Lab0 实验报告

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一　Program Structure and Design

For the webget program, I use the following structure:

```cpp
void get_URL( const string& host, const string& path )
{
  TCPSocket socket;
  socket.connect( Address( host, "http" ) );
  string request = "GET " + path + " HTTP/1.1\r\nHost: " + host + "\r\nConnection
      : close\r\n\r\n";
  socket.write( request );
  socket.shutdown( SHUT_WR );
  while ( !socket.eof() ) {
    string response;
    socket.read( response );
    cout << response;
  }
  socket.close();
}
```

And for the bytestream program, I just use deque to store the bytes and use the following structure:

```cpp
protected:
  uint64_t capacity_;
  std::deque<char> buffer_;//注意deque分块存储可能导致转换string_view时出现地址越界
  bool error_ {};
  uint64_t write_cnt_ { 0 }; // Position to write in the buffer
  uint64_t read_cnt_ { 0 }; // Position to read from the buffer
  bool input_closed_ { false };
  bool read_closed_ { false };
```

二 Experimental Results

图 1: using telnet

```
250-SIZE 73400320
250 OK
auth login
334 VXNlcm5hbWU6
MjMxMzg3NjQ1Nw==
334 UGFzc3dvcmQ6
Z21scnB1bWxxqZ3V1ZGlhYw==
235 Authentication successful
mail from:<2313876457@qq.com>
250 OK
RCPT TO:<2313876457@qq.com>
250 OK
DATA
354 End data with <CR><LF>.<CR><LF>.
from:2313876457@qq.com
to:2313876457@qq.com
subject: lab0 test telnet and smtp
this is my first email by using telnet and smtp!.
.
250 OK: queued as.
```

图 2: qq email by smtp

```
kenaz@Kenaz:~$ netcat -v -l -p 9090
Listening on Kenaz 9090
Connection received on localhost 60458
gelosd
Hello, Computer Network!
◊◊◊◊
▯
```

图 3: server program

```
kenaz@Kenaz:~$ telnet localhost 9090
Trying 127.0.0.1...
Connected to localhost.
Escape character is '^]'.
gelosd
Hello, Computer Network!
^C
▮
```

图 4: client program

3

```
kenaz@Kenaz:~/minnow$ cmake --build build --target check_webget
Test project /home/kenaz/minnow/build
    Start 1: compile with bug-checkers
1/2 Test #1: compile with bug-checkers ........   Passed    1.02 sec
    Start 2: t_webget
2/2 Test #2: t_webget ........................   Passed    1.67 sec

100% tests passed, 0 tests failed out of 2

Total Test time (real) =    2.70 sec
Built target check_webget
```

图 5: webget program test

```
kenaz@Kenaz:~/minnow$ cmake --build build --target check0
Test project /home/kenaz/minnow/build
     Start  1: compile with bug-checkers
 1/10 Test  #1: compile with bug-checkers ........   Passed    0.14 sec
     Start  2: t_webget
 2/10 Test  #2: t_webget ........................   Passed    1.09 sec
     Start  3: byte_stream_basics
 3/10 Test  #3: byte_stream_basics ...............   Passed    0.02 sec
     Start  4: byte_stream_capacity
 4/10 Test  #4: byte_stream_capacity .............   Passed    0.01 sec
     Start  5: byte_stream_one_write
 5/10 Test  #5: byte_stream_one_write ............   Passed    0.01 sec
     Start  6: byte_stream_two_writes
 6/10 Test  #6: byte_stream_two_writes ...........   Passed    0.01 sec
     Start  7: byte_stream_many_writes
 7/10 Test  #7: byte_stream_many_writes ..........   Passed    0.05 sec
     Start  8: byte_stream_stress_test
 8/10 Test  #8: byte_stream_stress_test ..........   Passed    0.30 sec
     Start 37: compile with optimization
 9/10 Test #37: compile with optimization ........   Passed    0.08 sec
     Start 38: byte_stream_speed_test
         ByteStream throughput: 0.64 Gbit/s
10/10 Test #38: byte_stream_speed_test ...........   Passed    0.19 sec

100% tests passed, 0 tests failed out of 10
```

图 6: bytestream program test

三　Challenge

Since I was using deque, which is a block storage, to store the bytes, when I convert the deque to string_view, I may get the address out of range. So I have to peek the byte one by one to avoid this problem.(maybe later I'll change the storage to vector)