

Task 1: Environment Setup

- Execute the “history -c && history -w” command. It should clear all the history of the specific user

```
guest@guest:~$ history
 1 shutdown now
 2 python3 --version
 3 history
guest@guest:~$ history -c && history -w
guest@guest:~$ history
 1 history
guest@guest:~$
```

‘history -c’ command clears the history list

‘history -w’ command writes the current history to history library

- Execute command “sudo apt list | grep -i python3.10”. If the package for Python 3.10 is installed, then it is removed.

```
guest@guest:~$ sudo apt list | grep -i python3.10
[sudo] password for guest:
WARNING: apt does not have a stable CLI interface. Use with caution in scripts.
guest@guest:~$
```

‘sudo apt list’ provides list of installed packages and ‘grep -i python3.10’ greps for python3.10 checking if python3.10 is installed on the system.

Here we can see since no packages are installed there is no output except for the warning.

- Download and install [Python 3.10](#) using tarball.

```
guest@guest:~$ wget https://www.python.org/ftp/python/3.10.16/Python-3.10.16.tar.xz
--2025-01-24 08:59:34--  https://www.python.org/ftp/python/3.10.16/Python-3.10.16.tar.xz
Resolving www.python.org (www.python.org)... 151.101.128.223, 151.101.64.223, 151.101.0.223, ...
Connecting to www.python.org (www.python.org)|151.101.128.223|:443... connected.
HTTP request sent, awaiting response... 200 OK
Length: 19610392 (19M) [application/octet-stream]
Saving to: 'Python-3.10.16.tar.xz'

Python-3.10.16.tar.xz      100%[=====] 18.70M  1.25MB/s  in 29s
2025-01-24 09:00:04 (670 KB/s) - 'Python-3.10.16.tar.xz' saved [19610392/19610392]
guest@guest:~$ _
```

We use `wget` to download the python source code from the python website

```
guest@guest:~$ 
guest@guest:~$ tar -xvf Python-3.10.16.tar.xz
```

We use `tar -xvf {package-name}` to extract the downloaded python source code which is compressed using xz. The flags used are explained below

- `-v`: provided verbosity to the output
- `-x`: extracts the compressed file
- `-f`: provides the filename to be extracted

```
Python-3.10.16/Tools/unicode/mk3strng.py
Python-3.10.16/Tools/unicode/python-mappings/
Python-3.10.16/Tools/unicode/python-mappings/CP1140.TXT
Python-3.10.16/Tools/unicode/python-mappings/CP273.TXT
Python-3.10.16/Tools/unicode/python-mappings/GB2312.TXT
Python-3.10.16/Tools/unicode/python-mappings/KOI8-U.TXT
Python-3.10.16/Tools/unicode/python-mappings/TIS-620.TXT
Python-3.10.16/Tools/unicode/python-mappings/diff/
Python-3.10.16/Tools/unicode/python-mappings/diff/jisx0213-2000-std.txt.diff
Python-3.10.16/Tools/unicode/python-mappings/diff/jisx0213-2004-std.txt.diff
Python-3.10.16/Tools/unicode/python-mappings/gb-18030-2000.xml
Python-3.10.16/Tools/unicode/python-mappings/jisx0213-2004-std.txt
Python-3.10.16/Tools/unittestgui/
Python-3.10.16/Tools/unittestgui/README.txt
Python-3.10.16/Tools/unittestgui/unittestgui.py
Python-3.10.16/aclocal.m4
Python-3.10.16/config.guess
Python-3.10.16/config.sub
Python-3.10.16/configure
Python-3.10.16/configure.ac
Python-3.10.16/install-sh
Python-3.10.16/pyconfig.h.in
Python-3.10.16/setup.py
guest@guest:~$
```

File extraction is now completed and we have it extracted in the `Python-3.10.16` directory.

We now use the command `./configure --prefix=/home/guest/python-3.10 --enable-optimizations`

```
guest@guest:~/Python-3.10.16$ ./configure --prefix=/home/guest/python3.10 --enable-optimizations
checking build system type... x86_64-pc-linux-gnu
checking host system type... x86_64-pc-linux-gnu
checking for python3.10... no
checking for python3... python3
checking for --enable-universalsdk... no
checking for --with-universal-archs... no
checking MACHDEP... "linux"
checking for gcc... no
checking for cc... no
checking for cl.exe... no
configure: error: in `~/home/guest/Python-3.10.16':
configure: error: no acceptable C compiler found in $PATH
See `config.log' for more details
guest@guest:~/Python-3.10.16$
```

It says we do not have a C compiler in `\$PATH`, so we need to install gcc and family, for that we first update the package list.

```
guest@guest:~/Python-3.10.16$ sudo apt-get update
Hit:1 http://in.archive.ubuntu.com/ubuntu noble InRelease
Get:2 http://security.ubuntu.com/ubuntu noble-security InRelease [126 kB]
Get:3 http://in.archive.ubuntu.com/ubuntu noble-updates InRelease [126 kB]
Get:4 http://in.archive.ubuntu.com/ubuntu noble-backports InRelease [126 kB]
Get:5 http://security.ubuntu.com/ubuntu noble-security/main amd64 Components [7,228 B]
Get:6 http://security.ubuntu.com/ubuntu noble-security/restricted amd64 Components [212 B]
Get:7 http://security.ubuntu.com/ubuntu noble-security/universe amd64 Components [52.0 kB]
Get:8 http://security.ubuntu.com/ubuntu noble-security/multiverse amd64 Components [208 B]
Get:9 http://in.archive.ubuntu.com/ubuntu noble-updates/main amd64 Components [151 kB]
Get:10 http://in.archive.ubuntu.com/ubuntu noble-updates/restricted amd64 Components [212 B]
Get:11 http://in.archive.ubuntu.com/ubuntu noble-updates/universe amd64 Components [313 kB]
Get:12 http://in.archive.ubuntu.com/ubuntu noble-updates/multiverse amd64 Components [940 B]
Get:13 http://in.archive.ubuntu.com/ubuntu noble-backports/main amd64 Components [208 B]
Get:14 http://in.archive.ubuntu.com/ubuntu noble-backports/restricted amd64 Components [212 B]
Get:15 http://in.archive.ubuntu.com/ubuntu noble-backports/universe amd64 Components [17.7 kB]
Get:16 http://in.archive.ubuntu.com/ubuntu noble-backports/multiverse amd64 Components [212 B]
Fetched 921 kB in 2s (429 kB/s)
Reading package lists... Done
guest@guest:~/Python-3.10.16$ guest@guest:~/Python-3.10.16$
```

And then we install build-essential to install all the packages we need for C compiler and other related tools.

```
guest@guest:~/Python-3.10.16$ sudo apt-get install build-essential
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following additional packages will be installed:
Unpacking build-essential (12.10ubuntu1) ...
Setting up gcc (4:13.2.0-7ubuntu1) ...
Setting up libstdc++-13-dev:amd64 (13.3.0-6ubuntu2~24.04) ...
Setting up g++-13-x86-64-linux-gnu (13.3.0-6ubuntu2~24.04) ...
Setting up g++-x86-64-linux-gnu (4:13.2.0-7ubuntu1) ...
Setting up g++-13 (13.3.0-6ubuntu2~24.04) ...
Setting up g++ (4:13.2.0-7ubuntu1) ...
update-alternatives: using /usr/bin/g++ to provide /usr/bin/c++ (c++) in auto mode
Setting up build-essential (12.10ubuntu1) ...
Processing triggers for man-db (2.12.0-4build2) ...
Scanning processes...
Scanning linux images...

Running kernel seems to be up-to-date.

No services need to be restarted.

No containers need to be restarted.

No user sessions are running outdated binaries.

No VM guests are running outdated hypervisor (qemu) binaries on this host.
guest@guest:~/Python-3.10.16$ guest@guest:~/Python-3.10.16$
```

Now that we have the C compiler we try to configure with the same flags again.

```
config.status: creating MISC/python-embed.pc
config.status: creating Misc/python-config.sh
config.status: creating Modules/ld_so_aix
config.status: creating pyconfig.h
config.status: pyconfig.h is unchanged
creating Modules/Setup.local
creating Makefile
guest@guest:~/Python-3.10.16$
```

```
guest@guest:~/Python-3.10.16$
```

`../configure` is successful so we now have `Makefile` which we can then use with `make` so we do that now.

```
guest@guest:~/Python-3.10.16$
```

```
guest@guest:~/Python-3.10.16$ make -j12
```

`make -j12` using `-j12` specifies make to use 12 threads while following the Makefile.

During `make` we encounter the error about not being able to build the ssl module

```
Could not build the ssl module!
Python requires a OpenSSL 1.1.1 or newer

running build_scripts
creating build/scripts-3.10
```

So to build the OpenSSL package we get the sources from the OpenSSL GitHub repository.

```
guest@guest:~$
```

```
guest@guest:~$ git clone https://github.com/openssl/openssl.git -b OpenSSL_1_1_1-stable openssl-1.1.1m
Cloning into 'openssl-1.1.1m'...
remote: Enumerating objects: 497923, done.
remote: Counting objects: 100% (100/100), done.
remote: Compressing objects: 100% (42/42), done.
remote: Total 497923 (delta 80), reused 58 (delta 58), pack-reused 497823 (from 3)
Receiving objects: 100% (497923/497923), 247.74 MiB | 3.34 MiB/s, done.
Resolving deltas: 100% (363922/363922), done.
guest@guest:~$ _
```

We now configure the OpenSSL source for the custom OpenSSL location and dir using the flags.

```
guest@guest:~/openssl-1.1.1m$ guest@guest:~/openssl-1.1.1m$ ./config --prefix=/home/guest/libs/custom-openssl --openssldir=/home/guest/libs/custom-openssl/ssl
Operating system: x86_64-whatever-linux2
Configuring OpenSSL version 1.1.1x-dev (0x10101180L) for linux-x86_64
Using os-specific seed configuration
Creating configdata.pm
Creating Makefile

*****
*** OpenSSL has been successfully configured
*** If you encounter a problem while building, please open an
*** issue on GitHub <https://github.com/openssl/openssl/issues>
*** and include the output from the following command:
*** perl configdata.pm --dump
*** (If you are new to OpenSSL, you might want to consult the
*** 'Troubleshooting' section in the INSTALL file first)
*** ****
guest@guest:~/openssl-1.1.1m$ guest@guest:~/openssl-1.1.1m$
```

Now that we have successfully configured the sources, so we proceed to `make`

```
guest@guest:~/openssl-1.1.1m$ guest@guest:~/openssl-1.1.1m$ make -j12
/usr/bin/perl "-I. -Mconfigdata "util/dofile.pl" \
"-oMakefile" include/crypto/bn_conf.h.in > include/crypto/bn_conf.h
/usr/bin/perl "-I. -Mconfigdata "util/dofile.pl" \
"-oMakefile" include/crypto/dso_conf.h.in > include/crypto/dso_conf.h
/usr/bin/perl "-I. -Mconfigdata "util/dofile.pl" \
"-oMakefile" include/openssl/opensslconf.h.in > include/openssl/opensslconf.h
make depend && make _all
make[1]: Entering directory '/home/guest/openssl-1.1.1m'
make[1]: Leaving directory '/home/guest/openssl-1.1.1m'
make[1]: Entering directory '/home/guest/openssl-1.1.1m'
gcc -I. -Iinclude -fPIC -pthread -m64 -Wa,--noexecstack -Wall -O3 -DOPENSSL_USE_NODELETE -DL_ENDIAN -DOPENSSL_PIC -DOPENSSL_CPU
ID_OBJ -DOPENSSL_IA32_SSE2 -DOPENSSL_BN_ASM_MONT -DOPENSSL_BN_ASM_MONT5 -DOPENSSL_BN_ASM_GF2m -DSHA1_ASM -DSHA256_ASM -DSHA512_A
SM -DKECCAK1600_ASM -DRC4_ASM -MD5_ASM -DAESNI_ASM -DVPAES_ASM -DGHASH_ASM -DECP_NIST256_ASM -DX25519_ASM -DPOLY1305_ASM -DOPENSSLDIR="\"/etc/ssl\""
-DENGINESDIR="\"/usr/local/custom-openssl/lib/engines-1.1\""
-DNDEBUG -MMD -MF apps/app_rand.d.tmp -MT apps/app_rand.o -c -o apps/app_rand.o apps/app_rand.c
gcc -I. -Iinclude -fPIC -pthread -m64 -Wa,--noexecstack -Wall -O3 -DOPENSSL_USE_NODELETE -DL_ENDIAN -DOPENSSL_PIC -DOPENSSL_CPU
ID_OBJ -DOPENSSL_IA32_SSE2 -DOPENSSL_BN_ASM_MONT -DOPENSSL_BN_ASM_MONT5 -DOPENSSL_BN_ASM_GF2m -DSHA1_ASM -DSHA256_ASM -DSHA512_A
```

```

${LDCMD:-gcc} -pthread -m64 -Wa,--noexecstack -Wall -O3 -L. \
-o apps/openssl apps/asn1pars.o apps/ca.o apps/ciphers.o apps/cms.o apps/crl.o apps/crl2p7.o apps/dgst.o apps/dhparam.o
apps/dsa.o apps/dsaparam.o apps/ec.o apps/ecparam.o apps/enc.o apps/engine.o apps/errstr.o apps/gendsa.o apps/genkey.o apps/gen
rsa.o apps/nseq.o apps/ocsp.o apps/openssl.o apps/passwd.o apps/pkcs12.o apps/pkcs7.o apps/pkcs8.o apps/pkey.o apps/pkeyparam.o
apps/pkeyutl.o apps/prime.o apps/rand.o apps/rehash.o apps/req.o apps/rsa.o apps/rsautl.o apps/s_client.o apps/s_server.o apps/s
_time.o apps/sess_id.o apps/smime.o apps/speed.o apps/spkac.o apps/srp.o apps/storeutl.o apps/ts.o apps/verify.o apps/version.o
apps/x509.o \
    apps/libapps.a -lssl -lcrypto -ldl -pthread
rm -f fuzz/asn1-test
${LDCMD:-gcc} -pthread -m64 -Wa,--noexecstack -Wall -O3 -L. \
-o fuzz/asn1-test fuzz/asn1.o fuzz/test-corpus.o \
    -lssl -lcrypto -ldl -pthread
rm -f fuzz/client-test
${LDCMD:-gcc} -pthread -m64 -Wa,--noexecstack -Wall -O3 -L. \
-o fuzz/client-test fuzz/client.o fuzz/test-corpus.o \
    -lssl -lcrypto -ldl -pthread
rm -f test/asn1_Internal_test
${LDCMD:-gcc} -pthread -m64 -Wa,--noexecstack -Wall -O3 -L. \
-o test/asn1_Internal_test test/asn1_Internal_test.o \
    test/libtestutil.a libcrypto.a -ldl -pthread
make[1]: Leaving directory '/home/guest/openssl-1.1.1m'
guest@guest:~/openssl-1.1.1m$ guest@guest:~/openssl-1.1.1m$
```

`make` runs with no errors, so now install the packages to system location.

N.B using sudo here is a must because if we install libraries to non-default location then we have to give extra flags to every dependency and it'll probably break the system since some sources look for specific sources in system specified location which if we wanted to change then it would need us to change the source-code, so from here on forward we use make with sudo to install at system location i.e `/usr/local/`

```

guest@guest:~/openssl-1.1.1m$ guest@guest:~/openssl-1.1.1m$ make install
/usr/bin/perl "-I." -Mconfigdata "util/dofile.pl" \
    "-oMakefile" include/crypto/bn_conf.h.in > include/crypto/bn_conf.h
/usr/bin/perl "-I." -Mconfigdata "util/dofile.pl" \
    "-oMakefile" include/crypto/dso_conf.h.in > include/crypto/dso_conf.h
/usr/bin/perl "-I." -Mconfigdata "util/dofile.pl" \
    "-oMakefile" include/openssl/opensslconf.h.in > include/openssl/opensslconf.h
make depend && make _build_libs

/home/guest/libs/custom-openssl/share/doc/openssl/html/man7/scrpt.html
/home/guest/libs/custom-openssl/share/doc/openssl/html/man7/SM2.html
/home/guest/libs/custom-openssl/share/doc/openssl/html/man7/ssl.html
/home/guest/libs/custom-openssl/share/doc/openssl/html/man7/X25519.html
/home/guest/libs/custom-openssl/share/doc/openssl/html/man7/X448.html -> /home/guest/libs/custom-openssl/share/doc/openssl/html/
man7/X25519.html
/home/guest/libs/custom-openssl/share/doc/openssl/html/man7/x509.html
guest@guest:~/openssl-1.1.1m$ guest@guest:~/openssl-1.1.1m$
```

`make install` runs with no errors and the files are now installed in their respective locations.

Now we retry the python source `configure` with our custom OpenSSL location specified via the `--with-openssl=/usr/local/custom-openssl/` flag.

```

guest@guest:~/Python-3.10.16$ ./configure --prefix=/home/guest/python3.10 --enable-optimizations --with-openssl=/home/guest/libs/custom-openssl/
checking build system type... x86_64-pc-linux-gnu
checking host system type... x86_64-pc-linux-gnu
checking for python3.10... no
checking for python3... python3
checking for --enable-universalsdk... no
checking for --with-universal-archs... no
checking MACHDEP... "linux"
checking for shm_unlink... yes
checking for openssl/ssl.h in /home/guest/libs/custom-openssl/... yes
checking whether compiling and linking against OpenSSL works... yes
checking for --with-openssl-rpath...
checking whether OpenSSL provides required APIs... yes
checking for --with-ssl-default-suites... python
checking for --with-builtin-hashlib-hashes... md5,sha1,sha256,sha512,sha3,blake2
checking for --with-experimental-isolated-subinterpreters... no
checking for --with-static-libpython... yes
checking for --disable-test-modules... no
configure: creating ./config.status
config.status: creating Makefile.pre
config.status: creating Misc/python.pc
config.status: creating Misc/python-embed.pc
config.status: creating Misc/python-config.sh
config.status: creating Modules/ld_so_aix
config.status: creating pyconfig.h
config.status: pyconfig.h is unchanged
creating Modules/Setup.local
creating Makefile
guest@guest:~/Python-3.10.16$ guest@guest:~/Python-3.10.16$
```

`configure` works without errors so we proceed to `make`

```

guest@guest:~/Python-3.10.16$ make -j12
Rebuilding with profile guided optimizations:
rm -f profile-clean-stamp
make build_all CFLAGS_NODIST="" -fprofile-use -fprofile-correction" LDFLAGS_NODIST=""
make[1]: Entering directory '/home/guest/Python-3.10.16'
gcc -c -fno-unused-result -fsign-compare -DNDEBUG -g -furaipv -O3 -Wall -fno-semantic-interposition -std=c99 -fextra -fno-unused-parameter -fno-missing-field-initializers -ferror=implicit-function-declaration -fvisibility=hidden -fprofile-use -fprofile-correction -I./Include/internal -I. -I./Include -DPY_BUILD_CORE \
-DABIFLAGS="" \
-DMULTIARCH="\x86_64-linux-gnu" \
-o Python/sysmodule.o ./Python/sysmodule.c
make[1]: Leaving directory '/home/guest/Python-3.10.16'
```

```

The necessary bits to build these optional modules were not found:
_bz2           _curses           _curses_panel
_dbm           _gdbm            _lzma
_sqlite3       _tkinter          _uuid
_nis           readline          zlib
To find the necessary bits, look in setup.py in detect_modules() for the module's name.

The following modules found by detect_modules() in setup.py, have been
built by the Makefile instead, as configured by the Setup files:
_abc           pwd              time

Failed to build these modules:
_ctypes

running build_scripts
copying and adjusting /home/guest/Python-3.10.16/Tools/scripts/pydoc3 -> build/scripts-3.10
copying and adjusting /home/guest/Python-3.10.16/Tools/scripts/idle3 -> build/scripts-3.10
copying and adjusting /home/guest/Python-3.10.16/Tools/scripts/2to3 -> build/scripts-3.10
changing mode of build/scripts-3.10/pydoc3 from 664 to 775
changing mode of build/scripts-3.10/idle3 from 664 to 775
changing mode of build/scripts-3.10/2to3 from 664 to 775
renaming build/scripts-3.10/pydoc3 to build/scripts-3.10/pydoc3.10
renaming build/scripts-3.10/idle3 to build/scripts-3.10/idle3.10
renaming build/scripts-3.10/2to3 to build/scripts-3.10/2to3.10
make[1]: Leaving directory '/home/guest/Python-3.10.16'
guest@guest:~/Python-3.10.16$
```

We see that `make` builds all but the optional libraries so we process to `make install`

```

guest@guest:~/Python-3.10.16$ make install
if test "no-framework" = "no-framework" ; then \
    /usr/bin/install -c python /home/guest/python3.10/bin/python3.10; \
else \
    /usr/bin/install -c -s Mac/pythonw /home/guest/python3.10/bin/python3.10; \
fi
if test "3.10" != "3.10"; then \
    if test -f /home/guest/python3.10/bin/python3.10 -o -h /home/guest/python3.10/bin/python3.10; \
    then rm -f /home/guest/python3.10/bin/python3.10; \
    fi; \
    (cd /home/guest/python3.10/bin; ln python3.10 python3.10); \
fi

Traceback (most recent call last):
  File "<string>", line 6, in <module>
  File "/home/guest/Python-3.10.16/Lib/runpy.py", line 220, in run_module
    mod_name, mod_spec, code = _get_module_details(mod_name)
  File "/home/guest/Python-3.10.16/Lib/runpy.py", line 146, in _get_module_details
    return _get_module_details(pkg_main_name, error)
  File "/home/guest/Python-3.10.16/Lib/runpy.py", line 110, in _get_module_details
    __import__(pkg_name)
  File "<frozen zipimport>", line 196, in get_code
  File "<frozen zipimport>", line 759, in _get_module_code
  File "<frozen zipimport>", line 627, in _get_data
zipimport.ZipImportError: can't decompress data; zlib not available
Traceback (most recent call last):
  File "/home/guest/Python-3.10.16/Lib/runpy.py", line 196, in _run_module_as_main
    return _run_code(code, main_globals, None,
  File "/home/guest/Python-3.10.16/Lib/runpy.py", line 86, in _run_code
    exec(code, run_globals)
  File "/home/guest/Python-3.10.16/Lib/ensurepip/__main__.py", line 5, in <module>
    sys.exit(ensurepip._main())
  File "/home/guest/Python-3.10.16/Lib/ensurepip/__init__.py", line 287, in _main
    return _bootstrap(
  File "/home/guest/Python-3.10.16/Lib/ensurepip/__init__.py", line 203, in _bootstrap
    return _run_pip([*args, *_PACKAGE_NAMES], additional_paths)
  File "/home/guest/Python-3.10.16/Lib/ensurepip/__init__.py", line 104, in _run_pip
    return subprocess.run(cmd, check=True).returncode
  File "/home/guest/Python-3.10.16/Lib/subprocess.py", line 526, in run
    raise CalledProcessError(retcode, process.args,
subprocess.CalledProcessError: Command '['/home/guest/Python-3.10.16/python', '-W', 'ignore::DeprecationWarning', '-c', '\nimport runpy\nimport sys\nsys.path = [\'/tmp/tmp8mzmdusd/setuptools-65.5.0-py3-none-any.whl\', \'/tmp/tmp8mzmdusd/pip-23.0.1-py3-none-any.whl\'] + sys.path\nsys.argv[1:] = [\'install\', \'--no-cache-dir\', \'--no-index\', \'--find-links\', \'/tmp/tmp8mzmdusd\', \'--root\', \'\', \'--upgrade\', \'setuptools\', \'pip\']\nrncpy.run_module("pip", run_name="__main__", alter_sys=True)\n']' r
eturned non-zero exit status 1.
make: *** [Makefile:1280: install] Error 1
guest@guest:~/Python-3.10.16$
```

We encounter a new error caused by not having the `zlib` module installed, so we get the zlib sources.

```
guest@guest:~$ wget "http://archive.ubuntu.com/ubuntu/pool/main/z/zlib/zlib_1.3.dfsg+really1.3.1.orig.tar.gz"
--2025-01-24 12:16:29--  http://archive.ubuntu.com/ubuntu/pool/main/z/zlib/zlib_1.3.dfsg+really1.3.1.orig.tar.gz
Resolving archive.ubuntu.com (archive.ubuntu.com)... 185.125.190.81, 185.125.190.82, 185.125.190.83, ...
Connecting to archive.ubuntu.com (archive.ubuntu.com)|185.125.190.81|:80... connected.
HTTP request sent, awaiting response... 200 OK
Length: 1325737 (1.3M) [application/x-gzip]
Saving to: 'zlib_1.3.dfsg+really1.3.1.orig.tar.gz'

zlib_1.3.dfsg+really1.3.1.orig. 100%[=====] 1.26M  1.02MB/s  in 1.2s
2025-01-24 12:16:31 (1.02 MB/s) - 'zlib_1.3.dfsg+really1.3.1.orig.tar.gz' saved [1325737/1325737]
guest@guest:~$
```

Extract the zlib sources using `tar -xvf`

```
guest@guest:~$ tar -xvf zlib_1.3.dfsg+really1.3.1.orig.tar.gz
zlib-1.3.1/
zlib-1.3.1/test/
zlib-1.3.1/test/infcover.c
zlib-1.3.1/test/example.c
zlib-1.3.1/test/minigzip.c
zlib-1.3.1/FAQ
zlib-1.3.1/gzguts.h
zlib-1.3.1/watcom/
zlib-1.3.1/nintendods/
zlib-1.3.1/nintendods/Makefile
zlib-1.3.1/nintendods/README
zlib-1.3.1/zutil.h
guest@guest:~$
```

`configure` zlib source.

```
guest@guest:~/zlib-1.3.1$ ./configure --prefix=/home/guest/libs/custom-zlib
Checking for gcc...
Checking for shared library support...
Building shared library libz.so.1.3.1 with gcc.
Checking for size_t... Yes.
Checking for off64_t... Yes.
Checking for fseeko... Yes.
Checking for strerror... Yes.
Checking for unistd.h... Yes.
Checking for stdarg.h... Yes.
Checking whether to use vs[n]printf() or s[n]printf()... using vs[n]printf().
Checking for vsnprintf() in stdio.h... Yes.
Checking for return value of vsnprintf()... Yes.
Checking for attribute(visibility) support... Yes.
guest@guest:~/zlib-1.3.1$
```

`make` the zlib source since configure had no errors.

```
guest@guest:~/zlib-1.3.1$ make
gcc -O3 -D_LARGEFILE64_SOURCE=1 -DHAVE_HIDDEN -I. -c -o example.o test/example.c
gcc -O3 -D_LARGEFILE64_SOURCE=1 -DHAVE_HIDDEN -c -o adler32.o adler32.c
gcc -O3 -D_LARGEFILE64_SOURCE=1 -DHAVE_HIDDEN -c -o crc32.o crc32.c
gcc -O3 -D_LARGEFILE64_SOURCE=1 -DHAVE_HIDDEN -c -o deflate.o deflate.c
gcc -O3 -D_LARGEFILE64_SOURCE=1 -DHAVE_HIDDEN -c -o infback.o infback.c
gcc -O3 -D_LARGEFILE64_SOURCE=1 -DHAVE_HIDDEN -c -o inffast.o inffast.c
gcc -O3 -D_LARGEFILE64_SOURCE=1 -DHAVE_HIDDEN -c -o inflate.o inflate.c
gcc -O3 -D_LARGEFILE64_SOURCE=1 -DHAVE_HIDDEN -c -o inftrees.o inftrees.c
```

`make` runs without errors so we install to system libraries using `make install`

```
gcc -shared -Wl,-soname,libz.so.1,--version-script,zlib.map -O3 -fPIC -D_LARGEFILE64_SOURCE=1 -DHAVE_HIDDEN -o libz.so.1.3.1 adler32.lo crc32.lo deflate.lo infback.lo infback.lo inflate.lo infback.lo inflate.lo inftrees.lo inftrees.lo trees.lo trees.lo zlib.lo zlib.lo gzread.lo gzwrite.lo -lc
rm -f libz.so libz.so.1
ln -s libz.so.1.3.1 libz.so
ln -s libz.so.1.3.1 libz.so.1
gcc -O3 -D_LARGEFILE64_SOURCE=1 -DHAVE_HIDDEN -o examplesh example.o -L libz.so.1.3.1
gcc -O3 -D_LARGEFILE64_SOURCE=1 -DHAVE_HIDDEN -o minigzip minigzip.o -L libz.so.1.3.1
gcc -O3 -D_LARGEFILE64_SOURCE=1 -DHAVE_HIDDEN -I . -D_FILE_OFFSET_BITS=64 -c -o example64.o test/example.c
gcc -O3 -D_LARGEFILE64_SOURCE=1 -DHAVE_HIDDEN -o example64 example64.o -L libz.a
gcc -O3 -D_LARGEFILE64_SOURCE=1 -DHAVE_HIDDEN -I . -D_FILE_OFFSET_BITS=64 -c -o minigzip64.o test/minigzip.c
gcc -O3 -D_LARGEFILE64_SOURCE=1 -DHAVE_HIDDEN -o minigzip64 minigzip64.o -L libz.a
guest@guest:~/zlib-1.3.1$ guest@guest:~/zlib-1.3.1$ make install
rm -f /home/guest/libs/custom-zlib/lib/libz.a
cp libz.a /home/guest/libs/custom-zlib/lib
chmod 644 /home/guest/libs/custom-zlib/lib/libz.a
cp libz.so.1.3.1 /home/guest/libs/custom-zlib/lib
chmod 755 /home/guest/libs/custom-zlib/lib/libz.so.1.3.1
rm -f /home/guest/libs/custom-zlib/share/man/man3/zlib.3
cp zlib.3 /home/guest/libs/custom-zlib/share/man/man3
chmod 644 /home/guest/libs/custom-zlib/share/man/man3/zlib.3
rm -f /home/guest/libs/custom-zlib/lib/pkgconfig/zlib.pc
cp zlib.pc /home/guest/libs/custom-zlib/lib/pkgconfig
chmod 644 /home/guest/libs/custom-zlib/lib/pkgconfig/zlib.pc
rm -f /home/guest/libs/custom-zlib/include/zlib.h /home/guest/libs/custom-zlib/include/zconf.h
cp zlib.h zconf.h /home/guest/libs/custom-zlib/include
chmod 644 /home/guest/libs/custom-zlib/include/zlib.h /home/guest/libs/custom-zlib/include/zconf.h
guest@guest:~/zlib-1.3.1$ guest@guest:~/zlib-1.3.1$
```

We need to provide `CPPFLAGS` and `LDFLAGS` to python to let it know where our libraries and include directory are located.

```
guest@guest:~/Python-3.10.16$  
guest@guest:~/Python-3.10.16$ echo $LDFLAGS  
  
guest@guest:~/Python-3.10.16$ echo $CPPFLAGS  
  
guest@guest:~/Python-3.10.16$  
guest@guest:~/Python-3.10.16$ export LDFLAGS="-L/home/guest/libs/custom-zlib/lib"  
guest@guest:~/Python-3.10.16$  
guest@guest:~/Python-3.10.16$  
guest@guest:~/Python-3.10.16$  
guest@guest:~/Python-3.10.16$ export CPPFLAGS="-I/home/guest/libs/custom-zlib/include"  
guest@guest:~/Python-3.10.16$
```

Now that we have zlib installed we proceed to retry `make` on python source.

```
guest@guest:~/Python-3.10.16$ make -j12
Rebuilding with profile guided optimizations:
rm -f profile-clean-stamp
make build_all CFLAGS_NODIST="-fprofile-use -fprofile-correction" LDFLAGS_NODIST=""
make[1]: Entering directory '/home/guest/Python-3.10.16'
gcc -c -Wno-unused-result -Wsign-compare -DNDEBUG -g -fwrapv -O3 -Wall -fno-semantic-interposition -std=c99 -Wextra -Wno-unused-ed-result -Wno-unused-parameter -Wno-missing-field-initializers -Werror=implicit-function-declaration -fvisibility=hidden -fprofile-use -fprofile-correction -I./Include/internal -I./Include -DPYTHONBUILD_CORE -o Programs/python.o ./Programs/python.c
gcc -c -Wno-unused-result -Wsign-compare -DNDEBUG -g -fwrapv -O3 -Wall -fno-semantic-interposition -std=c99 -Wextra -Wno-unused
```

This time we can see that zlib is gone from the list of not built packages.

```

The necessary bits to build these optional modules were not found:
_bz2           _curses           _curses_panel
_dbm           _gdbm            _lzma
_sqlite3        _tkinter          _uuid
_nis            readline

To find the necessary bits, look in setup.py in detect_modules() for the module's name.

The following modules found by detect_modules() in setup.py, have been
built by the Makefile instead, as configured by the Setup files:
_abc           pwd              time

Failed to build these modules:
_ctypes        binascii

running build_scripts
copying and adjusting /home/guest/Python-3.10.16/Tools/scripts/pydoc3 -> build/scripts-3.10
copying and adjusting /home/guest/Python-3.10.16/Tools/scripts/idle3 -> build/scripts-3.10
copying and adjusting /home/guest/Python-3.10.16/Tools/scripts/2to3 -> build/scripts-3.10
changing mode of build/scripts-3.10/pydoc3 from 664 to 775
changing mode of build/scripts-3.10/idle3 from 664 to 775
changing mode of build/scripts-3.10/2to3 from 664 to 775
renaming build/scripts-3.10/pydoc3 to build/scripts-3.10/pydoc3.10
renaming build/scripts-3.10/idle3 to build/scripts-3.10/idle3.10
renaming build/scripts-3.10/2to3 to build/scripts-3.10/2to3-3.10
make[1]: Leaving directory '/home/guest/Python-3.10.16'
guest@guest:~/Python-3.10.16$ guest@guest:~/Python-3.10.16$
```

So we now do `make install` again

```

guest@guest:~/Python-3.10.16$ guest@guest:~/Python-3.10.16$ make install
if test "no-framework" = "no-framework" ; then \
    /usr/bin/install -c python /home/guest/python3.10/bin/python3.10; \
else \
    /usr/bin/install -c -s Mac/pythonw /home/guest/python3.10/bin/python3.10; \
fi
if test "3.10" != "3.10"; then \
    if test -f /home/guest/python3.10/bin/python3.10 -o -h /home/guest/python3.10/bin/python3.10; \
    then rm -f /home/guest/python3.10/bin/python3.10; \
    fi; \
    (cd /home/guest/python3.10/bin; ln python3.10 python3.10); \
fi
fi
Looking in links: /tmp/tmpg4bvfg9c
Processing /tmp/tmpg4bvfg9c/setup tools-65.5.0-py3-none-any.whl
Processing /tmp/tmpg4bvfg9c/pip-23.0.1-py3-none-any.whl
Installing collected packages: setuptools, pip
  WARNING: The scripts pip3 and pip3.10 are installed in '/home/guest/python3.10/bin' which is not on PATH.
  Consider adding this directory to PATH or, if you prefer to suppress this warning, use --no-warn-script-location.
Successfully installed pip-23.0.1 setuptools-65.5.0
WARNING: Running pip as the 'root' user can result in broken permissions and conflicting behaviour with the system package manager. It is recommended to use a virtual environment instead: https://pip.pypa.io/warnings/venv
guest@guest:~/Python-3.10.16$
```

This time python compiles with no errors just warnings.

We now fix the warning.

```

export PATH=/home/guest/python3.10/bin/:$PATH
-- INSERT --
```

```
guest@guest:~$ vim ~/.bashrc
guest@guest:~$ source .bashrc
guest@guest:~$ python3 --version
Python 3.10.16
```

We have edited the `~/.bashrc` file to update our `$PATH` variable to include the new python bin directory in path.

If we try to install labe-studio now it would get installed but it would show this error while running.

```
from _ctypes import Union, Structure, Array
ModuleNotFoundError: No module named '_ctypes'
Sentry is attempting to send 2 pending events
Waiting up to 2 seconds
```

To fix that we need to fix the error from before

```
inux-x86_64-3.10/home/guest/Python-3.10.16/Modules/_ctypes/_ctypes.o -DPG_BUILD_CORE_MODULE
/home/guest/Python-3.10.16/Modules/_ctypes/_ctypes.c:107:10: fatal error: ffi.h: No such file or directory
 107 | #include <ffi.h>
      | ^~~~~~
compilation terminated.
```

This is the exact error we get, we need to have `ffi.h` header, which is provided by `libffi-dev` so we get the sources.

```
guest@guest:~$ wget "http://archive.ubuntu.com/ubuntu/pool/main/libf/libffi/libffi_3.4.6.orig.tar.gz"
--2025-01-24 12:38:13-- http://archive.ubuntu.com/ubuntu/pool/main/libf/libffi/libffi_3.4.6.orig.tar.gz
Resolving archive.ubuntu.com (archive.ubuntu.com) ... 185.125.190.83, 185.125.190.82, 91.189.91.81, ...
Connecting to archive.ubuntu.com (archive.ubuntu.com)|185.125.190.83|:80... connected.
HTTP request sent, awaiting response... 200 OK
Length: 598175 (584K) [application/x-gzip]
Saving to: 'libffi_3.4.6.orig.tar.gz'

libffi_3.4.6.orig.tar.gz      100%[=====] 584.16K  568KB/s   in 1.0s

2025-01-24 12:38:15 (568 KB/s) - 'libffi_3.4.6.orig.tar.gz' saved [598175/598175]
guest@guest:~$
```

Extract the sources.

```
guest@guest:~$  
guest@guest:~$ tar -xvf libffi_3.4.6.orig.tar.gz  
libffi-3.4.6/  
libffi-3.4.6/.allow-ai-service  
libffi-3.4.6/.appveyor.yml  
libffi-3.4.6/.appveyor/  
libffi-3.4.6/.appveyor/site.exp  
libffi-3.4.6/.appveyor/unix-noexec.exp  
libffi-3.4.6/.ci/  
libffi-3.4.6/.testsuite.libffi.go  
libffi-3.4.6/.testsuite/libffi.go/aa-direct.c  
libffi-3.4.6/.testsuite/libffi.go/closure1.c  
libffi-3.4.6/.testsuite/libffi.go/ffitest.h  
libffi-3.4.6/.testsuite/libffi.go/go.exp  
libffi-3.4.6/.testsuite/libffi.go/static-chain.h  
guest@guest:~$
```

Now libffi-dev requires us to use autoconf to generate the `./configure` script.

```
guest@guest:~/libffi-3.4.6$ ./autogen.sh  
./autogen.sh: 2: exec: autoreconf: not found  
guest@guest:~/libffi-3.4.6$ autoconf --version  
Command 'autoconf' not found, but can be installed with:  
sudo apt install autoconf  
guest@guest:~/libffi-3.4.6$ _
```

So we need to install autotools from sources but that depends on m4, so we need that as well from its sources.

We also need to setup the same prefix for all 4 programs (m4, autoconf, automake, libtool)

```
guest@guest:~/m4-1.4.19$  
guest@guest:~/m4-1.4.19$ vim ~/.bashrc  
guest@guest:~/m4-1.4.19$ source ~/.bashrc  
guest@guest:~/m4-1.4.19$  
  
export PATH=$HOME/libs/autotools/bin:$PATH  
~  
~
```

So now we get m4 from sources and extract it.

```
guest@guest:~$ wget "http://archive.ubuntu.com/ubuntu/pool/main/m/m4/m4_1.4.19.orig.tar.xz"
--2025-01-24 13:31:41--  http://archive.ubuntu.com/ubuntu/pool/main/m/m4/m4_1.4.19.orig.tar.xz
Resolving archive.ubuntu.com (archive.ubuntu.com)... 185.125.190.82, 185.125.190.83, 91.189.91.81, ...
Connecting to archive.ubuntu.com (archive.ubuntu.com)|185.125.190.82|:80... connected.
HTTP request sent, awaiting response... 200 OK
Length: 1654908 (1.6M) [application/x-xz]
Saving to: 'm4_1.4.19.orig.tar.xz'

m4_1.4.19.orig.tar.xz      100%[=====] 1.58M 1.19MB/s in 1.3s

2025-01-24 13:31:43 (1.19 MB/s) - 'm4_1.4.19.orig.tar.xz' saved [1654908/1654908]

guest@guest:~$ _
```

```
guest@guest:~$ tar -xvf m4_1.4.19.orig.tar.xz
m4-1.4.19/
m4-1.4.19/po/
m4-1.4.19/po/Makevars
m4-1.4.19/po/hr.po
m4-1.4.19/po/uk.gmo
m4-1.4.19/po/da.po
m4-1.4.19/po/Rules-quot
```

```
m4-1.4.19/tests/mmap-anon-util.h
m4-1.4.19/tests/test-posix_spawn-chdir.c
m4-1.4.19/tests/gl_array_list.c
m4-1.4.19/tests/vma-iter.c
m4-1.4.19/configure.ac
guest@guest:~$ cd m4-1.4.19/
guest@guest:~/m4-1.4.19$
```

`configure` m4.

```
guest@guest:~/m4-1.4.19$ ./configure --prefix=/home/guest/libs/autotools/
checking for a BSD-compatible install... /usr/bin/install -c
checking whether build environment is sane... yes
checking for a race-free mkdir -p... /usr/bin/mkdir -p
checking for gawk... gawk
checking whether make sets $(MAKE)... yes
checking whether make supports nested variables... yes
checking whether make supports nested variables... (cached) yes
```

```
config.status: creating tests/Makefile
config.status: creating checks/Makefile
config.status: creating examples/Makefile
config.status: creating lib/config.h
config.status: lib/config.h is unchanged
config.status: executing depfiles commands
config.status: executing stamp-h commands
config.status: executing po-directories commands
config.status: creating po/POTFILES
config.status: creating po/Makefile
guest@guest:~/m4-1.4.19$ guest@guest:~/m4-1.4.19$ guest@guest:~/m4-1.4.19$ guest@guest:~/m4-1.4.19$
```

`make` m4, we do so by using `make all install` this makes `all` the targets and then installs them too.

```
guest@guest:~/m4-1.4.19$  
guest@guest:~/m4-1.4.19$ make all install  
make all-recursive  
make[1]: Entering directory '/home/guest/m4-1.4.19'  
  Making all in .  
make[2]: Entering directory '/home/guest/m4-1.4.19'  
make[2]: Nothing to be done for 'all-am'.  
make[2]: Leaving directory '/home/guest/m4-1.4.19'  
  Making all in examples  
make[2]: Entering directory '/home/guest/m4-1.4.19/examples'  
make[2]: Nothing to be done for 'all'.  
make[2]: Leaving directory '/home/guest/m4-1.4.19/examples'  
  Making all in lib  
make[2]: Entering directory '/home/guest/m4-1.4.19/lib'  
  GEN      alloca.h  
  GEN      configmake.h  
make[2]: Leaving directory '/home/guest/m4-1.4.19'  
make[5]: Entering directory '/home/guest/m4-1.4.19/tests'  
make[5]: Nothing to be done for 'install-exec-am'.  
make[5]: Nothing to be done for 'install-data-am'.  
make[5]: Leaving directory '/home/guest/m4-1.4.19/tests'  
make[4]: Leaving directory '/home/guest/m4-1.4.19/tests'  
make[3]: Leaving directory '/home/guest/m4-1.4.19/tests'  
make[2]: Leaving directory '/home/guest/m4-1.4.19/tests'  
make[1]: Leaving directory '/home/guest/m4-1.4.19'  
guest@guest:~/m4-1.4.19$  
guest@guest:~/m4-1.4.19$
```

We check if m4 is successfully installed with `m4 --version`

```
guest@guest:~/m4-1.4.19$  
guest@guest:~/m4-1.4.19$ m4 --version  
m4 (GNU M4) 1.4.19  
Copyright (C) 2021 Free Software Foundation, Inc.  
License GPLv3+: GNU GPL version 3 or later <https://gnu.org/licenses/gpl.html>.  
This is free software: you are free to change and redistribute it.  
There is NO WARRANTY, to the extent permitted by law.  
Written by René Seindal.  
guest@guest:~/m4-1.4.19$
```

Next we need autoconf, automake and libtool, we compile the individually.

```

guest@guest:~$ wget "http://archive.ubuntu.com/ubuntu/pool/main/a/autoconf/autoconf_2.72.orig.tar.xz"
--2025-01-25 07:42:57--  http://archive.ubuntu.com/ubuntu/pool/main/a/autoconf/autoconf_2.72.orig.tar.xz
Resolving archive.ubuntu.com (archive.ubuntu.com)... 91.189.91.82, 185.125.190.82, 91.189.91.83, ...
Connecting to archive.ubuntu.com (archive.ubuntu.com)|91.189.91.82|:80... connected.
HTTP request sent, awaiting response... 200 OK
Length: 1389680 (1.3M) [application/x-xz]
Saving to: 'autoconf_2.72.orig.tar.xz'

autoconf_2.72.orig.tar.xz      100%[=====] 1.33M  651KB/s  in 2.1s
2025-01-25 07:43:00 (651 KB/s) - 'autoconf_2.72.orig.tar.xz' saved [1389680/1389680]

guest@guest:~$ wget "http://archive.ubuntu.com/ubuntu/pool/main/a/automake-1.16/automake-1.16_1.16.5.orig.tar.xz"
--2025-01-25 07:44:00--  http://archive.ubuntu.com/ubuntu/pool/main/a/automake-1.16/automake-1.16_1.16.5.orig.tar.xz
Resolving archive.ubuntu.com (archive.ubuntu.com)... 185.125.190.82, 185.125.190.83, 91.189.91.81, ...
Connecting to archive.ubuntu.com (archive.ubuntu.com)|185.125.190.82|:80... connected.
HTTP request sent, awaiting response... 200 OK
Length: 1601740 (1.5M) [application/x-xz]
Saving to: 'automake-1.16_1.16.5.orig.tar.xz'

automake-1.16_1.16.5.orig.tar.xz 100%[=====] 1.53M  1.04MB/s  in 1.5s
2025-01-25 07:44:11 (1.04 MB/s) - 'automake-1.16_1.16.5.orig.tar.xz' saved [1601740/1601740]

guest@guest:~$ wget "http://archive.ubuntu.com/ubuntu/pool/main/libt/libtool/libtool_2.4.7.orig.tar.xz"
--2025-01-25 07:44:38--  http://archive.ubuntu.com/ubuntu/pool/main/libt/libtool/libtool_2.4.7.orig.tar.xz
Resolving archive.ubuntu.com (archive.ubuntu.com)... 91.189.91.82, 91.189.91.83, 185.125.190.81, ...
Connecting to archive.ubuntu.com (archive.ubuntu.com)|91.189.91.82|:80... connected.
HTTP request sent, awaiting response... 200 OK
Length: 1026028 (1002K) [application/x-xz]
Saving to: 'libtool_2.4.7.orig.tar.xz'

libtool_2.4.7.orig.tar.xz      100%[=====] 1002K  465KB/s  in 2.2s
2025-01-25 07:44:36 (465 KB/s) - 'libtool_2.4.7.orig.tar.xz' saved [1026028/1026028]

guest@guest:~$
```

Building autoconf

Get autoconf sources and extract.

```

guest@guest:~$ wget "http://archive.ubuntu.com/ubuntu/pool/main/a/autoconf/autoconf_2.72.orig.tar.xz"
--2025-01-24 13:39:14--  http://archive.ubuntu.com/ubuntu/pool/main/a/autoconf/autoconf_2.72.orig.tar.xz
Resolving archive.ubuntu.com (archive.ubuntu.com)... 91.189.91.83, 185.125.190.81, 185.125.190.82, ...
Connecting to archive.ubuntu.com (archive.ubuntu.com)|91.189.91.83|:80... connected.
HTTP request sent, awaiting response... 200 OK
Length: 1389680 (1.3M) [application/x-xz]
Saving to: 'autoconf_2.72.orig.tar.xz'

autoconf_2.72.orig.tar.xz      100%[=====] 1.33M  448KB/s  in 3.0s
2025-01-24 13:39:18 (448 KB/s) - 'autoconf_2.72.orig.tar.xz' saved [1389680/1389680]

guest@guest:~$
```

```
guest@guest:~$ tar -xvf autoconf_2.72.orig.tar.xz
autoconf-2.72/
autoconf-2.72/.prev-version
autoconf-2.72/.tarball-version
autoconf-2.72/.version
autoconf-2.72/AUTHORS
autoconf-2.72/BUGS
autoconf-2.72/COPYING
autoconf-2.72/COPYING.EXCEPTION
autoconf-2.72/COPYINGv3

autoconf-2.72/tests/tools.at
autoconf-2.72/tests/torture.at
autoconf-2.72/tests(wrapper.as
guest@guest:~$  
guest@guest:~$
```

`configure` autoconf

```
guest@guest:~/autoconf-2.72$  
guest@guest:~/autoconf-2.72$  
guest@guest:~/autoconf-2.72$ ./configure --prefix=/home/guest/libs/autotools
checking for a BSD-compatible install... /usr/bin/install -c
checking whether build environment is sane... yes
checking for a race-free mkdir -p... /usr/bin/mkdir -p
checking for gawk... gawk
  checking whether make sets $MAKE
you have defined TEST_PTHREADS_AUTOTEST in the environment.
Meanwhile, Cygwin has known problems with named fifos that cause
failures when attempting parallel tests in an autotest suite. It is
possible that other difficulties will be encountered, whether with
shell or platform limitations; help is appreciated in improving
parallel testsuite support.
```

```
guest@guest:~/autoconf-2.72$
```

`make all install` since no errors in configuration.

```
guest@guest:~/autoconf-2.72$  
guest@guest:~/autoconf-2.72$ make all install
make all-am
make[1]: Entering directory '/home/guest/autoconf-2.72'
rm -f bin/autoconf bin/autoconf.tmp
/usr/bin/mkdir -p bin
srcdir=''; \
  test -f .. /bin/autoconf.in || srcdir=.; \
  sed -e 's|@SHELL@|/bin/bash|g' -e 's|@PERL@|/usr/bin/perl|g' -e 's|@PERL_FLOCK@|yes|g' -e 's|@bindir@|/home/guest/libs/autotools/bin|g' -e 's|@pkgsdatadir@|/home/guest/libs/autotools/share/autoconf|g' -e 's|@prefix@|/home/guest/libs/autotools|g' -e 's|@autoconf-name@|echo autoconf | sed 's,x,x,'|g' -e 's|@autoheader-name@|echo autoheader | sed 's,x,x,'|g' -e 's|@autom4te-name@|echo autom4te | sed 's,x,x,'|g' -e 's|@M4@|/home/guest/libs/autotools/bin/m4|g' -e 's|@M4_DEBUGFILE@|--debugfile|g' -e 's|@M4_GNU@|--gnu|g' -e 's|@MK@|gawk|g' -e 's|@RELEASE_YEAR@|2023|g' -e 's|@VERSION@|2.72|g' -e 's|@PACKAGE_NAME@|GNU Autoconf|g' -e 's|@configure_input@|Generated from bin/autoconf.in; do not edit by hand.|g' ${srcdir}bin/autoconf.in >bin/autoconf.tmp
```

```
make[3]: Entering directory '/home/guest/autoconf-2.72'
for s in build-aux/config.guess build-aux/config.sub build-aux/install-sh; do \
    chmod +x "/home/guest/libs/autotools/share/autoconf/$s"; \
done
make[3]: Leaving directory '/home/guest/autoconf-2.72'
make[2]: Leaving directory '/home/guest/autoconf-2.72'
make[1]: Leaving directory '/home/guest/autoconf-2.72'
guest@guest:~/autoconf-2.72$
```

```
guest@guest:~/autoconf-2.72$ autoconf --version
autoconf (GNU Autoconf) 2.72
Copyright (C) 2023 Free Software Foundation, Inc.
License GPLv3+/Autoconf: GNU GPL version 3 or later
<https://gnu.org/licenses/gpl.html>, <https://gnu.org/licenses/exceptions.html>
This is free software: you are free to change and redistribute it.
There is NO WARRANTY, to the extent permitted by law.

Written by David J. MacKenzie and Akim Demaille.
guest@guest:~/autoconf-2.72$
```

Building automake similarly as autoconf.

```
guest@guest:~$ tar -xvf automake-1.16_1.16.5.orig.tar.xz
automake-1.16.5/
automake-1.16.5/configure.ac
automake-1.16.5/bin/
automake-1.16.5/bin/automake.in
automake-1.16.5/bin/aclocal.in
automake-1.16.5/bin/local.mk
automake-1.16.5/PLANS/
automake-1.16.5/PLANS/texi/drop-split-info-files.txt
automake-1.16.5/PLANS/texi/warnings-for-automake-ng-compatibility.txt
automake-1.16.5/THANKS
automake-1.16.5/GNUmakefile
automake-1.16.5/HACKING
guest@guest:~$
```

```
guest@guest:~/automake-1.16.5$ ./configure --prefix=/home/guest/libs/autotools/
checking whether make supports nested variables... yes
checking build system type... x86_64-pc-linux-gnu
checking host system type... x86_64-pc-linux-gnu
checking for a BSD-compatible install... /usr/bin/install -c
checking whether build environment is sane... yes
checking for a race-free mkdir -p... /usr/bin/mkdir -p
checking for gawk... gawk
dash is not a Bourne shell (dash)
```

```
checking for gcj... no
checking that generated files are newer than configure... done
configure: creating ./config.status
config.status: creating Makefile
config.status: creating pre-inst-env
guest@guest:~/automake-1.16.5$
```

```
guest@guest:~/automake-1.16.5$ make all install
  GEN      bin/automake
  GEN      bin/aclocal
  GEN      bin/aclocal-1.16
  GEN      bin/automake-1.16
  GEN      t/ax/shell-no-trail-bslash
  GEN      t/ax/cc-no-c-o
  GEN      runtest
  GEN      doc/aclocal.1
  GEN      doc/automake-1.16.5
```

```
chmod +x '/home/guest/ribs/autotools/share/automake-1.16/giwrap'
chmod +x '/home/guest/ribs/autotools/share/automake-1.16/depcomp'
chmod +x '/home/guest/ribs/autotools/share/automake-1.16/compile'
chmod +x '/home/guest/ribs/autotools/share/automake-1.16/py-compile'
chmod +x '/home/guest/ribs/autotools/share/automake-1.16/ar-lib'
chmod +x '/home/guest/ribs/autotools/share/automake-1.16/test-driver'
chmod +x '/home/guest/ribs/autotools/share/automake-1.16/tap-driver.sh'
make[2]: Leaving directory '/home/guest/automake-1.16.5'
make[1]: Leaving directory '/home/guest/automake-1.16.5'
guest@guest:~/automake-1.16.5$
```

```
guest@guest:~/automake-1.16.5$ automake --version
automake (GNU automake) 1.16.5
Copyright (C) 2021 Free Software Foundation, Inc.
License GPLv2+: GNU GPL version 2 or later <https://gnu.org/licenses/gpl-2.0.html>
This is free software: you are free to change and redistribute it.
There is NO WARRANTY, to the extent permitted by law.

Written by Tom Tromey <tromey@redhat.com>
      and Alexandre Duret-Lutz <adl@gnu.org>.
guest@guest:~/automake-1.16.5$
```

Building libtool similarly as autoconf.

```
guest@guest:~$  
guest@guest:~$ tar -xvf libtool_2.4.7.orig.tar.xz  
libtool-2.4.7/  
libtool-2.4.7/build-aux/  
libtool-2.4.7/build-aux/gnu-web-doc-update  
libtool-2.4.7/build-aux/funclib.sh  
libtool-2.4.7/build-aux/options-parser  
libtool-2.4.7/build-aux/config.guess  
libtool-2.4.7/build-aux/useless-if-before-free  
libtool-2.4.7/build-aux/announce-gen  
libtool-2.4.7/build-aux/update-copyright  
libtool-2.4.7/build-aux/ltmain.in  
libtool-2.4.7/build-aux/missing  
libtool-2.4.7/m4/obsolete.m4  
libtool-2.4.7/m4/m4.m4  
libtool-2.4.7/m4/lt~obsolete.m4  
libtool-2.4.7/m4/ltargz.m4  
libtool-2.4.7/m4/ltsugar.m4  
libtool-2.4.7/m4/gnulib-common.m4  
libtool-2.4.7/m4/ltoptions.m4  
libtool-2.4.7/m4/zzgnulib.m4  
libtool-2.4.7/m4/ltversion.m4  
guest@guest:~$  
guest@guest:~$
```

```
guest@guest:~/libtool-2.4.7$  
guest@guest:~/libtool-2.4.7$ ./configure --prefix=/home/guest/libs/autotools/  
## ----- ##  
## Configuring libtool 2.4.7 ##  
## ----- ##  
  
checking for GNU M4 that supports accurate traces... /home/guest/libs/autotools/bin/m4  
checking whether /home/guest/libs/autotools/bin/m4 accepts --gnu... yes  
checking how m4 supports trace files... --debugfile  
checking for a BSD-compatible install... /usr/bin/install -c  
checking whether build environment is sane... yes  
checking for a thread-safe mkdir -p... /usr/bin/mkdir -p  
checking for gawk... gawk  
checking whether make sets $(MAKE)... yes  
checking whether make supports nested variables... yes  
checking whether make supports nested variables... (cached) yes  
checking build system type... x86_64-linux-gnu
```

```
checking for C++ compiler option to allow warnings... -Wno-error
checking that generated files are newer than configure... done
configure: creating ./config.status
config.status: creating Makefile
config.status: creating gnulib-tests/Makefile
config.status: creating config.h
config.status: executing tests/atconfig commands
config.status: executing depfiles commands
config.status: executing libtool commands
guest@guest:~/libtool-2.4.7$  
guest@guest:~/libtool-2.4.7$
```

```
guest@guest:~/libtool-2.4.7$  
guest@guest:~/libtool-2.4.7$ make all install
  GEN      libtoolize
make  all-recurse
make[1]: Entering directory '/home/guest/libtool-2.4.7'
Making all in .
make[2]: Entering directory '/home/guest/libtool-2.4.7'
  CC      libltdl/loaders/libltdl_la-preopen.lo
  CC      libltdl/libltdl_la-lt__alloc.lo
  CC      libltdl/libltdl_la-lt_dilloader.lo
  CC      libltdl/libltdl_la-lt_error.lo
  CC      libltdl/libltdl_la-ltdl.lo
  CC      libltdl/libltdl_la-slist.lo
  CC      libltdl/loaders/dlopen.lo
  CCLD    libltdl/dlopen.lo
  CCLD    libltdl/libltdl.lo
```

```
bs/autotools/include/libltdl'
/usr/bin/mkdir -p '/home/guest/libs/autotools/share/man/man1'
/usr/bin/install -c -m 644 ./doc/libtool.1 ./doc/libtoolize.1 '/home/guest/libs/autotools/share/man/man1'
make[3]: Leaving directory '/home/guest/libtool-2.4.7'
make[2]: Leaving directory '/home/guest/libtool-2.4.7'
Making install in gnulib-tests
make[2]: Entering directory '/home/guest/libtool-2.4.7/gnulib-tests'
make  install-recurse
make[3]: Entering directory '/home/guest/libtool-2.4.7/gnulib-tests'
Making install in .
make[4]: Entering directory '/home/guest/libtool-2.4.7/gnulib-tests'
make[5]: Entering directory '/home/guest/libtool-2.4.7/gnulib-tests'
make[5]: Nothing to be done for 'install-exec-am'.
make[5]: Nothing to be done for 'install-data-am'.
make[5]: Leaving directory '/home/guest/libtool-2.4.7/gnulib-tests'
make[4]: Leaving directory '/home/guest/libtool-2.4.7/gnulib-tests'
make[3]: Leaving directory '/home/guest/libtool-2.4.7/gnulib-tests'
make[2]: Leaving directory '/home/guest/libtool-2.4.7/gnulib-tests'
make[1]: Leaving directory '/home/guest/libtool-2.4.7'
guest@guest:~/libtool-2.4.7$  
guest@guest:~/libtool-2.4.7$
```

```
guest@guest:~/libtool-2.4.7$  
guest@guest:~/libtool-2.4.7$ libtoolize --version  
libtoolize (GNU libtool) 2.4.7  
Written by Gary V. Vaughan <garry@gnu.org>, 2003  
Copyright (C) 2022 Free Software Foundation, Inc.  
guest@guest:~/libtool-2.4.7$
```

Now that we have all the dependencies for autogen we run it.

```
guest@guest:~/libffi-3.4.6$ ./autogen.sh  
autoreconf: export WARNINGS=  
autoreconf: Entering directory '.'  
autoreconf: configure.ac: not using Gettext  
autoreconf: running: aclocal -I m4  
autoreconf: configure.ac: tracing  
autoreconf: running: libtoolize --copy  
libtoolize: putting auxiliary files in '.'.  
libtoolize: copying file './ltmain.sh'  
libtoolize: putting macros in AC_CONFIG_MACRO_DIRS, 'm4'.  
libtoolize: copying file 'm4/libtool.m4'  
libtoolize: copying file 'm4/ltoptions.m4'  
libtoolize: copying file 'm4/ltsugar.m4'  
libtoolize: copying file 'm4/ltversion.m4'  
libtoolize: copying file 'm4/lt~obsolete.m4'  
autoreconf: configure.ac: not using Intltool  
autoreconf: configure.ac: not using Gtkdoc  
autoreconf: running: aclocal -I m4  
autoreconf: running: /usr/local/bin/autoconf  
configure.ac:88: warning: The preprocessor macro `STDC_HEADERS' is obsolete.  
configure.ac:88: Except in unusual embedded environments, you can safely include all  
configure.ac:88: ISO C90 headers unconditionally.  
configure.ac:123: warning: The macro 'AC_TRY_COMPILE' is obsolete.  
configure.ac:123: You should run autoupdate.  
.lib/autoconf/general.m4:2845: AC_TRY_COMPILE is expanded from...  
lib/m4sugar/m4sh.m4:690: _AS_IF_ELS is expanded from...  
lib/m4sugar/m4sh.m4:697: AS_IF is expanded from...  
.lib/autoconf/general.m4:2249: AC_CACHE_VAL is expanded from...  
.lib/autoconf/general.m4:2270: AC_CACHE_CHECK is expanded from...  
m4/asmcfi.m4:1: GCC_AS_CFI_PSEUDO_OP is expanded from...  
configure.ac:123: the top level  
autoreconf: running: /usr/local/bin/autoheader  
autoreconf: running: automake --add-missing --copy --no-force  
autoreconf: Leaving directory '.'
```

`autogen.sh` runs with no error so we now have `configure` ready.

```
guest@guest:~/libffi-3.4.6$ ./configure --prefix=/home/guest/libs/custom-libffi --disable-docs
checking build system type... x86_64-pc-linux-gnu
checking host system type... x86_64-pc-linux-gnu
checking target system type... x86_64-pc-linux-gnu
continue configure in default builddir "./x86_64-pc-linux-gnu"
....exec /bin/bash ../../configure "--srcdir=.." "--enable-builddir=x86_64-pc-linux-gnu" "linux
gnu"
```

We configure with no-docs since that requires extra packages and is not really needed.

```
config.status: executing buildin' commands
config.status: reusing top_srcdir/Makefile from earlier configure
config.status: build in x86_64-pc-linux-gnu (HOST=)
config.status: executing depfiles commands
config.status: executing libtool commands
config.status: executing include commands
config.status: executing src commands
guest@guest:~/libffi-3.4.6$
```

`configure` is successful so we proceed to `make`

```
guest@guest:~/libffi-3.4.6$ make
make[1]: Entering directory '/home/guest/libffi-3.4.6/x86_64-pc-linux-gnu'
make[1]: Leaving directory '/home/guest/libffi-3.4.6/x86_64-pc-linux-gnu'
make[2]: Entering directory '/home/guest/libffi-3.4.6/x86_64-pc-linux-gnu'
make[2]: Leaving directory '/home/guest/libffi-3.4.6/x86_64-pc-linux-gnu'
make[3]: Entering directory '/home/guest/libffi-3.4.6/x86_64-pc-linux-gnu/include'
make[3]: Nothing to be done for 'all'.
make[3]: Leaving directory '/home/guest/libffi-3.4.6/x86_64-pc-linux-gnu/include'
make[3]: Entering directory '/home/guest/libffi-3.4.6/x86_64-pc-linux-gnu/testsuite'
make[3]: Nothing to be done for 'all'.

libtool: link: (cd ".libs" && rm -f "libffi.so" && ln -s "libffi.so.8.1.4" "libffi.so")
libtool: link: ar cr .libs/libffi.a src/prep_clif.o src/types.o src/raw_api.o src/java_raw_api.o src/closures.o src/tramp.o src/x86/ffi64.o src/x86/unix64.o src/x86/ffi64.o src/x86/win64.o
libtool: link: ranlib .libs/libffi.a
libtool: link: ( cd ".libs" && rm -f "libffi.la" && ln -s "../libffi.la" "libffi.la" )
make[3]: Leaving directory '/home/guest/libffi-3.4.6/x86_64-pc-linux-gnu'
make[2]: Leaving directory '/home/guest/libffi-3.4.6/x86_64-pc-linux-gnu'
make[1]: Leaving directory '/home/guest/libffi-3.4.6/x86_64-pc-linux-gnu'
guest@guest:~/libffi-3.4.6$
```

`make` is successful we now do `make install`

```
guest@guest:~/libffi-3.4.6$ guest@guest:~/libffi-3.4.6$ make install
MAKE x86_64-pc-linux-gnu : 0 * install
make[1]: Entering directory '/home/guest/libffi-3.4.6/x86_64-pc-linux-gnu'
Making install in include
make[2]: Entering directory '/home/guest/libffi-3.4.6/x86_64-pc-linux-gnu/include'
make[3]: Entering directory '/home/guest/libffi-3.4.6/x86_64-pc-linux-gnu/include'
make[3]: Nothing to be done for 'install-exec-am'.
/usr/bin/mkdir -p '/home/guest/libs/custom-libffi/include'
/usr/bin/install -c -m 644 ffi.h ffitarget.h '/home/guest/libs/custom-libffi/include'
make[3]: Leaving directory '/home/guest/libffi-3.4.6/x86_64-pc-linux-gnu/include'
make[2]: Leaving directory '/home/guest/libffi-3.4.6/x86_64-pc-linux-gnu/include'
drwxr-xr-x 2 guest guest 4096 Jul  1 14:47 include
-----  
Libraries have been installed in:
  /home/guest/libs/custom-libffi/lib/.../lib

If you ever happen to want to link against installed libraries
in a given directory, LIBDIR, you must either use libtool, and
specify the full pathname of the library, or use the '-LLIBDIR'
flag during linking and do at least one of the following:
  - add LIBDIR to the 'LD_LIBRARY_PATH' environment variable
    during execution
  - add LIBDIR to the 'LD_RUN_PATH' environment variable
    during linking
  - use the '-Wl,-rpath -Wl,LIBDIR' linker flag
  - have your system administrator add LIBDIR to '/etc/ld.so.conf'

See any operating system documentation about shared libraries for
more information, such as the ld(1) and ld.so(8) manual pages.
-----  
/usr/bin/mkdir -p '/home/guest/libs/custom-libffi/lib/pkgconfig'
/usr/bin/install -c -m 644 libffi.pc '/home/guest/libs/custom-libffi/lib/pkgconfig'
make[3]: Leaving directory '/home/guest/libffi-3.4.6/x86_64-pc-linux-gnu'
make[2]: Leaving directory '/home/guest/libffi-3.4.6/x86_64-pc-linux-gnu'
make[1]: Leaving directory '/home/guest/libffi-3.4.6/x86_64-pc-linux-gnu'
guest@guest:~/libffi-3.4.6$
```

Now we have libeffi-dev installed so we retry making python from sources.

First we setup the `LDFLAGS` and `CPPFLAGS`

```
guest@guest:~/Python-3.10.16$ export CPPFLAGS="-I/home/guest/libs/custom-zlib/include -I/home/guest/libs/custom-libeffi/include -I/home/guest/libs/custom-openssl/include"
guest@guest:~/Python-3.10.16$ export LDFLAGS="-L/home/guest/libs/custom-zlib/lib -L/home/guest/libs/custom-libeffi/lib -L/home/guest/libs/custom-openssl/lib"
guest@guest:~/Python-3.10.16$
```

Check that they point to correct locations

```
guest@guest:~/Python-3.10.16$  
guest@guest:~/Python-3.10.16$ echo $CPPFLAGS  
-I/home/guest/libs/custom-zlib/include -I/home/guest/libs/custom-libeffi/include -I/home/guest/libs/custom-openssl/include  
guest@guest:~/Python-3.10.16$ echo $LDFLAGS  
-L/home/guest/libs/custom-zlib/lib -L/home/guest/libs/custom-libeffi/lib -L/home/guest/libs/custom-openssl/lib  
guest@guest:~/Python-3.10.16$
```

`configure` again

```
guest@guest:~/Python-3.10.16$  
guest@guest:~/Python-3.10.16$ ./configure --prefix=/home/guest/python3.10 --enable-optimizations --with-openssl=/home/guest/libs  
/custom-openssl --with-openssl-rpath=auto  
checking build system type... x86_64-pc-linux-gnu  
checking host system type... x86_64-pc-linux-gnu  
checking for python3.10... no  
checking for python3... python3  
checking for --enable-universalsdk... no  
checking for --with-universal-archs... no  
  
checking for --with-static-libpython... yes  
checking for --disable-test-modules... no  
configure: creating ./config.status  
config.status: creating Makefile.pre  
config.status: creating Misc/python.pc  
config.status: creating Misc/python-embed.pc  
config.status: creating Misc/python-config.sh  
config.status: creating Modules/ld_so_aix  
config.status: creating pyconfig.h  
config.status: pyconfig.h is unchanged  
creating Modules/Setup.local  
creating Makefile  
guest@guest:~/Python-3.10.16$  
guest@guest:~/Python-3.10.16$
```

`make` again

```
guest@guest:~/Python-3.10.16$  
guest@guest:~/Python-3.10.16$ make -j12  
Rebuilding with profile guided optimizations:  
rm -f profile-clean-stamp  
make build_all CFLAGS_NODIST="-fprofile-use -fprofile-correction" LDFLAGS_NODIST=""  
make[1]: Entering directory '/home/guest/Python-3.10.16'  
gcc -c -Wno-unused-result -Wsign-compare -DNDEBUG -g -fwrapv -O3 -Wall -fno-semantic-interposition -std=c99 -Wextra -Wno-unused-parameter -Wno-missing-field-initializers -Werror=implicit-function-declaration -fvisibility=hidden -fprofile-use -fprofile-correction -I./Include/internal -I./Include -I/home/guest/libs/custom-zlib/include -I/home/guest/libs/custom-libeffi/include -I/home/guest/libs/custom-openssl/include -I/home/guest/libs/custom-zlib/include -I/home/guest/libs/custom-libeffi/include -I/home/guest/libs/custom-openssl/include -DPy_BUILD_CORE \  
-DABIFLAGS="" \  
DMULTITARGETS="gcc c4 linux aarch64" <
```

```

The necessary bits to build these optional modules were not found:
_bz2           _curses           _curses_panel
_dbm           _gdbm            _lzma
_sqlite3       _tkinter          _uuid
_nis           readline

To find the necessary bits, look in setup.py in detect_modules() for the module's name.

The following modules found by detect_modules() in setup.py, have been
built by the Makefile instead, as configured by the Setup files:
_abc           pwd              time

Failed to build these modules:
binascii

running build_scripts
copying and adjusting /home/guest/Python-3.10.16/Tools/scripts/pydoc3 -> build/scripts-3.10
copying and adjusting /home/guest/Python-3.10.16/Tools/scripts/idle3 -> build/scripts-3.10
copying and adjusting /home/guest/Python-3.10.16/Tools/scripts/2to3 -> build/scripts-3.10
changing mode of build/scripts-3.10/pydoc3 from 664 to 775
changing mode of build/scripts-3.10/idle3 from 664 to 775
changing mode of build/scripts-3.10/2to3 from 664 to 775
renaming build/scripts-3.10/pydoc3 to build/scripts-3.10/pydoc3.10
renaming build/scripts-3.10/idle3 to build/scripts-3.10/idle3.10
renaming build/scripts-3.10/2to3 to build/scripts-3.10/2to3-3.10
make[1]: Leaving directory '/home/guest/Python-3.10.16'
guest@guest:~/Python-3.10.16$
```

No errors so we do `make install`

```

guest@guest:~/Python-3.10.16$ make install
if test "no-framework" = "no-framework" ; then \
    /usr/bin/install -c python /home/guest/python3.10/bin/python3.10; \
else \
    /usr/bin/install -c -s Mac/pythonw /home/guest/python3.10/bin/python3.10; \
fi
if test "3.10" != "3.10"; then \
    if test -f /home/guest/python3.10/bin/python3.10 -o -h /home/guest/python3.10/bin/python3.10; \
    then rm -f /home/guest/python3.10/bin/python3.10; \
    fi; \
    (cd /home/guest/python3.10/bin; ln python3.10 python3.10); \
fi
if test "x" != "x" ; then \
    rm -f /home/guest/python3.10/bin/python3.10-2to3
Running setup.py install for drf-generators ... done
Successfully installed Django-4.2.18 MarkupSafe-3.0.2 Pillow-11.1.0 annotated-types-0.7.0 anyio-4.8.0 appdirs-1.4.4 argcomplete-3.5.3 asgiref-3.0.1 attr-0.3.1 attrs-24.3.0 azure-core-1.32.0 azure-storage-blob-12.24.1 black-24.10.0 bleach-5.0.1 boto-2.49.0 boto3-1.36.5 botocore-1.36.5 cachetools-5.5.1 certifi-2024.12.14 cffi-1.17.1 charset-normalizer-3.4.1 click-8.1.8 colorama-0.4.6 cryptography-44.0.0 datamodel-code-generator-0.26.1 defusedxml-0.7.1 deprecated-1.2.16 distro-1.9.0 django-annoying-0.10.6 djan go-cors-headers-3.6.0 django-csp-3.7 django-debug-toolbar-3.2.1 django-environ-0.10.0 django-extensions-3.2.3 django-filter-2.4.0 django-migration-linter-5.1.0 django-model-utils-4.1.1 django-ranged-fileresponse-0.1.2 django-rq-2.5.1 django-storages-1.12.3 django-user-agents-0.4.0 djangorestframework-3.15.2 dnspython-2.7.0 drf-dynamic-fields-0.3.0 drf-flex-fields-0.9.5 drf-generato rs-0.3.0 email-validator-2.2.0 exceptiongroup-1.2.2 expiringdict-1.2.2 faker-35.0.0 genson-1.3.0 google-api-core-2.24.0 google-a uth-2.38.0 google-cloud-appengine-logging-1.5.0 google-cloud-audit-log-0.3.0 google-cloud-core-2.4.1 google-cloud-logging-3.11.3 google-cloud-storage-2.19.0 google-crc32c-1.6.0 google-resumable-media-2.7.2 googleapis-common-protos-1.66.0 grpc-google-iam-v1 -0.14.0 grpcio-1.70.0 grpcio-status-1.70.0 h11-0.14.0 httpcore-1.0.7 httpx-0.28.1 humansignal-drf-yasg-1.21.10,post1 idna-3.10 i json-3.3.0 importlib-metadata-8.5.0 inflect-5.6.2 inflection-0.5.1 isodate-0.7.2 isort-5.18.2 jinja2-3.1.5 jiter-0.8.2 jmespath-1.0.1 joblib-1.4.2 jsf-0.11.2 jsonschema-4.23.0 jsonschema-specifications-2024.10.1 label-studio-1.15.0 label-studio-sdk-1.0.8 launchdarkly-server-sdk-8.2.1 lockfile-0.12.2 lxml-5.3.0 markdown-it-py-3.0.0 mdurl-0.1.2 mypy-extensions-1.0.0 nltk-3.9.1 numpy-1.26.4 openai-1.60.0 opentelemetry-api-1.29.0 ordered-set-4.0.2 packaging-24.2 pandas-2.2.3 pathspec-0.12.1 platformdirs-4.3.6 p rotobuf-plus-1.25.0 protobuf-5.29.3 psycopg2-binary-2.9.10 pyRFC3339-2.0.1 pyasn1-0.6.1 pyasn1-modules-0.4.1 pyboxen-1.3.0 pyccparse r-2.22 pydantic-2.10.6 pydantic-core-2.27.2 pygments-2.19.1 python-dateutil-2.9.0,post1 python-json-logger-2.0.4 pytz-2022.7.1 p yyaml-6.0.2 redis-3.5.3 referencing-0.36.1 regex-2024.11.6 requests-2.32.3 requests-mock-1.12.1 rich-13.9.4 rpsd-py-0.22.3 rq-1.10.1 rsa-4.9 rstr-3.2.2 rules-3.4 s3transfer-0.11.2 semver-3.0.4 sentry-sdk-2.20.0 setuptools-75.0.0 six-1.17.0 smart-open-7.1.0 sniffio-1.3.1 sqlparse-0.5.3 toml-0.10.2 tomli-2.2.1 tqdm-4.67.1 typing_extensions-4.12.2 tzdata-2025.1 ua-parser-1.0.0 ua-pars er-builtins-0.18.0,post1 ujson-5.10.0 uritemplate-4.1.1 urllib3-1.26.20 user-agents-2.2.0 webencodings-0.5.1 wheel-0.40.0 wrapt-1.17.2 xmljson-0.2.1 zipp-3.21.0

[notice] A new release of pip is available: 23.0.1 -> 24.3.1
[notice] To update, run: pip install --upgrade pip
(venv) guest@guest:~/assignment3$
```

Now we try to run label-studio.

```
(venv) guest@guest:~/assignment3$ label-studio start
=> Database and media directory: /home/guest/.local/share/label-studio
=> Static URL is set to: /static/
=> Database and media directory: /home/guest/.local/share/label-studio
=> Static URL is set to: /static/
Read environment variables from: /home/guest/.local/share/label-studio/.env
get 'SECRET_KEY' casted as '<class 'str'>' with default ''
Starting new HTTPS connection (1): pypi.org:443
https://pypi.org:443 "GET /pypi/label-studio/json HTTP/1.1" 200 33651
January 24, 2025 - 14:56:48
Django version 4.2.18, using settings 'label_studio.core.settings.label_studio'
Starting development server at http://0.0.0.0:8080/
Quit the server with CONTROL-C.
```

It seems that it works but not completely.

```
File "/home/guest/python3.10/lib/python3.10/sqlite3/__init__.py", line 57, in <module>
    from sqlite3.dbapi2 import *
File "/home/guest/python3.10/lib/python3.10/sqlite3/dbapi2.py", line 27, in <module>
    from _sqlite3 import *
ModuleNotFoundError: No module named '_sqlite3'
Sentry is attempting to send 2 pending events
Waiting up to 2 seconds
Press Ctrl-C to quit
(venv) guest@guest:~/assignment3$
```

When creating databases we get this error so we need install the sqlite3-dev package, so we get the sources and extract, `configure` and `make` and then do `make install`

```
guest@guest:~$ wget "http://archive.ubuntu.com/ubuntu/pool/main/s/sqlite3/sqlite3_3.46.1.orig.tar.xz"
--2025-01-24 13:02:27--  http://archive.ubuntu.com/ubuntu/pool/main/s/sqlite3/sqlite3_3.46.1.orig.tar.xz
Resolving archive.ubuntu.com (archive.ubuntu.com)... 185.125.190.81, 91.189.91.82, 91.189.91.81, ...
Connecting to archive.ubuntu.com (archive.ubuntu.com)|185.125.190.81|:80... connected.
HTTP request sent, awaiting response... 200 OK
Length: 8456776 (8.1M) [application/x-xz]
Saving to: 'sqlite3_3.46.1.orig.tar.xz'

sqlite3_3.46.1.orig.tar.xz      100%[=====] 8.06M  4.50MB/s  in 1.8s
2025-01-24 13:02:29 (4.50 MB/s) - 'sqlite3_3.46.1.orig.tar.xz' saved [8456776/8456776]
guest@guest:~$ _
```

```
guest@guest:~/sqlite3-3.46.1$ ./configure --prefix=/home/guest/libs/custom-libsqlite3-dev
checking build system type... x86_64-pc-linux-gnu
checking host system type... x86_64-pc-linux-gnu
checking for gcc... gcc
checking whether the C compiler works... yes
checking for C compiler default output file name... a.out
checking for suffix of executables...
checking whether we are cross compiling... no
checking for suffix of object files... o
```

```

checking whether to support FTS4... no
checking whether to support FTS5... no
checking whether to support LIMIT on UPDATE and DELETE statements... no
checking whether to support GEOPOLY... no
checking whether to support RTREE... no
checking whether to support SESSION... no
configure: creating ./config.status
config.status: creating Makefile
config.status: creating sqlite3.pc
config.status: creating sqlite_cfg.h
config.status: executing libtool commands
guest@guest:~/sqlite3-3.46.1$ 
guest@guest:~/sqlite3-3.46.1$ 
guest@guest:~/sqlite3-3.46.1$ 
guest@guest:~/sqlite3-3.46.1$ 
guest@guest:~/sqlite3-3.46.1$ 
guest@guest:~/sqlite3-3.46.1$ make -j12
gcc -g -O2 -o mksourceid /home/guest/sqlite3-3.46.1/tool/mksourceid.c
sh /home/guest/sqlite3-3.46.1/tool/cktclsh.sh 8.4 tclsh8.6
gcc -g -O2 -o mkkeywordhash -DSQLITE_ENABLE_MATH_FUNCTIONS /home/guest/sqlite3-3.46.1/tool/mkkeywordhash.c
touch has_tclsh84
gcc -g -O2 -o lemon /home/guest/sqlite3-3.46.1/tool/lemon.c
gcc -g -O2 -o src-verify /home/guest/sqlite3-3.46.1/tool/src-verify.c
./mkkeywordhash >keywordhash.h
tclsh8.6 /home/guest/sqlite3-3.46.1/tool/mkshellc.tcl >shell.c
tclsh8.6 /home/guest/sqlite3-3.46.1/tool/mksqlite3h.tcl /home/guest/sqlite3-3.46.1 >sqlite3.h
cp /home/guest/sqlite3-3.46.1/tool/lempar.c .
cp /home/guest/sqlite3-3.46.1/src/parse.y .
cp /home/guest/sqlite3-3.46.1/ext/fts5/fts5parse.y .
rm -f fts5parse.h

```

```

./libtool --mode=link gcc -g -O2 -DSQLITE_OS_UNIX=1 -I. -I/home/guest/sqlite3-3.46.1/src -I/home/guest/sqlite3-3.46.1/ext/rtree
-I/home/guest/sqlite3-3.46.1/ext/icu -I/home/guest/sqlite3-3.46.1/ext/fts3 -I/home/guest/sqlite3-3.46.1/ext/async -I/home/guest/
sqlite3-3.46.1/ext/session -I/home/guest/sqlite3-3.46.1/ext/userauth -D_HAVE_SQLITE_CONFIG_H -DBUILD_sqlite -DNDEBUG -DSQLITE_TH
READSAFE=1 -DSQLITE_ENABLE_MATH_FUNCTIONS -no-undefined -o libsqlite3.la sqlite3.lo -lm \
-rpath "/home/guest/libs/custom-libssqlite3-dev/lib" -version-info "8:6:8"
libtool: link: gcc -shared .libs/sqlite3.o -lm -Wl,-soname -Wl,libsqlite3.so.0 -o .libs/libsqlite3.so.0.8.6
libtool: link: (cd ".libs" && rm -f "libsqlite3.so.0" && ln -s "libsqlite3.so.0.8.6" "libsqlite3.so.0")
libtool: link: (cd ".libs" && rm -f "libsqlite3.so" && ln -s "libsqlite3.so.0.8.6" "libsqlite3.so")
libtool: link: ar cru .libs/libsqlite3.a sqlite3.o
ar: `u' modifier ignored since `D' is the default (see `U')
libtool: link: ranlib .libs/libsqlite3.a
libtool: link: ( cd ".libs" && rm -f "libsqlite3.la" && ln -s "../libsqlite3.la" "libsqlite3.la" )
guest@guest:~/sqlite3-3.46.1$ 
guest@guest:~/sqlite3-3.46.1$ make install
/usr/bin/install -c -d /home/guest/libs/custom-libssqlite3-dev/lib
./libtool --mode=install /usr/bin/install -c libsqlite3.la /home/guest/libs/custom-libssqlite3-dev/lib
libtool: install: /usr/bin/install -c .libs/libsqlite3.so.0.8.6 /home/guest/libs/custom-libssqlite3-dev/lib/libsqlite3.so.0.8.6
libtool: install: (cd /home/guest/libs/custom-libssqlite3-dev/lib && { ln -s -f libsqlite3.so.0.8.6 libsqlite3.so.0 || { rm -f li
bsqlite3.so.0 && ln -s libsqlite3.so.0.8.6 libsqlite3.so.0; }; })
libtool: install: (cd /home/guest/libs/custom-libssqlite3-dev/lib && { ln -s -f libsqlite3.so.0.8.6 libsqlite3.so || { rm -f lib
sqlite3.so && ln -s libsqlite3.so.0.8.6 libsqlite3.so; }; })
libtool: install: /usr/bin/install -c .libs/libsqlite3.lai /home/guest/libs/custom-libssqlite3-dev/lib/libsqlite3.la
libtool: install: /usr/bin/install -c .libs/libsqlite3.a /home/guest/libs/custom-libssqlite3-dev/lib/libsqlite3.a
libtool: install: chmod 644 /home/guest/libs/custom-libssqlite3-dev/lib/libsqlite3.a

```

```

libtool: finish: PATH="/home/guest/libs/autotools/bin:/home/guest/libs/autotools/bin:/usr/local/sbin:/usr/local/bin:/usr/sbin:/usr/bin:/sbin:/bin:/usr/games:/usr/local/games:/snap/bin:/sbin" ldconfig -n /home/guest/libs/custom-libssqlite3-dev/lib
-----
Libraries have been installed in:
  /home/guest/libs/custom-libssqlite3-dev/lib

If you ever happen to want to link against installed libraries
in a given directory, LIBDIR, you must either use libtool, and
specify the full pathname of the library, or use the '-LLIBDIR'
flag during linking and do at least one of the following:
  - add LIBDIR to the 'LD_LIBRARY_PATH' environment variable
    during execution
  - add LIBDIR to the 'LD_RUN_PATH' environment variable
    during linking
  - use the '-Wl,-rpath -Wl,LIBDIR' linker flag
  - have your system administrator add LIBDIR to '/etc/ld.so.conf'

See any operating system documentation about shared libraries for
more information, such as the ld(1) and ld.so(8) manual pages.
-----
/usr/bin/install -c -d /home/guest/libs/custom-libssqlite3-dev/bin
./libtool --mode=install /usr/bin/install -c sqlite3 /home/guest/libs/custom-libssqlite3-dev/bin/sqlite3
libtool: install: /usr/bin/install -c sqlite3 /home/guest/libs/custom-libssqlite3-dev/bin/sqlite3
/usr/bin/install -c -d /home/guest/libs/custom-libssqlite3-dev/include
/usr/bin/install -c -m 0644 sqlite3.h /home/guest/libs/custom-libssqlite3-dev/include
/usr/bin/install -c -m 0644 /home/guest/sqlite3-3.46.1/src/sqlite3ext.h /home/guest/libs/custom-libssqlite3-dev/include
/usr/bin/install -c -d /home/guest/libs/custom-libssqlite3-dev/lib/pkgconfig
/usr/bin/install -c -m 0644 sqlite3.pc /home/guest/libs/custom-libssqlite3-dev/lib/pkgconfig
guest@guest:~/sqlite3-3.46.1$ 
guest@guest:~/sqlite3-3.46.1$ 

```

Rebuilding python source

We update the flags

```

guest@guest:~/Python-3.10.16$ 
guest@guest:~/Python-3.10.16$ export CPPFLAGS="-I/home/guest/libs/custom-zlib/include -I/home/guest/libs/custom-libeffi/include
-I/home/guest/libs/custom-openssl/include -I/home/guest/libs/custom-libssqlite3-dev/include"
guest@guest:~/Python-3.10.16$ export LDFLAGS="-L/home/guest/libs/custom-zlib/lib -L/home/guest/libs/custom-libeffi/lib -L/home/guest/libs/custom-openssl/lib -L/home/guest/libs/custom-libssqlite3-dev"
guest@guest:~/Python-3.10.16$ 

```

`configure` and `make` once again

```

guest@guest:~/Python-3.10.16$ 
guest@guest:~/Python-3.10.16$ ./configure --prefix=/home/guest/python3.10 --enable-optimizations --with-openssl=/home/guest/libs
/custom-openssl --with-openssl-rpath=auto
checking build system type... x86_64-pc-linux-gnu
checking host system type... x86_64-pc-linux-gnu
checking for python3.10... no
checking for python3... python3
checking for --enable-universalsdk... no
guest@guest:~/Python-3.10.16$ 
guest@guest:~/Python-3.10.16$ make -j12
Rebuilding with profile guided optimizations:
rm -f profile-clean-stamp
make build_all CFLAGS_NODIST="" -fprofile-use -fprofile-correction" LDFLAGS_NODIST="""
make[1]: Entering directory '/home/guest/Python-3.10.16'
CC='gcc' LDSHARED='gcc -shared -fno-semantic-interposition' OPT='--DNDEBUG -g -fwrapv -O3 -Wall' _TCLTK_INCLUDES=''
_KLIBS=' ./python -E ./setup.py build
running build
running build_ext
TNEO: Can't locate Tk/Tk libs and/or headers

```

```
The necessary bits to build these optional modules were not found:
_bz2           _curses           _curses_panel
_dbm           _gdbm            _lzma
_tkinter        _uuid            nis
readline
To find the necessary bits, look in setup.py in detect_modules() for the module's name.

The following modules found by detect_modules() in setup.py, have been
built by the Makefile instead, as configured by the Setup files:
_abc           pwd              time

Failed to build these modules:
binascii

running build_scripts
copying and adjusting /home/guest/Python-3.10.16/Tools/scripts/pydoc3 -> build/scripts-3.10
copying and adjusting /home/guest/Python-3.10.16/Tools/scripts/idle3 -> build/scripts-3.10
copying and adjusting /home/guest/Python-3.10.16/Tools/scripts/2to3 -> build/scripts-3.10
changing mode of build/scripts-3.10/pydoc3 from 664 to 775
changing mode of build/scripts-3.10/idle3 from 664 to 775
changing mode of build/scripts-3.10/2to3 from 664 to 775
renaming build/scripts-3.10/pydoc3 to build/scripts-3.10/pydoc3.10
renaming build/scripts-3.10/idle3 to build/scripts-3.10/idle3.10
renaming build/scripts-3.10/2to3 to build/scripts-3.10/2to3-3.10
make[1]: Leaving directory '/home/guest/Python-3.10.16'
guest@guest:~/Python-3.10.16$
```

`make` has no errors we do `make install`

```
guest@guest:~/Python-3.10.16$ guest@guest:~/Python-3.10.16$ make install
if test "ho-framework" = "ho-framework" ; then \
    /usr/bin/install -c python /home/guest/python3.10/bin/python3.10; \
else \
    /usr/bin/install -c -s Mac/pythonw /home/guest/python3.10/bin/python3.10; \
fi
if test "3.10" != "3.10"; then \
    if test -f /home/guest/python3.10/bin/python3.10 -o -h /home/guest/python3.10/bin/python3.10; \
    then rm -f /home/guest/python3.10/bin/python3.10; \
    fi; \
    (cd /home/guest/python3.10/bin; ln python3.10 python3.10); \
fi
guest@guest:~/Python-3.10.16$
```

```

if test $upgrade != $no ; then \
    case upgrade in \
        upgrade) ensurepip="--upgrade" ;; \
        install|*) ensurepip="" ;; \
    esac; \
    ./python -E -m ensurepip \
        $ensurepip --root=/ ; \
fi
Looking in links: /tmp/tmp3fp0x910w
Requirement already satisfied: setuptools in /home/guest/python3.10/lib/python3.10/site-packages (65.5.0)
Requirement already satisfied: pip in /home/guest/python3.10/lib/python3.10/site-packages (23.0.1)
guest@guest:~/Python-3.10.16$
```

Python was successfully installed.

- Make Pip environment using newly installed python3.10

```

guest@guest:~/assignment3$ 
guest@guest:~/assignment3$ python3 --version
Python 3.10.16
guest@guest:~/assignment3$ 
guest@guest:~/assignment3$ python3 -m pip --version
pip 23.0.1 from /home/guest/python3.10/lib/python3.10/site-packages/pip (python 3.10)
guest@guest:~/assignment3$ 
guest@guest:~/assignment3$ python3 -m pip install --upgrade pip
Requirement already satisfied: pip in /home/guest/python3.10/lib/python3.10/site-packages (23.0.1)
Collecting pip
  Downloading pip-24.3.1-py3-none-any.whl (1.8 MB)
                                             1.8/1.8 MB 2.9 MB/s eta 0:00:00
Installing collected packages: pip
  Attempting uninstall: pip
    Found existing installation: pip 23.0.1
    Uninstalling pip-23.0.1:
      Successfully uninstalled pip-23.0.1
Successfully installed pip-24.3.1
guest@guest:~/assignment3$ 
guest@guest:~/assignment3$ python3 -m venv venv
guest@guest:~/assignment3$ 
guest@guest:~/assignment3$ source venv/bin/activate
(venv) guest@guest:~/assignment3$ 
(venv) guest@guest:~/assignment3$ which pip
/home/guest/assignment3/venv/bin/pip
(venv) guest@guest:~/assignment3$ which python
/home/guest/assignment3/venv/bin/python
(venv) guest@guest:~/assignment3$ 
(venv) guest@guest:~/assignment3$ python --version
Python 3.10.16
(venv) guest@guest:~/assignment3$ python -m pip --version
pip 23.0.1 from /home/guest/assignment3/venv/lib/python3.10/site-packages/pip (python 3.10)
(venv) guest@guest:~/assignment3$ 
(venv) guest@guest:~/assignment3$
```

- Install [label studio](#) using pip.

```
(venv) guest@guest:~/assignment3$ pip install label-studio
Collecting label-studio
  Downloading label_studio-1.15.0-py3-none-any.whl (60.6 MB)
                                             60.6/60.6 MB 7.9 MB/s eta 0:00:00
Collecting google-cloud-storage<3.0.0,>=2.13.0
  Downloading google_cloud_storage-2.19.0-py2.py3-none-any.whl (131 kB)
                                             131.8/131.8 kB 13.9 MB/s eta 0:00:00
Collecting drf-dynamic-fields==0.3.0
  Downloading drf_dynamic_fields-0.3.0-py2.py3-none-any.whl (6.6 kB)
Collecting python-json-logger==2.0.4
  Downloading python_json_logger-2.0.4-py3-none-any.whl (7.8 kB)
Collecting django-filter==2.4.0
  Downloading django_filter-2.4.0-py3-none-any.whl (73 kB)
                                             73.2/73.2 kB 9.5 MB/s eta 0:00:00
Running setup.py install for drf-generators ... done
Successfully installed Django-4.2.18 MarkupSafe-3.0.2 Pillow-11.1.0 annotated-types-0.7.0 aiohttp-4.8.0 appdirs-1.4.4 argcomplete-3.5.3 asgiref-3.8.1 attr-0.3.1 attrs-24.3.0 azure-core-1.32.0 azure-storage-blob-12.24.1 black-24.10.0 bleach-5.0.1 boto-2.49.0 boto3-1.36.6 botocore-1.36.6 cachetools-5.5.1 certifi-2024.12.14 cffi-1.17.1 charset-normalizer-3.4.1 click-8.1.8 colorama-0.4.6 cryptography-44.0.0 datamodel-code-generator-0.26.1 defusedxml-0.7.1 deprecated-1.2.17 distro-1.9.0 django-annoying-0.10.6 djan go-cors-headers-3.6.0 django-csp-3.7 django-debug-toolbar-3.2.1 django-environ-0.10.0 django-extensions-3.2.3 django-filter-2.4.0 django-migration-linter-5.1.0 django-model-utils-4.1.1 django-ranged-fileresponse-0.1.2 django-rq-2.5.1 django-storages-1.12.3 django-user-agents-0.4.0 djangorestframework-3.15.2 dnspython-2.7.0 drf-dynamic-fields-0.9.0 drf-flex-fields-0.9.5 drf-generators-0.3.0 email-validator-2.2.0 exceptiongroup-1.2.2 expiringdict-1.2.2 faker-35.0 genson-1.3.0 google-api-core-2.24.0 google-auth-2.38.0 google-cloud-appengine-logging-1.5.0 google-cloud-audit-log-0.3.0 google-cloud-core-2.4.1 google-cloud-logging-3.11.3 google-cloud-storage-2.19.0 google-crc32c-1.6.0 google-resumable-media-2.7.2 googleapis-common-protos-1.66.0 grpc-google-iam-v1-0.14.0 grpcio-1.70.0 grpcio-status-1.70.0 h11-0.14.0 httpcore-1.0.7 httpx-0.28.1 humansignal-drf-yasg-1.21.10.post1 idna-3.10.1 json-3.3.0 importlib-metadata-8.5.0 inflect-5.6.2 inflection-0.5.1 isodate-0.7.2 isort-5.13.2 jinja2-3.1.5 jiter-0.8.2 jmespath-1.0.1 joblib-1.4.2 jstf-0.11.2 jsonschema-4.23.0 jsonschema-specifications-2024.10.1 label-studio-sdk-1.0.8 launchdarkly-server-sdk-8.2.1 lockfile-0.12.2 lxml-5.3.0 markdown-it-py-3.0.0 mdurl-0.1.2 mypy-extensions-1.0.0 nltk-3.9.1 numpy-1.26.4 openai-1.60.1 opentelemetry-api-1.29.0 ordered-set-4.0.2 packaging-24.2 pandas-2.2.3 pathspec-0.12.1 platformdirs-4.3.6 protocol-plus-1.25.0 protobuf-5.29.3 psycopg2-binary-2.9.10 pyRFC3339-2.0.1 pyasn1-0.6.1 pyasn1-modules-0.4.1 pyboxen-1.3.0 pycparser-0.2.22 pydantic-2.10.6 pydantic-core-2.27.2 pygments-2.19.1 python-dateutil-2.9.0.post0 python-json-logger-2.0.4 pytz-2022.7.1 pyyaml-6.0.2 redis-3.5.3 referencing-0.36.2 regex-2024.11.6 requests-2.32.3 requests-mock-1.12.1 rich-13.9.4 rpds-py-0.22.3 rq-1.10.1 rsa-4.9 rstr-3.2.2 rules-3.4 s3transfer-0.11.2 semver-3.0.4 sentry-sdk-2.20.0 setuptools-75.8.0 six-1.17.0 smart-open-7.1.0 sniffio-1.3.1 sqlparse-0.5.3 toml-0.10.2 toml-2.2.1 tqdm-4.67.1 typing_extensions-4.12.2 tzdata-2025.1 ua-parser-1.0.0 ua-parser-builtins-0.18.0.post1 ujson-5.10.0 uritemplate-4.1.1 urllib3-1.26.20 user-agents-2.2.0 webencodings-0.5.1 wheel-0.40.0 wrapt-1.17.2 xmljson-0.2.1 zipp-3.21.0

[notice] A new release of pip is available: 23.0.1 -> 24.3.1
[notice] To update, run: pip install --upgrade pip
(venv) guest@guest:~/assignment3$
```

We use the `python3 -m venv venv` to create a virtual environment for installing pip packages locally in a directory without disrupting global pip packages.

The ` -m` flag provides python which module to use and I am naming the virtual environment directory as `venv`.

We use the `source` command to run the `activate` script in `venv/bin/activate`

Then we finally install label-studio using pip.

We can now get Label Studio running at our VM's IP address and the specified port.

