

Lab 7 Writeup

My name: 李易

My Student ID: 191830079

This lab took me about 6 hours to do. I did attend the lab session.

Program Structure and Design of the Router:

这次最后的lab应该是相当友好了...思维量和代码量都不大。主要完成最长前缀匹配和一些简单的逻辑，模拟网络层的路由功能。

在我们的路由表结构中找到最长前缀匹配项，实现复杂度只要求 $O(N)$ ，所以遍历就好。

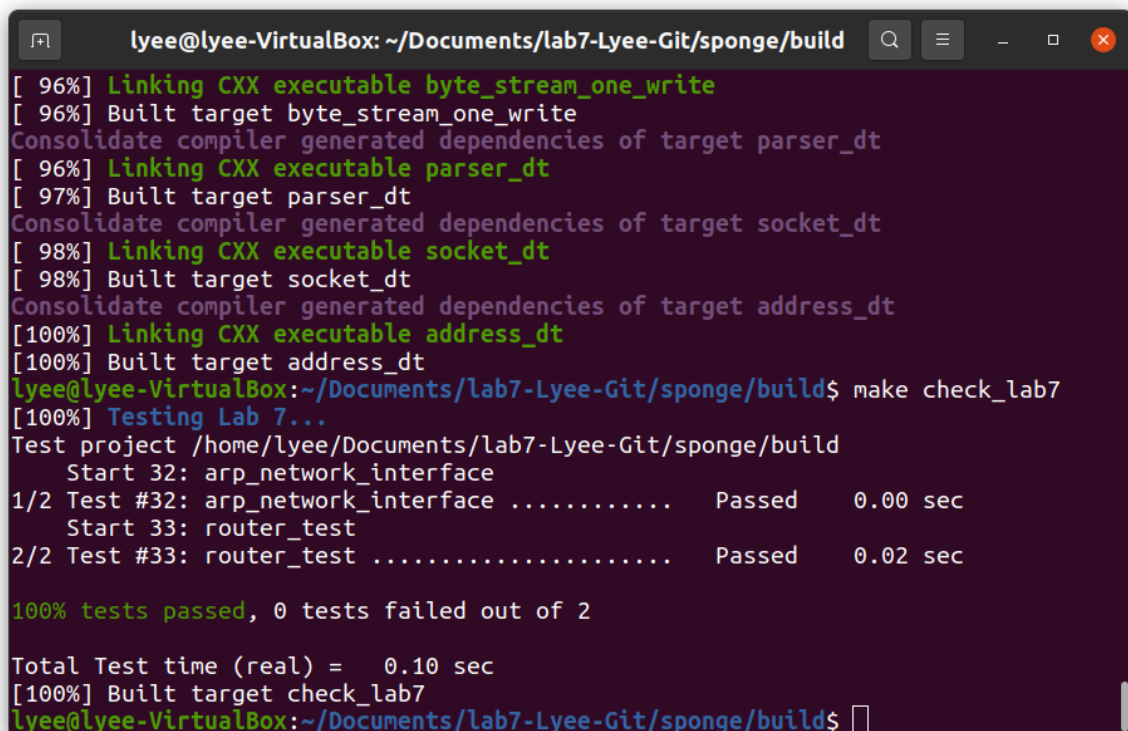
找不到匹配项或者 ttl 减一后小于等于零就返回。否则的话，根据_next_hop变量是否为空来判断是直接将数据包发往数据报中的目的IP还是路径上的下一跳路由。

Implementation Challenges:

唯一比较tricky的地方就只有设计前缀匹配用到的掩码。学过ICS的感觉这个应该还是不难的。

```
uint32_t mask = _routing_table[i]._prefix_length == 0 ? 0 : 0xffffffff << (32 -  
_routing_table[i]._prefix_length);
```

Remaining Bugs:



```
lyee@lyee-VirtualBox: ~/Documents/lab7-Lyee-Git/sponge/build
[ 96%] Linking CXX executable byte_stream_one_write
[ 96%] Built target byte_stream_one_write
Consolidate compiler generated dependencies of target parser_dt
[ 96%] Linking CXX executable parser_dt
[ 97%] Built target parser_dt
Consolidate compiler generated dependencies of target socket_dt
[ 98%] Linking CXX executable socket_dt
[ 98%] Built target socket_dt
Consolidate compiler generated dependencies of target address_dt
[100%] Linking CXX executable address_dt
[100%] Built target address_dt
lyee@lyee-VirtualBox:~/Documents/lab7-Lyee-Git/sponge/build$ make check_lab7
[100%] Testing Lab 7...
Test project /home/lyee/Documents/lab7-Lyee-Git/sponge/build
  Start 32: arp_network_interface
1/2 Test #32: arp_network_interface ..... Passed    0.00 sec
  Start 33: router_test
2/2 Test #33: router_test ..... Passed    0.02 sec

100% tests passed, 0 tests failed out of 2

Total Test time (real) =  0.10 sec
[100%] Built target check_lab7
lyee@lyee-VirtualBox:~/Documents/lab7-Lyee-Git/sponge/build$
```

```
lyee@lyee-VirtualBox: ~/Documents/lab7-Lyee-Git/sponge/build
Start 156: t_isnS_128K_8K_l
156/164 Test #156: t_isnS_128K_8K_l ..... Passed    0.15 sec
Start 157: t_isnS_128K_8K_L
157/164 Test #157: t_isnS_128K_8K_L ..... Passed    0.26 sec
Start 158: t_isnS_128K_8K_LL
158/164 Test #158: t_isnS_128K_8K_LL ..... Passed    0.33 sec
Start 159: t_isnR_128K_8K_l
159/164 Test #159: t_isnR_128K_8K_l ..... Passed    0.59 sec
Start 160: t_isnR_128K_8K_L
160/164 Test #160: t_isnR_128K_8K_L ..... Passed    0.28 sec
Start 161: t_isnR_128K_8K_LL
161/164 Test #161: t_isnR_128K_8K_LL ..... Passed    1.78 sec
Start 162: t_isnD_128K_8K_l
162/164 Test #162: t_isnD_128K_8K_l ..... Passed    0.67 sec
Start 163: t_isnD_128K_8K_L
163/164 Test #163: t_isnD_128K_8K_L ..... Passed    0.29 sec
Start 164: t_isnD_128K_8K_LL
164/164 Test #164: t_isnD_128K_8K_LL ..... Passed    2.00 sec

100% tests passed, 0 tests failed out of 164

Total Test time (real) = 47.33 sec
[100%] Built target check
lyee@lyee-VirtualBox:~/Documents/lab7-Lyee-Git/sponge/build$
```

做到这里lab终于完结撒花了.....通过整个lab下来除了中间几个比较痛苦，其他的还是设计精良，对学生比较友好的。回过来看，把一个比较大的任务量做了很好的拆分。通过阅读Buffer和BufferList等数据结构的实现，也复习到了CPP一些遗漏的知识。