# 计网 Lab0 实验报告

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## 一、 程序结构与设计

**Webget**:首先创建 address 对象与 socket 对象，之后 socket 连接该 address，同时把 socket 视为一个文件描述符，向其中写入字符串来发送请求，然后读出字符串来接收回复，最终关闭 socket

**An in-memory reliable byte stream**：首先在 Bytestream 中设置状态（buffer,累计 push 字节数等），然后实现 Reader 和 Writer 的各种方法。Push 直接把 buffer 与 data 连接并保证 buffer 长度不超过容量即可，Pop 直接删除 buffer 前 len 个字符即可（不足 len 个则删除所有字符），peek 方法直接返回整个 buffer,close 方法设置 closed=1,其余方法都根据要求读取状态即可。

## 二、 实现挑战

本实验实现挑战主要在于 Webget 实现时读懂每个接口的作用，明白作用之后实现并不难。此外还有 byte stream 实现时出现的 AddressSanitizer：DEADLYSIGNAL 错误，该错误在查询 FAQ 之后用 echo 0 | sudo tee /proc/sys/kernel/randomize_va_space 禁止 liunx 地址空间布局随机化 ASLR 之后成功解决。

## 三、 残留的 BUG

```
tongyf@tongyf-virtual-machine:~/Desktop/minnow$ cmake --build build --target check0
Test project /home/tongyf/Desktop/minnow/build
      Start  1: compile with bug-checkers
 1/10 Test  #1: compile with bug-checkers ........   Passed    0.21 sec
      Start  2: t_webget
 2/10 Test  #2: t_webget .........................   Passed    1.13 sec
      Start  3: byte_stream_basics
 3/10 Test  #3: byte_stream_basics ...............   Passed    0.01 sec
      Start  4: byte_stream_capacity
 4/10 Test  #4: byte_stream_capacity .............   Passed    0.02 sec
      Start  5: byte_stream_one_write
 5/10 Test  #5: byte_stream_one_write ............   Passed    0.03 sec
      Start  6: byte_stream_two_writes
 6/10 Test  #6: byte_stream_two_writes ...........   Passed    0.02 sec
      Start  7: byte_stream_many_writes
 7/10 Test  #7: byte_stream_many_writes ..........   Passed    0.15 sec
      Start  8: byte_stream_stress_test
 8/10 Test  #8: byte_stream_stress_test ..........   Passed    0.04 sec
      Start 37: compile with optimization
 9/10 Test #37: compile with optimization ........   Passed    0.11 sec
      Start 38: byte_stream_speed_test
            ByteStream throughput: 0.61 Gbit/s
10/10 Test #38: byte_stream_speed_test ...........   Passed    0.24 sec

100% tests passed, 0 tests failed out of 10

Total Test time (real) =   1.96 sec
Built target check0
```

暂未发现残留的 bug.

## 四、 实验结果

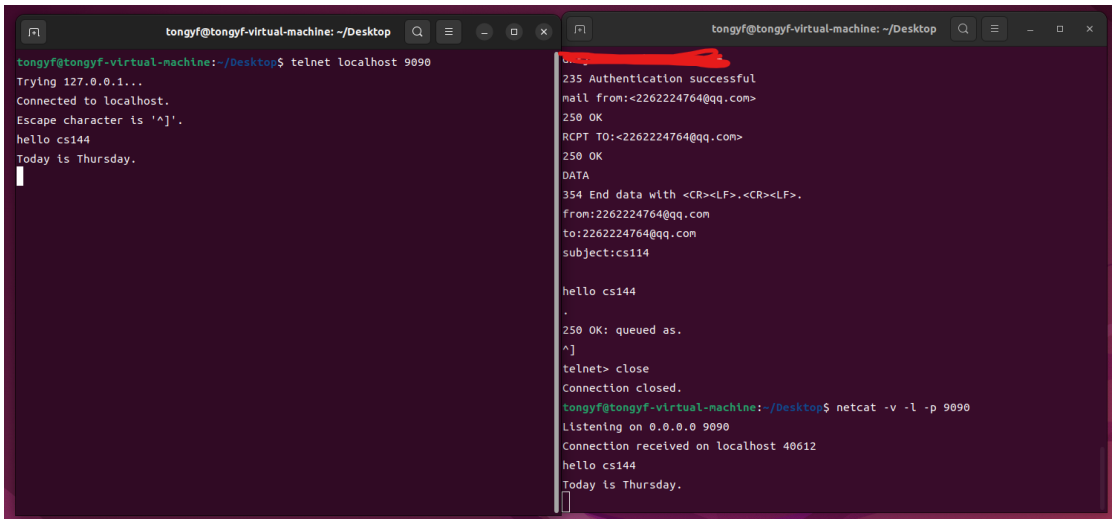
终端抓取网页：

```
tongyf@tongyf-virtual-machine:~/Desktop$ telnet cs144.keithw.org http
Trying 104.196.238.229...
Connected to cs144.keithw.org.
Escape character is '^]'.
GET /hello HTTP/1.1
Host: cs144.keithw.org
Connection: close


HTTP/1.1 200 OK
Date: Thu, 12 Sep 2024 05:59:14 GMT
Server: Apache
Last-Modified: Thu, 13 Dec 2018 15:45:29 GMT
ETag: "e-57ce93446cb64"
Accept-Ranges: bytes
Content-Length: 14
Connection: close
Content-Type: text/plain

Hello, CS144!
Connection closed by foreign host.
```

终端发送 email：

```
tongyf@tongyf-virtual-machine:~/Desktop$  telnet smtp.qq.com smtp
Trying 109.244.198.105...
Connected to smtp.qq.com.
Escape character is '^]'.
220 newxmesmtplogicsvrsza10-0.qq.com XMail Esmtp QQ Mail Server.
HELO qq.com
250-newxmesmtplogicsvrsza10-0.qq.com-11.137.201.48-48962882
250-SIZE 73400320
250 OK
auth login
334 VXNlcm5hbWU6
[redacted]
334 UGFzc3dvcmQ6
[redacted]
235 Authentication successful
mail from:<2262224764@qq.com>
250 OK
RCPT TO:<2262224764@qq.com>
250 OK
DATA
354 End data with <CR><LF>.<CR><LF>.
from:2262224764@qq.com
to:2262224764@qq.com
subject:cs114

hello cs144
.
250 OK: queued as.
^]
telnet> close
Connection closed.
tongyf@tongyf-virtual-machine:~/Desktop$
```

终端中监听和连接:




Webget:

```
tongyf@tongyf-virtual-machine:~/Desktop/minnow$ cmake --build build --target check_webget
Test project /home/tongyf/Desktop/minnow/build
    Start 1: compile with bug-checkers
1/2 Test #1: compile with bug-checkers ........   Passed    0.20 sec
    Start 2: t_webget
2/2 Test #2: t_webget .........................   Passed    1.12 sec

100% tests passed, 0 tests failed out of 2

Total Test time (real) =   1.32 sec
Built target check_webget
```

Byte stream:

```
tongyf@tongyf-virtual-machine:~/Desktop/minnow$ cmake --build build --target check0
Test project /home/tongyf/Desktop/minnow/build
      Start  1: compile with bug-checkers
 1/10 Test  #1: compile with bug-checkers ........   Passed    0.18 sec
      Start  2: t_webget
 2/10 Test  #2: t_webget .........................   Passed    1.07 sec
      Start  3: byte_stream_basics
 3/10 Test  #3: byte_stream_basics ...............   Passed    0.01 sec
      Start  4: byte_stream_capacity
 4/10 Test  #4: byte_stream_capacity .............   Passed    0.02 sec
      Start  5: byte_stream_one_write
 5/10 Test  #5: byte_stream_one_write ............   Passed    0.02 sec
      Start  6: byte_stream_two_writes
 6/10 Test  #6: byte_stream_two_writes ...........   Passed    0.02 sec
      Start  7: byte_stream_many_writes
 7/10 Test  #7: byte_stream_many_writes ..........   Passed    0.13 sec
      Start  8: byte_stream_stress_test
 8/10 Test  #8: byte_stream_stress_test ..........   Passed    0.02 sec
      Start 37: compile with optimization
 9/10 Test #37: compile with optimization ........   Passed    0.10 sec
      Start 38: byte_stream_speed_test
            ByteStream throughput: 0.63 Gbit/s
10/10 Test #38: byte_stream_speed_test ...........   Passed    0.23 sec

100% tests passed, 0 tests failed out of 10

Total Test time (real) =   1.82 sec
Built target check0
```