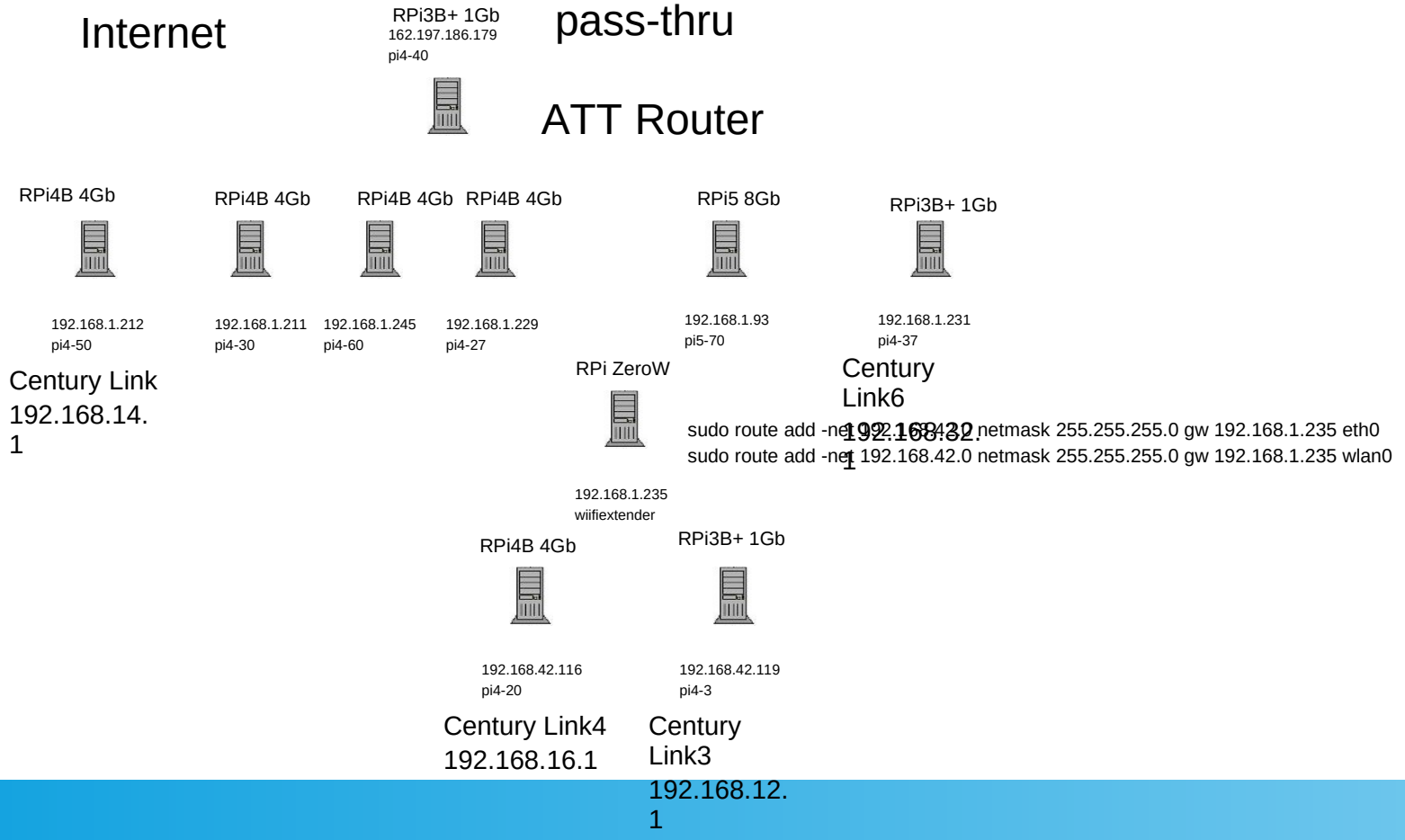
X-Window & Networking

Goal: Accessing 1of 5 RPi4B from the Over the Internet with graphical displays

- Examples graphical displays
  - Geany editor
  - Octave matlab like program
  - Gtkwave VCD viewer
  - Mousepad editor
  - GIMP
  - Lazarus IDE (Ulitobo Editor)
    - Bare metal for Pi
      - QEMU, Rpi Zero, RPi3B+, RPi4, and CM4


Internet
RPi3B+ 1Gb
162.197.186.179
pi4-40
pass-thru
ATT Router
RPi4B 4Gb
192.168.1.212
pi4-50
RPi4B 4Gb
192.168.1.211
pi4-30
RPi4B 4Gb
192.168.1.245
pi4-60
RPi4B 4Gb
192.168.1.229
pi4-27
RPi5 8Gb
192.168.1.93
pi5-70
RPi3B+ 1Gb
192.168.1.231
pi4-37
Century Link
192.168.14.
1
RPi ZeroW
192.168.1.235
wiifiextender
Century
Link6
192.168.32.
1
sudo route add -net 192.168.42.0 netmask 255.255.255.0 gw 192.168.1.235 eth0
sudo route add -net 192.168.42.0 netmask 255.255.255.0 gw 192.168.1.235 wlan0
RPi4B 4Gb
192.168.42.116
pi4-20
RPi3B+ 1Gb
192.168.42.119
pi4-3
Century Link4
192.168.16.1
Century
Link3
192.168.12.
1

Internet

TMO-G4AR.lan
192.168,12.1

T-Mobile Router

RPi5 8Gb
192.168.12.208
pi5-70

RPi3B+ 1Gb
192.168.1.231
pi4-37

RPi5 8Gb
192.168.12.237
pi5-80

RPi5 8Gb
192.168.12.196
pi5-90

RPi4B 4Gb
192.168.1.212
pi4-50

RPi4B 4Gb
192.168.1.211
pi4-30

RPi4B 4Gb
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pi4-60

192.168.1.229
pi4-27

Century Link
192.168.14.1

RPi4B 4Gb

RPi ZeroW
192.168.1.235
wiifiextender

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Century Link6
192.168.82.1

RPi4B 4Gb
192.168.42.116
pi4-20

RPi3B+ 1Gb
192.168.42.119
pi4-3

Century Link4
192.168.16.1

Century Link3
192.168.12.1

RPi3 1Gb

162.197.186.179
Hbserver IP Pass-Thur

Internet

TMO-G4AR.lan
192.168.12.1

T-Mobile Router

RPi ZeroW

192.168.12.119
pi-zero1

RPi5 8Gb

192.168.12.208
pi5-70

pico2_w
remote3
192.168.12.133

RPi ZeroW

192.168.12.140
wifiextender

RPi5 8Gb

192.168.12.237
pi5-80

pico2_w
remote5
192.168.12.233

RPi5 8Gb

192.168.12.196
pi5-90

pico2_w
remote4
192.168.12.133

RPi4 4Gb

192.168.12.130
HBclient

RPi4 4Gb

192.168.12.234
pi4-50

toshiba

192.168.12.160
ws012

RPi ZeroW

192.168.12.122
pi-zero2

pico_w
remote5
192.168.16.114

RPi4 4Gb

192.168.42.116
pi4-20

pico_w
remote7
192.168.12.120
pico_w
remote8
192.168.12.106
pico_w
remote9
192.168.12.108

RPi3 1Gb

192.168.42.119
pi3-3

RPi3 1Gb

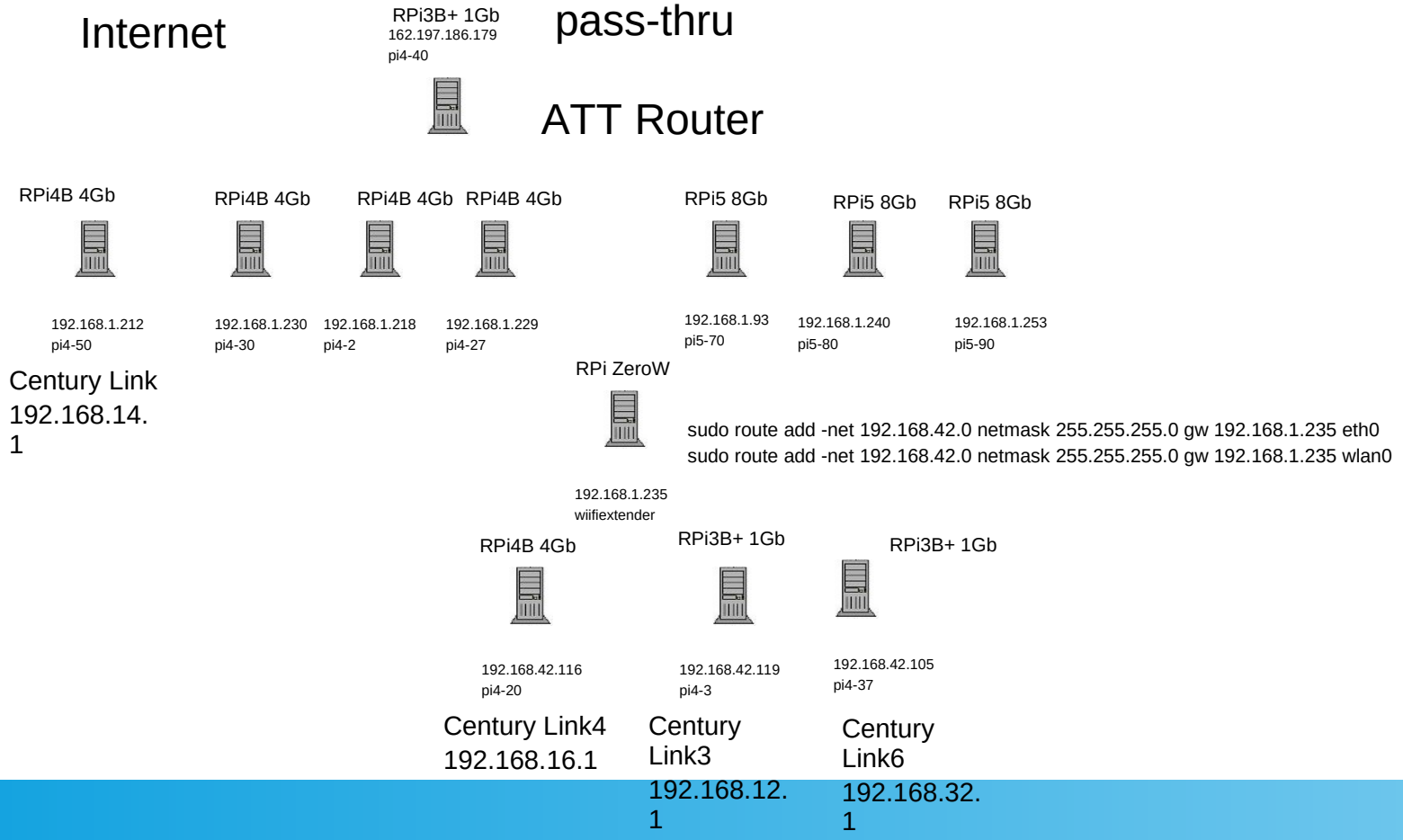
192.168.42.105
pi3-37

pico_w
remote5
192.168.32.106

pi4-37 “SSID” "Century Link6"

pi4-3 “SSID” “Century Link3"

pi4-20 “SSID” “Century Link4"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pi4-2
RPi4B 4Gb
192.168.1.229
pi4-27
RPi5 8Gb
192.168.1.93
pi5-70
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pi4-3
RPi3B+ 1Gb
192.168.42.105
pi4-37
Century Link4
192.168.16.1
Century
Link3
192.168.12.
1
Century
Link6
192.168.32.
1

```
devel@pi5-90:~ $ ./scripts-rpi/route/2nd_level-tmo.sh
Kernel IP routing table
Destination     Gateway         Genmask         Flags Metric Ref    Use Iface
default         TMO-G4AR.lan    0.0.0.0         UG    600    0        0 wlan0
192.168.12.0    0.0.0.0         255.255.255.0   U     600    0        0 wlan0
192.168.42.0    wifiextender.la 255.255.255.0   UG    0      0        0 wlan0
SIOCADDRT: File exists
Kernel IP routing table
Destination     Gateway         Genmask         Flags Metric Ref    Use Iface
default         TMO-G4AR.lan    0.0.0.0         UG    600    0        0 wlan0
192.168.12.0    0.0.0.0         255.255.255.0   U     600    0        0 wlan0
192.168.42.0    wifiextender.la 255.255.255.0   UG    0      0        0 wlan0
devel@pi5-90:~ $ traceroute 192.168.42.116
traceroute to 192.168.42.116 (192.168.42.116), 30 hops max, 60 byte
packets
 1  wifiextender.lan (192.168.12.141)  77.323 ms  77.362 ms  77.354 ms
 2  pi4-20 (192.168.42.116)  77.347 ms  77.405 ms  77.399 ms
```

pi4-50
Pico_w Zone1
remote1 192.168.1.160
remote3 192.168.1.178
remote4 192.168.1.177
remote5 192.168.1.168
remote6 192.168.1.175

pi4-37
Pico_w Zone2
SSID Century Link6
remote5 192.168.32.106

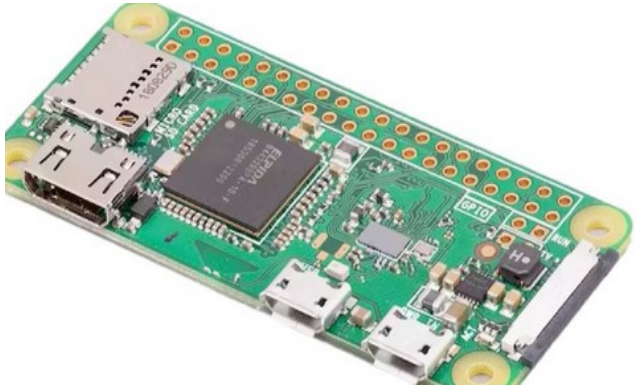
pi4-20
Pico_w Zone3
SSID Century Link4
remote5 192.168.16.114

pi4-3
Pico_w Zone4
SSID Century Link3
remote8 192.168.12.120
remote9 192.168.12.108
remote7 192.168.12.106

Goal: Accessing 1of 5 RPi4B from the Over the Internet with graphical displays

- Run Graphical Application
- Steps Required
- Need to ssh to
- LAN Home RPi3B+ on 162.197.186.xx
- Need to ssh to 1 of 5 RPi4B
-

RPi Models

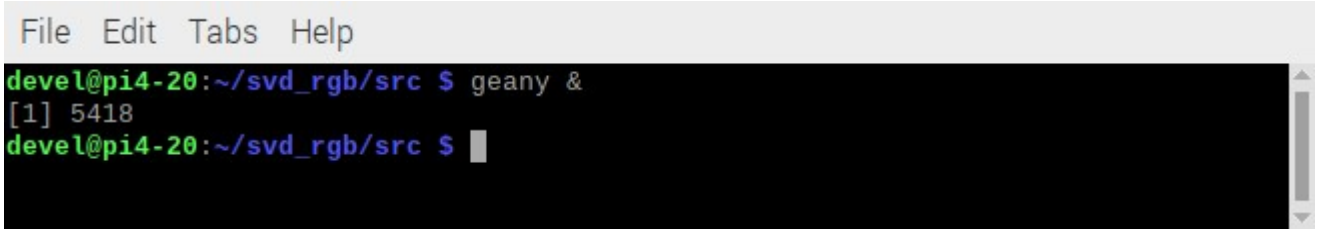


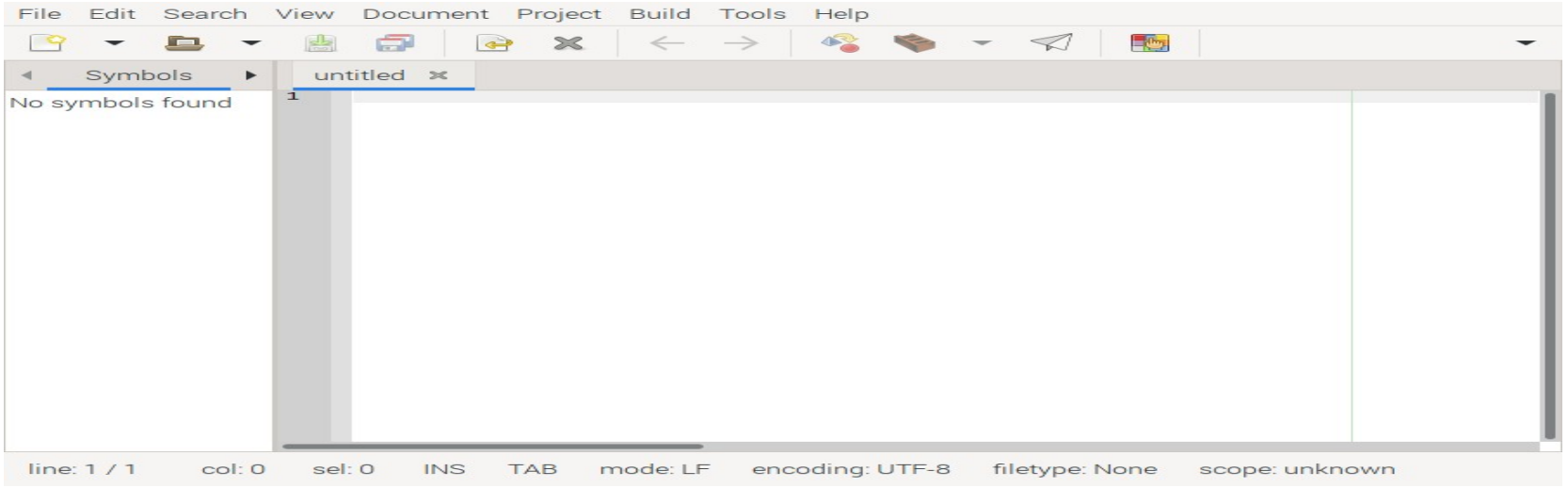
RPi CM4

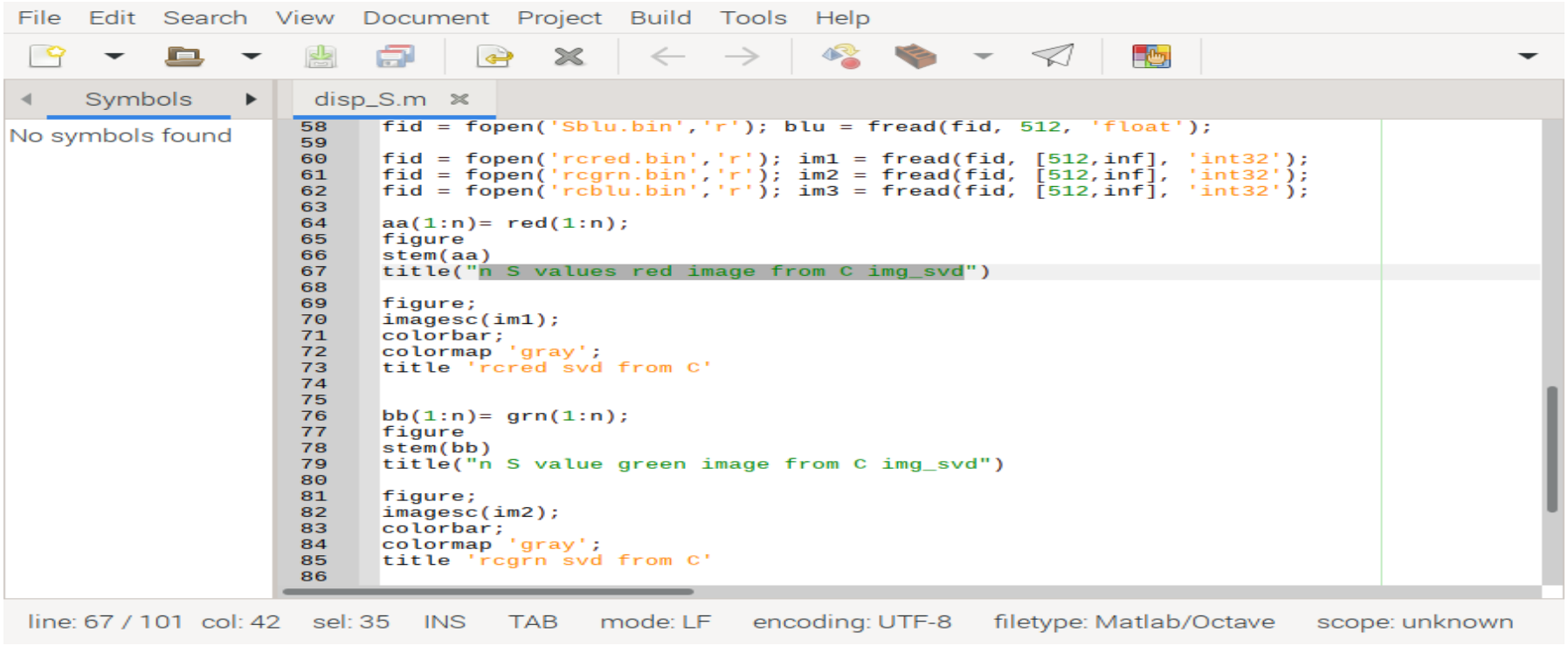
RPi3B+

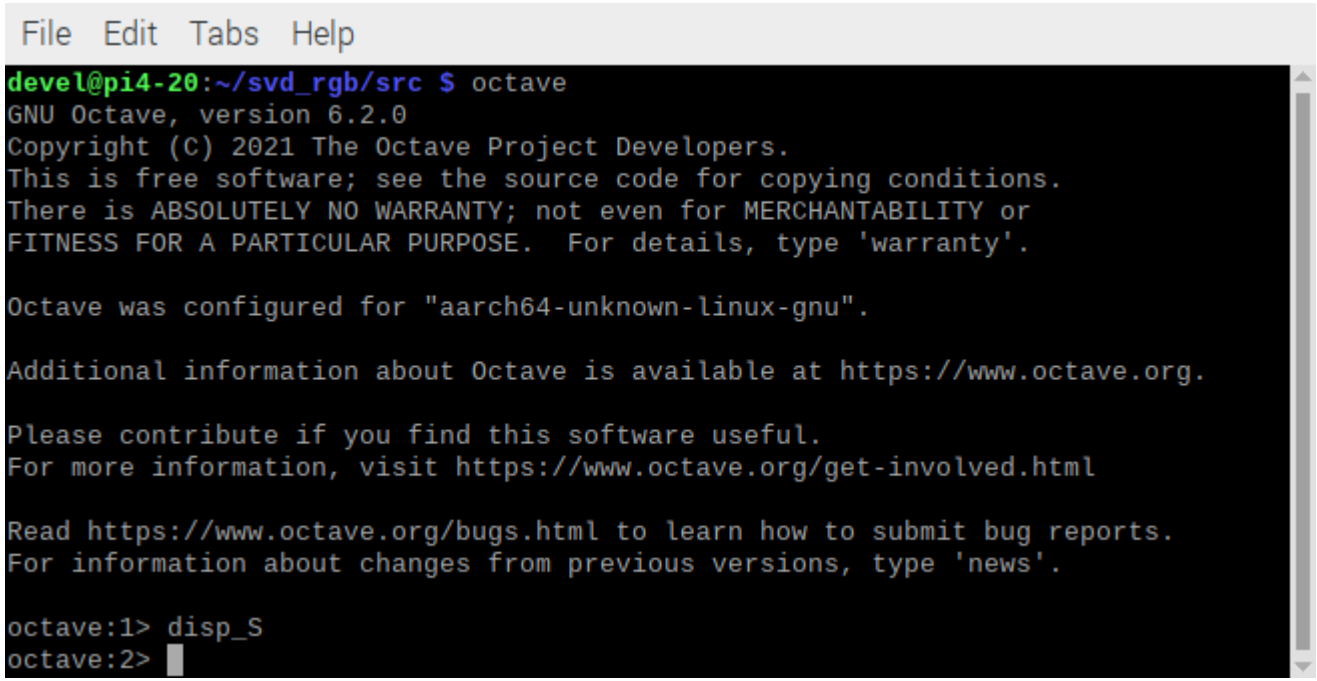
RPi4B

RPi3A

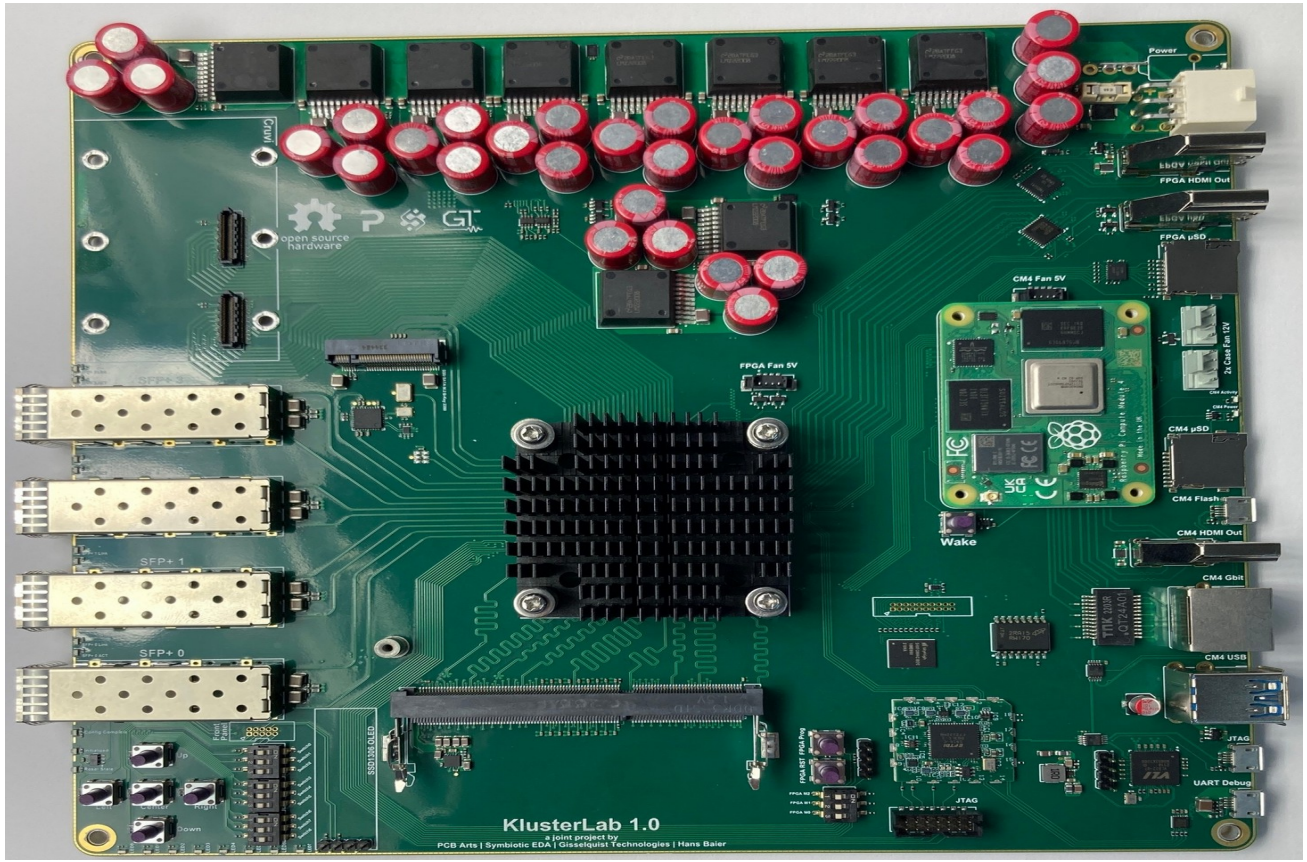

File Edit Tabs Help
devel@pi4-20:~/svd_rgb/src $ geany &
[1] 5418
devel@pi4-20:~/svd_rgb/src $


File Edit Search View Document Project Build Tools Help
Symbols
No symbols found
untitled
1
line: 1 / 1 col: 0 sel: 0 INS TAB mode: LF encoding: UTF-8 filetype: None scope: unknown

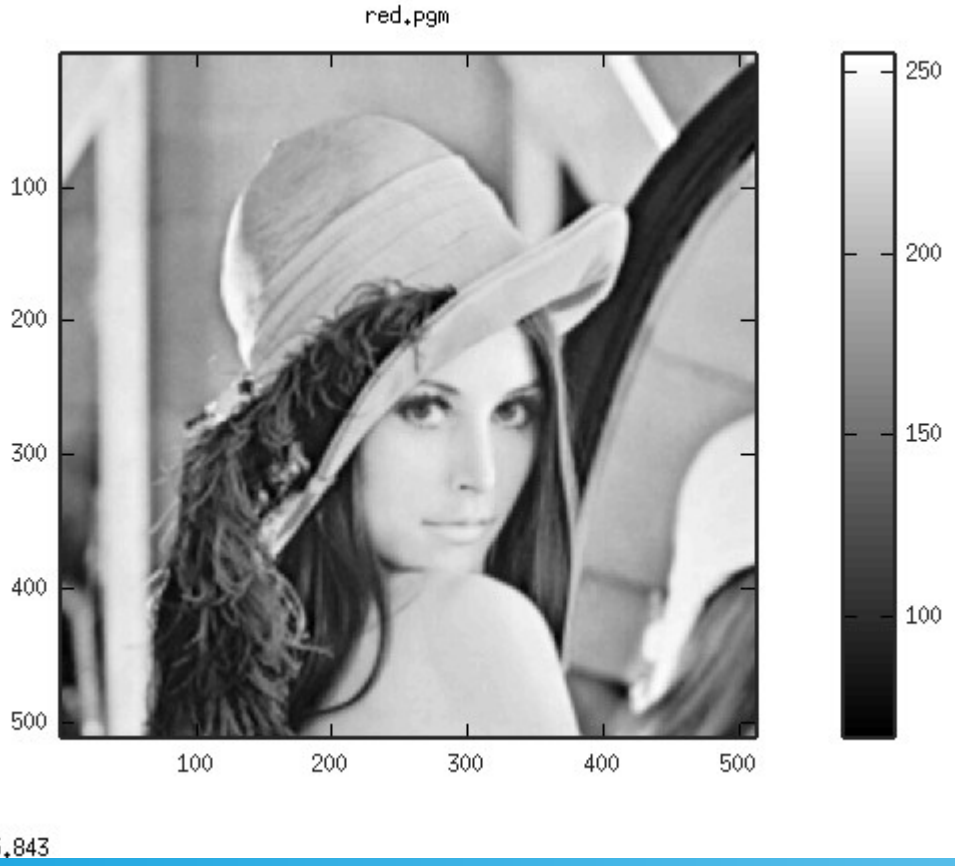

File Edit Search View Document Project Build Tools Help
Symbols
No symbols found
disp_S.m
fid = fopen('Sblu.bin','r'); blu = fread(fid, 512, 'float');
fid = fopen('rcred.bin','r'); im1 = fread(fid, [512,inf], 'int32');
fid = fopen('rcgrn.bin','r'); im2 = fread(fid, [512,inf], 'int32');
fid = fopen('rcblu.bin','r'); im3 = fread(fid, [512,inf], 'int32');
aa(1:n)= red(1:n);
figure
stem(aa)
title("n S values red image from C img_svd")
figure;
imagesc(im1);
colorbar;
colormap 'gray';
title 'rcred svd from C'
bb(1:n)= grn(1:n);
figure
stem(bb)
title("n S value green image from C img_svd")
figure;
imagesc(im2);
colorbar;
colormap 'gray';
title 'rcgrn svd from C'
line: 67 / 101 col: 42 sel: 35 INS TAB mode: LF encoding: UTF-8 filetype: Matlab/Octave scope: unknown


File Edit Tabs Help
devel@pi4-20:~/svd_rgb/src $ octave
GNU Octave, version 6.2.0
Copyright (C) 2021 The Octave Project Developers.
This is free software; see the source code for copying conditions.
There is ABSOLUTELY NO WARRANTY; not even for MERCHANTABILITY or
FITNESS FOR A PARTICULAR PURPOSE. For details, type 'warranty'.
Octave was configured for "aarch64-unknown-linux-gnu".
Additional information about Octave is available at https://www.octave.org.
Please contribute if you find this software useful.
For more information, visit https://www.octave.org/get-involved.html
Read https://www.octave.org/bugs.html to learn how to submit bug reports.
For information about changes from previous versions, type 'news'.
octave:1> disp_S
octave:2>

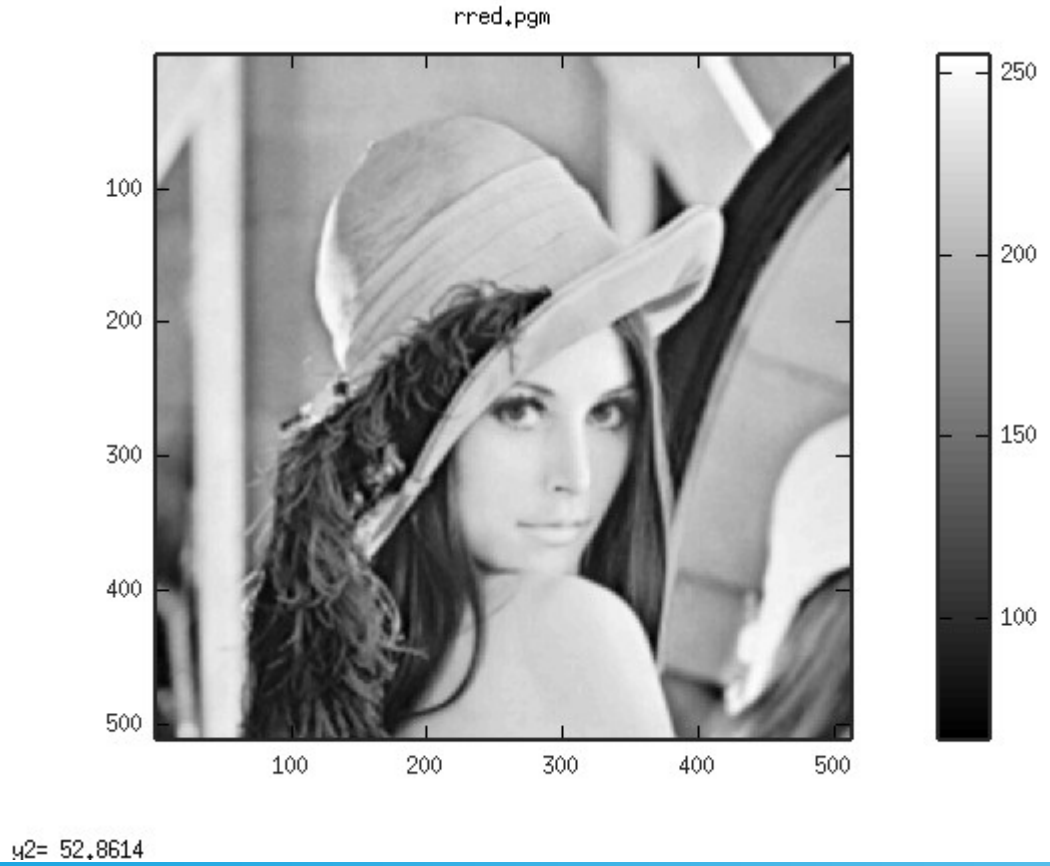
Rpi CM4 with FPGA Kintex-7 160T with 4 Ethernet 10Gb



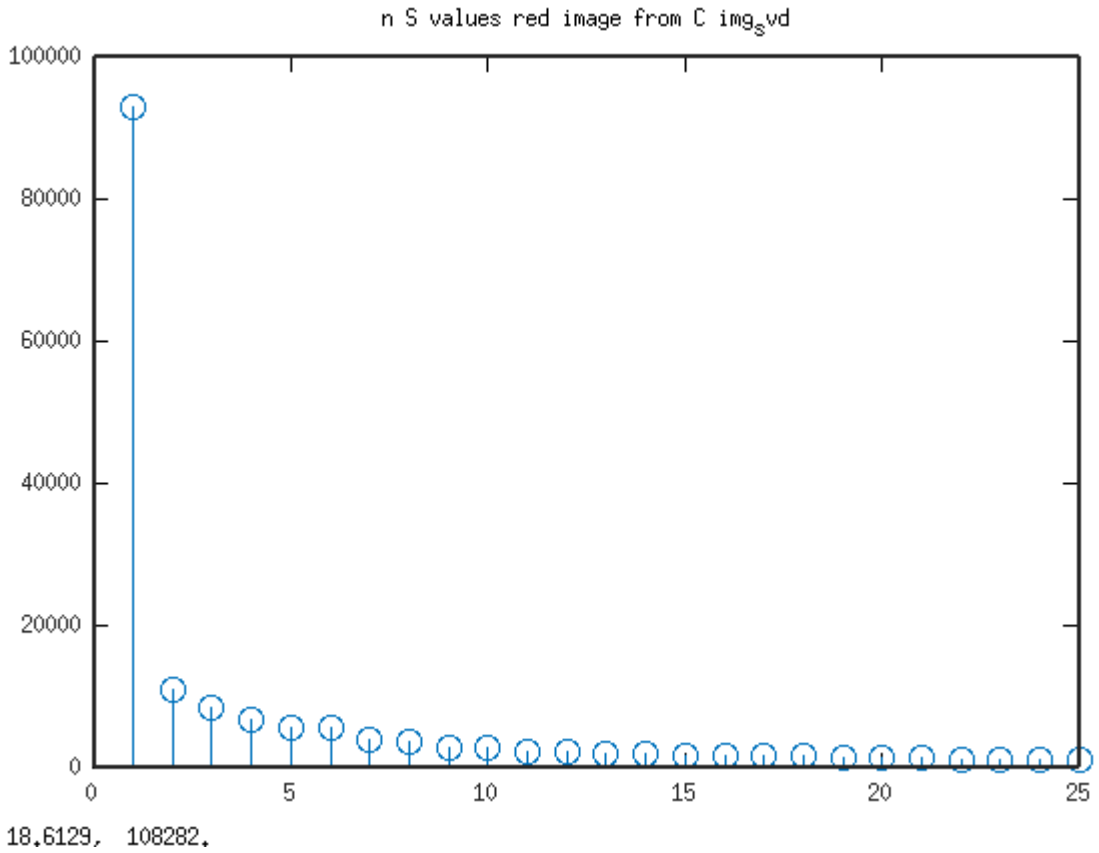
500 x 500 red subband lena



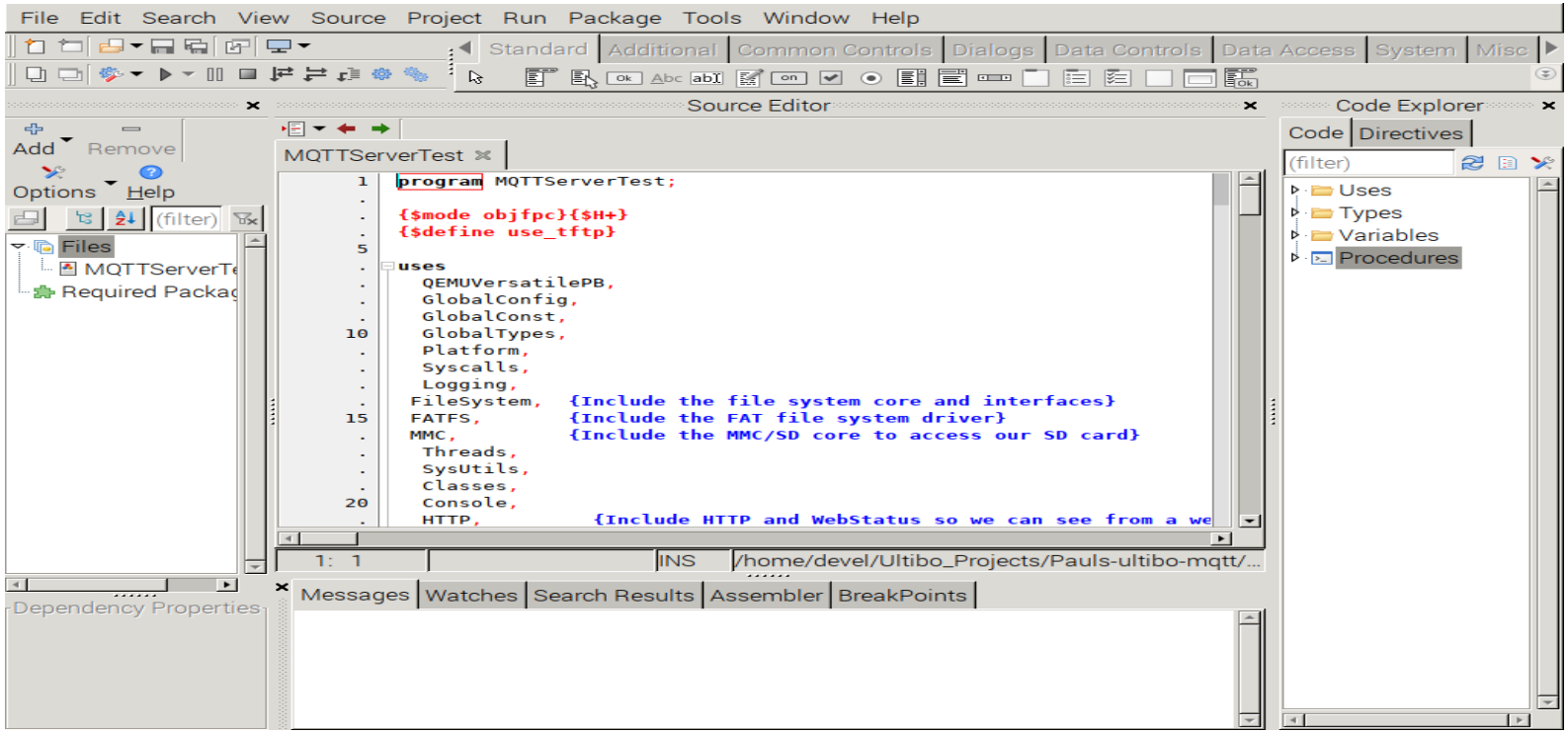
500 x 500 red subband lena reconstructed after perfoming KLT



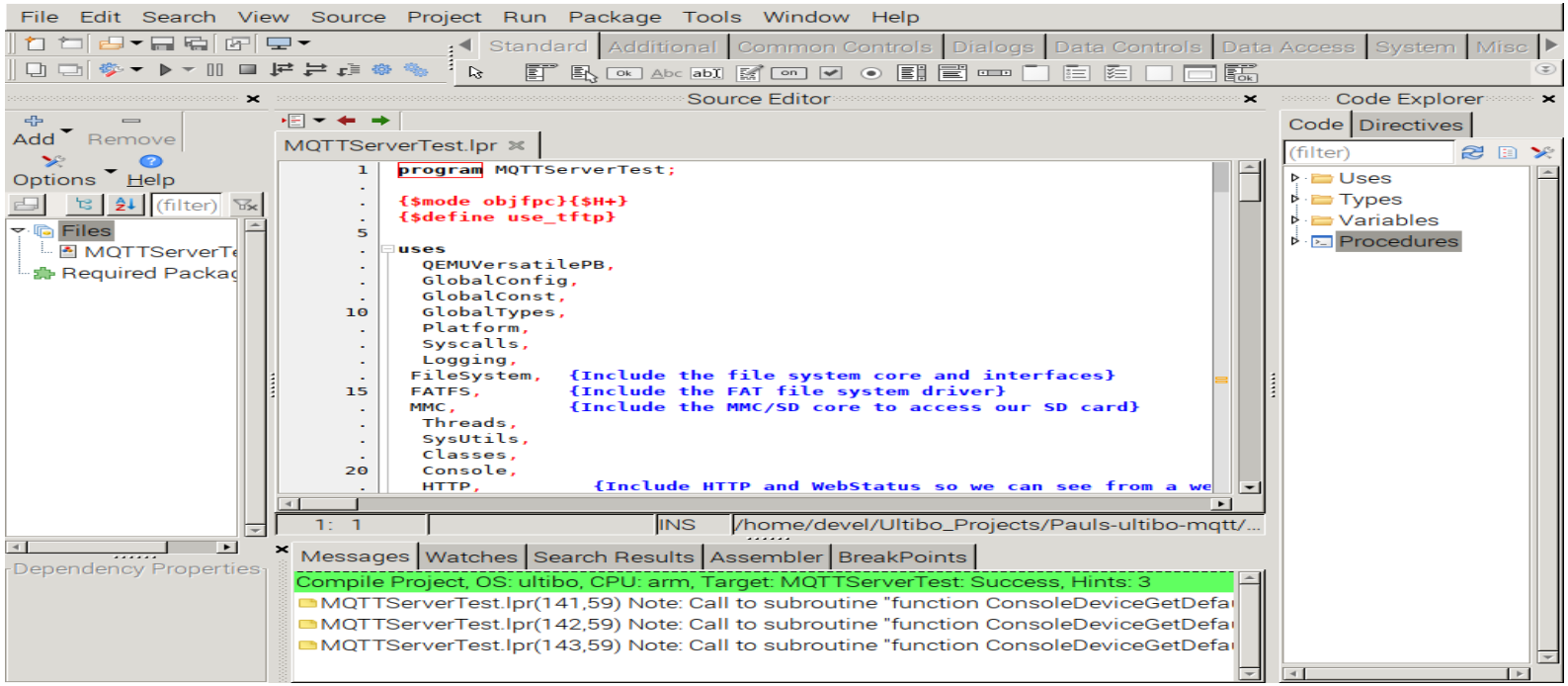
n S values red image from C img_svd



Goal: Accessing 1of 5 RPi4B from the Over the Internet with graphical displays

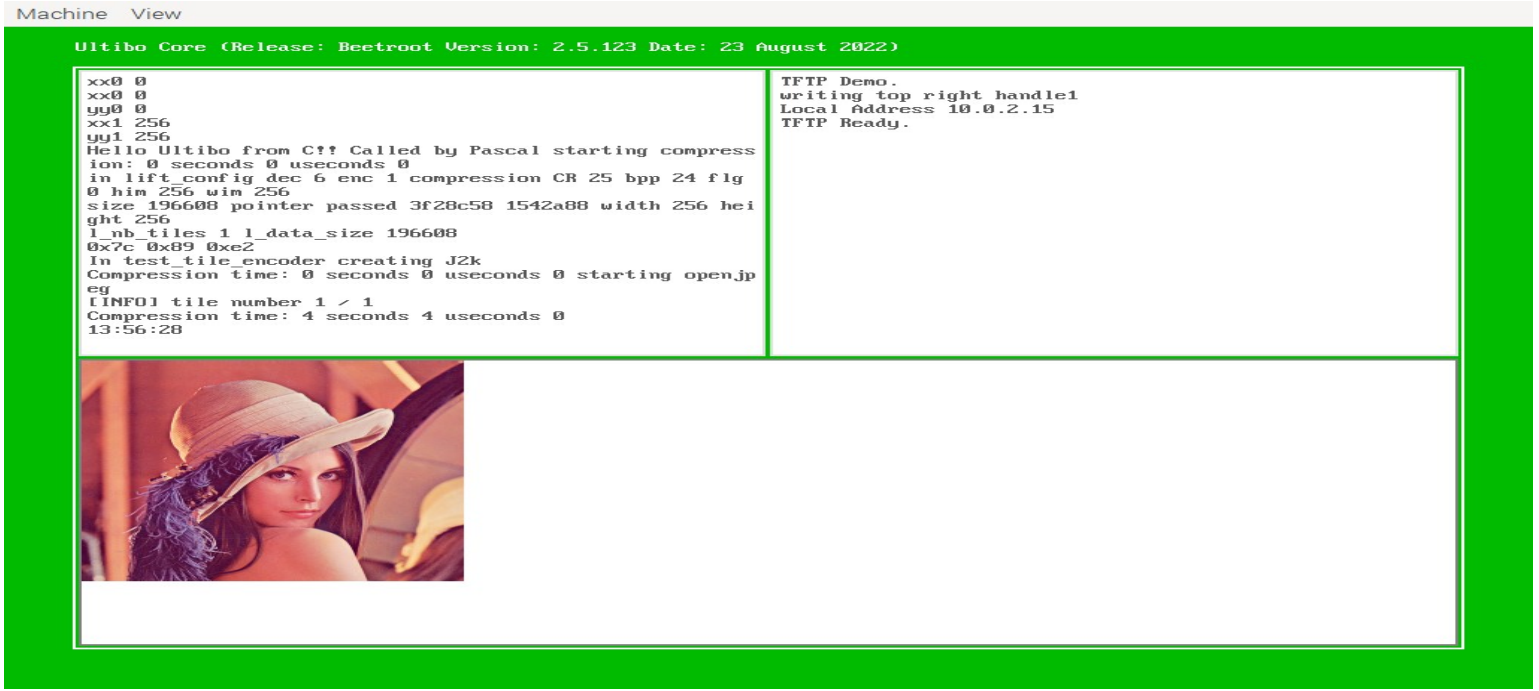


Goal: Accessing 1of 5 RPi4B from the Over the Internet with graphical displays



Goal: Accessing 1of 5 RPi4B from the Over the Internet with graphical displays

devel@pi4-20:~/Ultibo_Projects/jpeg2000/QEMU $ ./startqemu.s



ATT Router