

TCP Client/Server Example

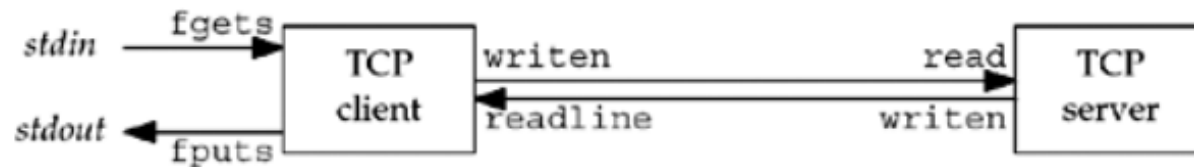
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Intro

- write a complete TCP client/server example:
 1. The client reads a line of text from its standard input and writes the line to the server.
 2. The server reads the line from its network input and echoes the line back to the client.
 3. The client reads the echoed line and prints it on its standard output.



TCP Echo Server: main Function

tcpdiserv/tcpserv01.c

```
1  #include      "unp.h"

2  int
3  main(int argc, char **argv)
4  {
5      int      listenfd, connfd;
6      pid_t    childpid;
7      socklen_t clilen;
8      struct sockaddr_in cliaddr, servaddr;

9      listenfd = Socket (AF_INET, SOCK_STREAM, 0);

10     bzero(&servaddr, sizeof(servaddr));
11     servaddr.sin_family = AF_INET;
12     servaddr.sin_addr.s_addr = htonl (INADDR_ANY);
13     servaddr.sin_port = htons (SERV_PORT);

14     Bind(listenfd, (SA *) &servaddr, sizeof(servaddr));

15     Listen(listenfd, LISTENQ);

16     for ( ; ; ) {
17         clilen = sizeof(cliaddr);
18         connfd = Accept(listenfd, (SA *) &cliaddr, &clilen);

19         if ( (childpid = Fork()) == 0) { /* child process */
20             Close(listenfd); /* close listening socket */
21             str_echo(connfd); /* process the request */
22             exit (0);
23         }
24         Close(connfd); /* parent closes connected socket */
25     }
26 }
```

TCP Echo Server: str_echo Function

lib/str_echo.c

```
1 #include      "unp.h"

2 void
3 str_echo(int sockfd)
4 {
5     ssize_t n;
6     char    buf[MAXLINE];

7     again:
8     while ( (n = read(sockfd, buf, MAXLINE)) > 0)
9         Writen(sockfd, buf, n);

10    if (n < 0 && errno == EINTR)
11        goto again;
12    else if (n < 0)
13        err_sys("str_echo: read error");
14 }
```

TCP Echo Client: main Function

tcpcliserv/tcpli01.c

```
1  #include      "unp.h"

2  int
3  main(int argc, char **argv)
4  {
5      int      sockfd;
6      struct sockaddr_in servaddr;

7      if (argc != 2)
8          err_quit("usage: tcpcli <IPaddress>");

9      sockfd = Socket(AF_INET, SOCK_STREAM, 0);

10     bzero(&servaddr, sizeof(servaddr));
11     servaddr.sin_family = AF_INET;
12     servaddr.sin_port = htons(SERV_PORT);
13     Inet_pton(AF_INET, argv[1], &servaddr.sin_addr);

14     Connect(sockfd, (SA *) &servaddr, sizeof(servaddr));

15     str_cli(stdin, sockfd);      /* do it all */

16     exit(0);
17 }
```

TCP Echo Client: str_cli Function

lib/str_cli.c

```
1  #include      "unp.h"

2  void
3  str_cli(FILE *fp, int sockfd)
4  {
5      char      sendline[MAXLINE], recvline[MAXLINE];

6      while (Fgets(sendline, MAXLINE, fp) != NULL) {

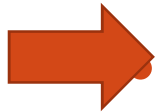
7          Writen(sockfd, sendline, strlen (sendline));

8          if (Readline(sockfd, recvline, MAXLINE) == 0)
9              err_quit("str_cli: server terminated prematurely");

10         Fputs(recvline, stdout);
11     }
12 }
```

Issues

- Issues: the client host crashes, the client process crashes, network connectivity is lost, and so on.



It's time for some practical works