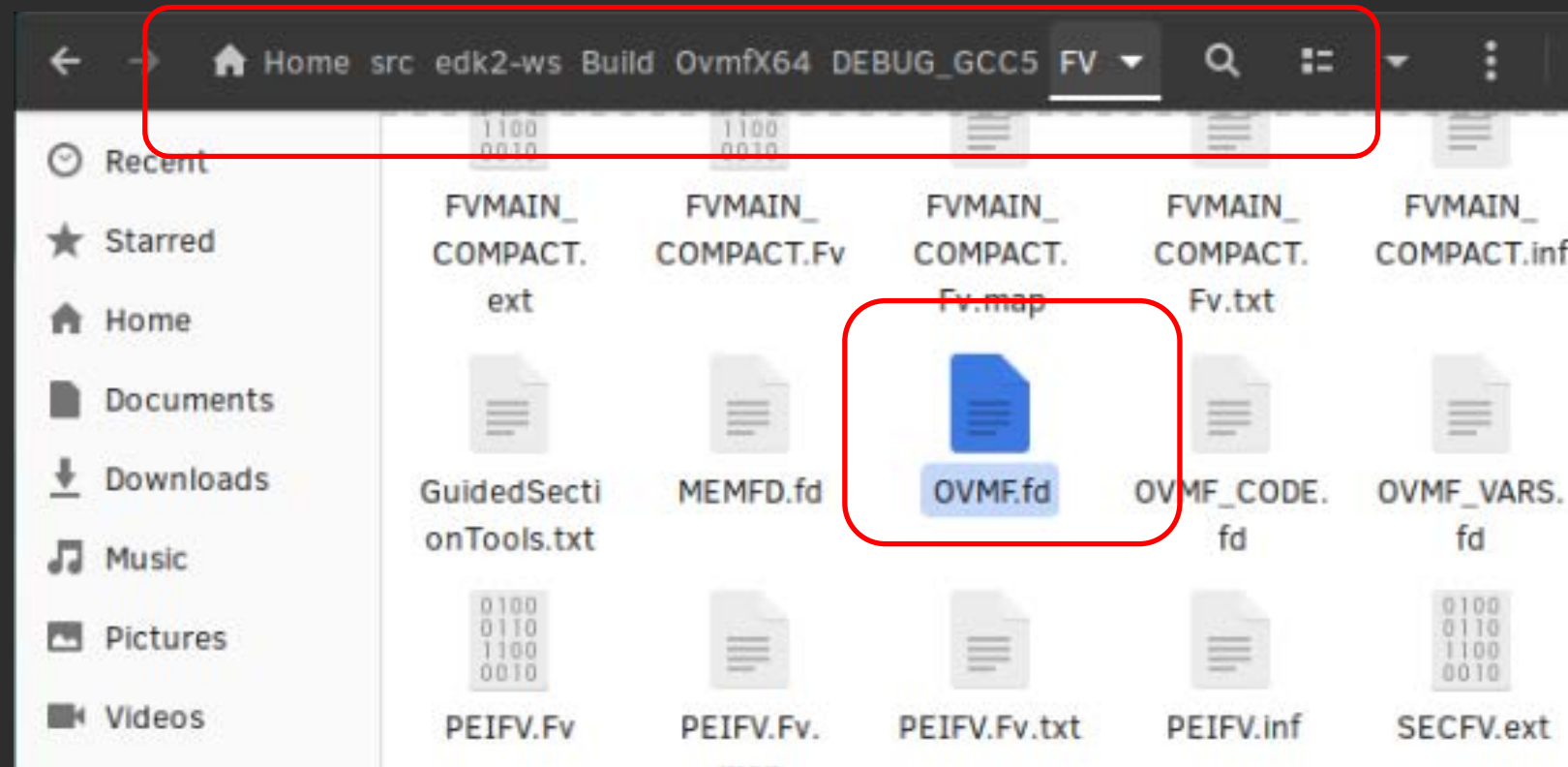
BUILD EDK II OVMF

-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
```

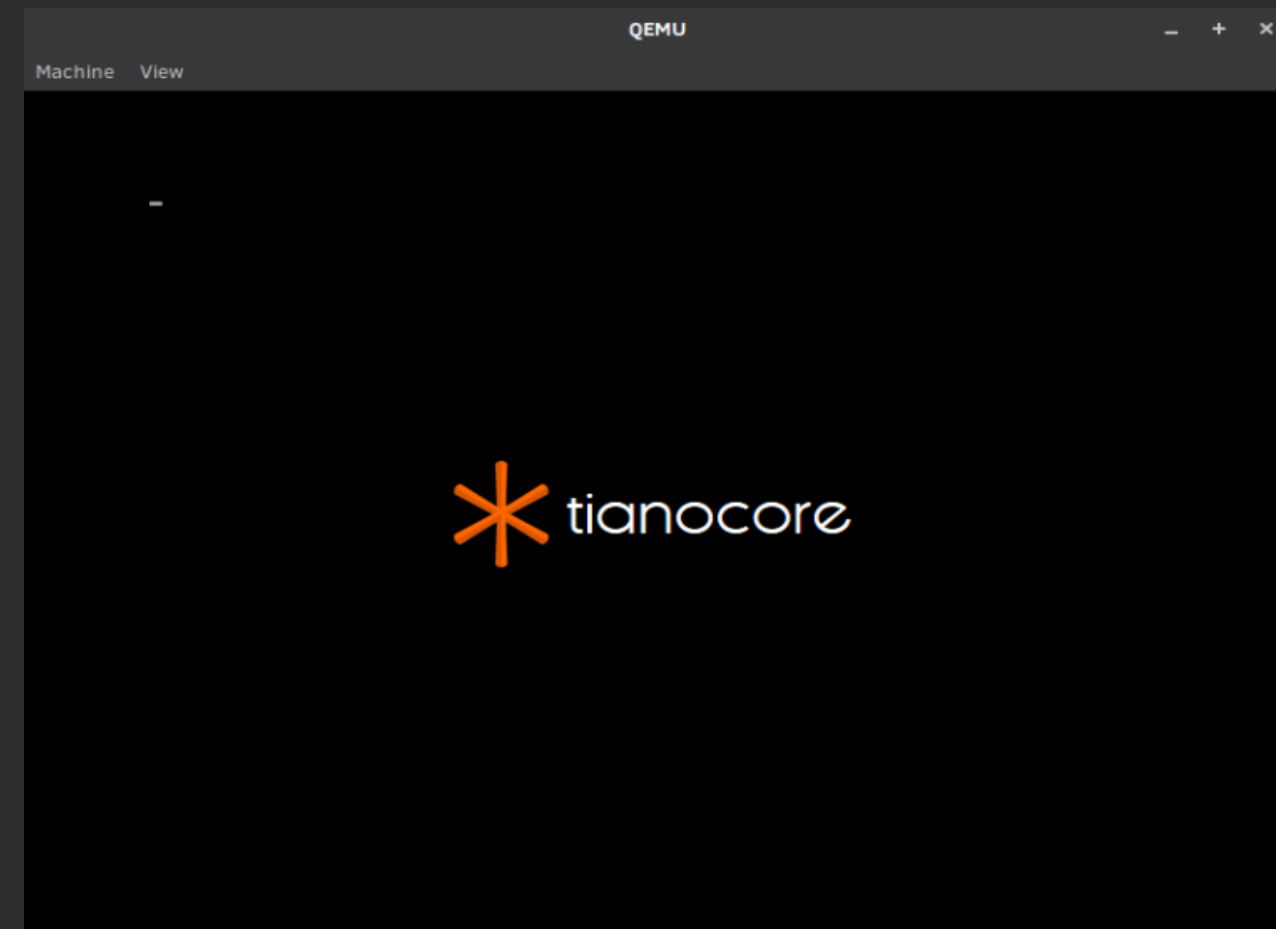
Copy the OVMF.fd BIOS image created from the build to the run-ovmf directory naming it bios.bin

```
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?



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.