

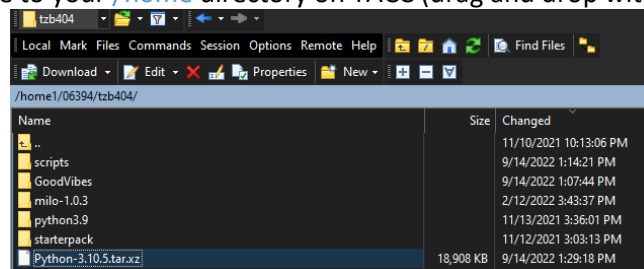
## Installing Python 3 on Frontera/TACC in general (GCH 9/14/22)

Frontera uses an old as dirt Python 2.7 install as its native Python. We want to update to this century. Many of the scripts we use have dependencies for Python3, so we need to update the default Python.

1. First, download a version of Python3 from the source website. You need the Linux version, the XZ compressed tarball. **The latest version you can install is 3.9.5**; anything newer is not supported on TACC. Here, I tried to install 3.10 – **the process is the same for 3.9, so make sure you install 3.9 instead of 3.10.**

- [Python 3.10.5 - June 6, 2022](#)
  - [Download Gzipped source tarball](#)
  - [Download XZ compressed source tarball](#)

2. Upload the .tar.xz file to your `/home` directory on TACC (drag and drop with WinSCP):



3. Back in MobaXterm, navigate to your home directory (where you uploaded the tar file to). Untar (unpack) the file in that directory with the command `'tar -xvf Python-3.10.5.tar.xz'`

A bunch of lines will be spat out. **Don't panic.**

```
login3.frontera(1171)$ pwd
/home1/06394/tzb404
login3.frontera(1172)$ ls
GoodVibes  python3.10  python3.9  starterpack
milo-1.0.3 Python-3.10.5.tar.xz  scripts
login3.frontera(1173)$ tar -xvf Python-3.10.5.tar.xz
Python-3.10.5/
Python-3.10.5/Mac/
Python-3.10.5/Mac/README.rst
Python-3.10.5/Mac/Icons/
Python-3.10.5/Mac/Icons/PythonLauncher.icns
Python-3.10.5/Mac/Icons/IDLE.icns
```

You should now have a new directory in your `/home` directory (circled in red):

```
login3.frontera(1017)$ ls -ll
total 28
drwxr-xr-x  5 tzb404 G-820939 4096 Sep 14 13:07 GoodVibes
drwxrwxr--  4 tzb404 G-820939 4096 Feb 12 2022 milo-1.0.3
drwxrwxr--  2 tzb404 G-820939 4096 Sep 14 13:32 python3.10
drwxr-xr-x 16 tzb404 G-820939 4096 Jun  6 07:05 Python-3.10.5
drwxrwxr--  6 tzb404 G-820939 4096 Nov 13 2021 python3.9
drwx----- 2 tzb404 G-820939 4096 Sep 14 13:14 scripts
drwx----- 2 tzb404 G-820939 4096 Nov 12 2021 starterpack
login3.frontera(1018)$
```

4. We need to make a new directory that will contain your Python install. Make a new directory in your home directory (you can see I already made it, above, above the red circled directory):

```
login3.frontera(1170)$ mkdir python3.10
```

5. Now, we will install your new Python3.10.5. Move into the directory that untarring created. Note that there is now a 'configure' file in this directory:

```
login3.frontera(1019)$ cd Python-3.10.5/
login3.frontera(1020)$ ls
aclocal.m4      Doc          Mac          Parser        README.rst
CODE_OF_CONDUCT.md Grammar      Makefile.pre.in PC          setup.py
config.guess    Include      Misc          PCbuild       Tools
config.sub      install-sh  Modules       Programs
config.ac       Lib         netlify.toml pyconfig.h.in
LICENSE        Objects     Python
```

- We need to tell Python where we want it to be installed. We want to install it into the folder we made earlier in the /home directory, so we will edit the configure instructions to point to the location we want. In my case:

`./configure --prefix=/home1/06394/tzb404/python3.10`

A lot of things will happen when you press 'enter'. Don't panic.

This is the top:

```
login3.frontera(1019)$ cd Python-3.10.5/
login3.frontera(1020)$ ls
aclocal.m4      Doc          Mac          Parser        README.rst
CODE_OF_CONDUCT.md Grammar      Makefile.pre.in PC          setup.py
config.guess    Include      Misc          PCbuild       Tools
config.sub      install-sh  Modules       Programs
config.ac       Lib         netlify.toml pyconfig.h.in
LICENSE        Objects     Python
login3.frontera(1021)$ ./configure --prefix=/home1/06394/tzb404/python3.10
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
```

This is the bottom:

```
creating Modules/Setup.local
creating Makefile

If you want a release build with all stable optimizations active (PGO, etc)
, please run ./configure --enable-optimizations

login3.frontera(1022)$
```

- Now, type 'make' and press enter. A lot of things will happen when you press 'enter'. Don't panic.

```
login3.frontera(1022)$ make
gcc -pthread -c -Wno-unused-result -Wsign-compare -DN
Wall -std=c99 -Wextra -Wno-unused-result -Wno-unus
ing-field-initializers -Werror=implicit-function-decl
idden -I./Include/internal -I. -I./Include -DPy_
/python.o ./Programs/python.c
```

- Now the real install. Type 'make install' and press enter. A lot of things will happen when you press 'enter'. Don't panic.

No picture because I don't feel like scrolling up through all that text. It should look something like this at the end:

```
Looking in links: /tmp/tmpraqkxgzk
Processing /tmp/tmpraqkxgzk/setuptools-58.1.0-py3-none-any.whl
Processing /tmp/tmpraqkxgzk/pip-22.0.4-py3-none-any.whl
Installing collected packages: setuptools, pip
WARNING: The scripts pip3 and pip3.10 are installed in '/home1/06394/tzb4
04/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-22.0.4 setuptools-58.1.0
login3.frontera(1024)$
```

- Navigate to the directory you just installed Python3 into (yay!) and verify that you actually installed it (you should have /bin in that directory):

```
login3.frontera(1027)$ pwd
/home1/06394/tzb404/Python-3.10.5
login3.frontera(1028)$ cd ..
login3.frontera(1029)$ ls
GoodVibes  python3.10  python3.9  starterpack
milo-1.0.3 Python-3.10.5 scripts
login3.frontera(1030)$ cd python3.10
login3.frontera(1031)$ ls
bin include lib share
login3.frontera(1032)$
```

10. We now need to make your new installation the default when you log into Frontera/call 'python' from wherever. Record (copy and paste it somewhere) the location of your /bin directory using 'pwd':

```
login3.frontera(1032)$ cd bin
login3.frontera(1033)$ pwd
/home1/06394/tzb404/python3.10/bin
Copy this line. You'll need it in just a moment.
```

11. Navigate to your /home directory using 'cdh' and open your .bashrc file with 'vi .bashrc'

```
login3.frontera(1035)$ cdh
login3.frontera(1036)$ vi .bashrc
```

12. Scroll to 'SECTION 2' – we will add your Python install to your PATH. Press 'i' to enter – INSERT – mode in vi text editor and add the following line (pointing to your directory):

```
#####
# SECTION 2
#
# Please set or modify any environment variables inside the if block
# below. For example, modifying PATH or other path like variables
# (e.g LD_LIBRARY_PATH), the guard variable (__PERSONAL_PATH__)
# prevents your PATH from having duplicate directories on sub-shells.

if [ -z "$__PERSONAL_PATH__" ]; then
    export __PERSONAL_PATH__=1

    #####
    # *** PLACE Environment Variables including PATH here. ***
    #####

    # export PATH=$HOME/bin:$PATH
    #path for Python3-9.5
    export PATH=/home1/06394/tzb404/python3.10/bin:$PATH
```

Press 'esc' to exit insert mode and save your changes and exit with ':wq'

13. You'll notice that if you use 'python -V' from the command line that it will still be the old version of Python (2.7.5 at time of writing). We need to change this so that when you type 'python' it will use your new version instead of the TACC default. For this we will create some [symlinks](#) aka symbolic links. Move to your python/.../bin directory and use the following command to link the Python file in the directory with 'python' (make sure 'python3.10' is a file that actually exists in that directory. In my case, you can see python3.10 exists in the directory):

`ln -s python3.10 python`

```
login3.frontera(1054)$ cd python3.10
login3.frontera(1055)$ cd bin
login3.frontera(1056)$ ls
2to3      idle3      pip3       pydoc3     python3     python3.10-config
2to3-3.10 idle3.10    pip3.10    pydoc3.10  python3.10  python3-config
login3.frontera(1057)$ ln -s python3.10 python
```

Note that 'python3.10' is specific to my python I'm installing; you might need to change that.

Create a second symlink for pip:

```
login3.frontera(1058)$ ln -s pip3 pip
```

14. Check that your symlinks exist using 'ls -l'

```
login3.frontera(1059)$ ls -l
total 22116
lrwxrwxrwx 1 tzb404 G-820939      9 Sep 14 14:09 2to3 -> 2to3-3.10
-rwxrwxr-x 1 tzb404 G-820939    122 Sep 14 14:09 2to3-3.10
lrwxrwxrwx 1 tzb404 G-820939      8 Sep 14 14:09 idle3 -> idle3.10
-rwxrwxr-x 1 tzb404 G-820939    120 Sep 14 14:09 idle3.10
lrwxrwxrwx 1 tzb404 G-820939      4 Sep 14 14:46 pip -> pip3
-rwxrwxr-x 1 tzb404 G-820939    250 Sep 14 14:09 pip3
-rwxrwxr-x 1 tzb404 G-820939    250 Sep 14 14:09 pip3.10
lrwxrwxrwx 1 tzb404 G-820939      9 Sep 14 14:09 pydoc3 -> pydoc3.10
-rwxrwxr-x 1 tzb404 G-820939    105 Sep 14 14:09 pydoc3.10
lrwxrwxrwx 1 tzb404 G-820939     10 Sep 14 14:45 python -> python3.10
-rwxrwxr-x 1 tzb404 G-820939    10 Sep 14 14:09 python3 -> python3.10
-rwxr-xr-x 1 tzb404 G-820939 22619256 Sep 14 14:09 python3.10
-rwxr-xr-x 1 tzb404 G-820939    3110 Sep 14 14:09 python3.10-config
lrwxrwxrwx 1 tzb404 G-820939     17 Sep 14 14:09 python3-config -> python3.10-config
```

*Symlink will start with 'l' all the way on the left. See that 'python' maps to your new install.*

15. Now, start a new MobaXterm session (log out and back in). Check that your Python version is now working using 'python -V'

```
login3.frontera(1001)$ python -V
Python 3.10.5
```

*Success!*

Next step: install GoodVibes.