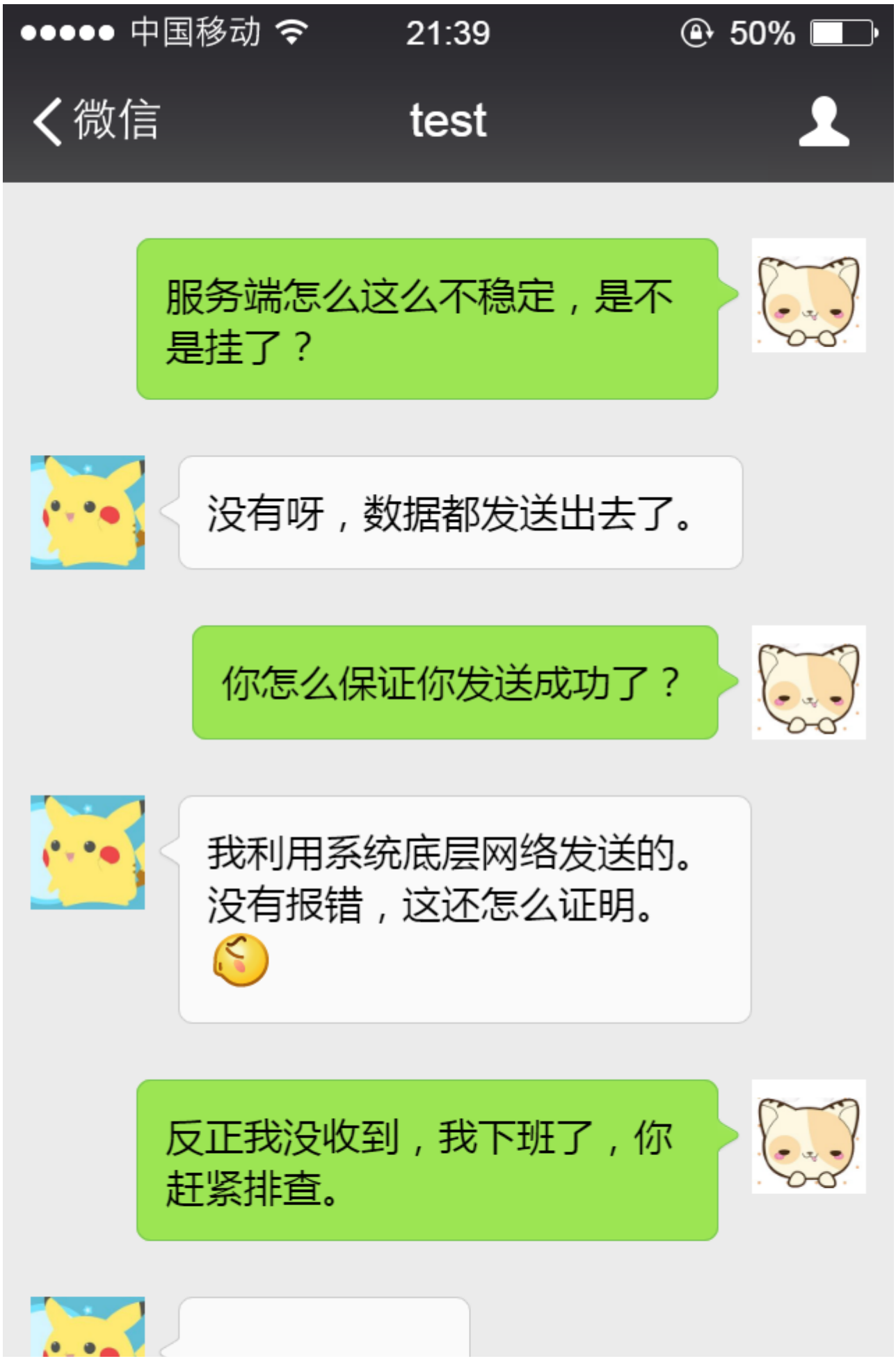
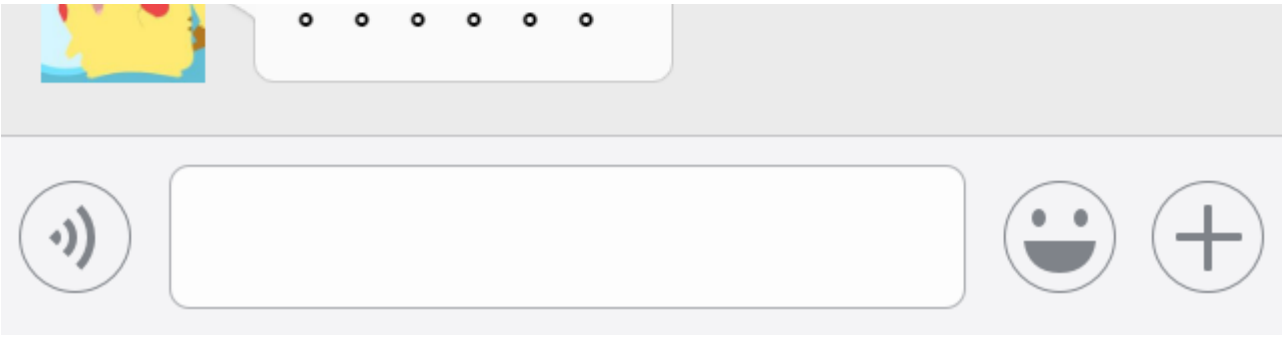
第二节：tcpdump

小对话

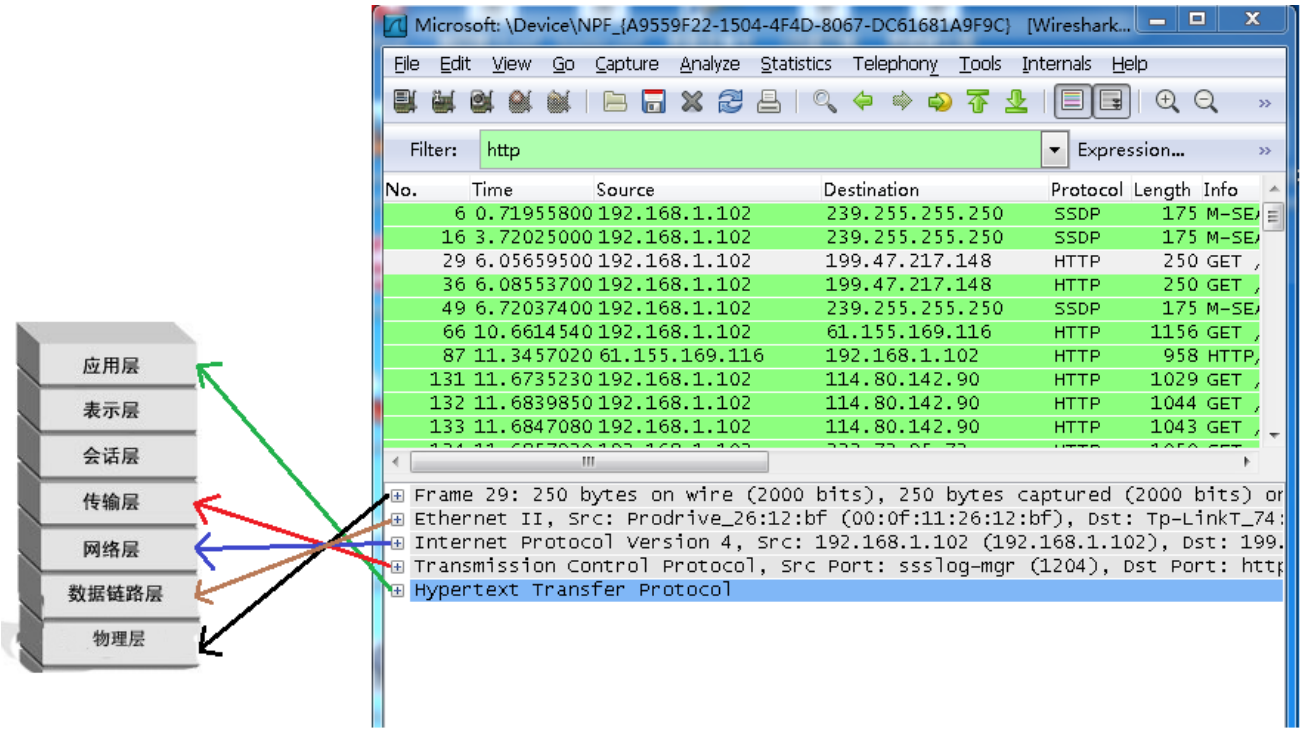

中国移动
21:39
50%
微信
test
服务端怎么这么不稳定，是不是挂了？
没有呀，数据都发送出去了。
你怎么保证你发送成功了？
我利用系统底层网络发送的。没有报错，这还怎么证明。
反正我没收到，我下班了，你赶紧排查。



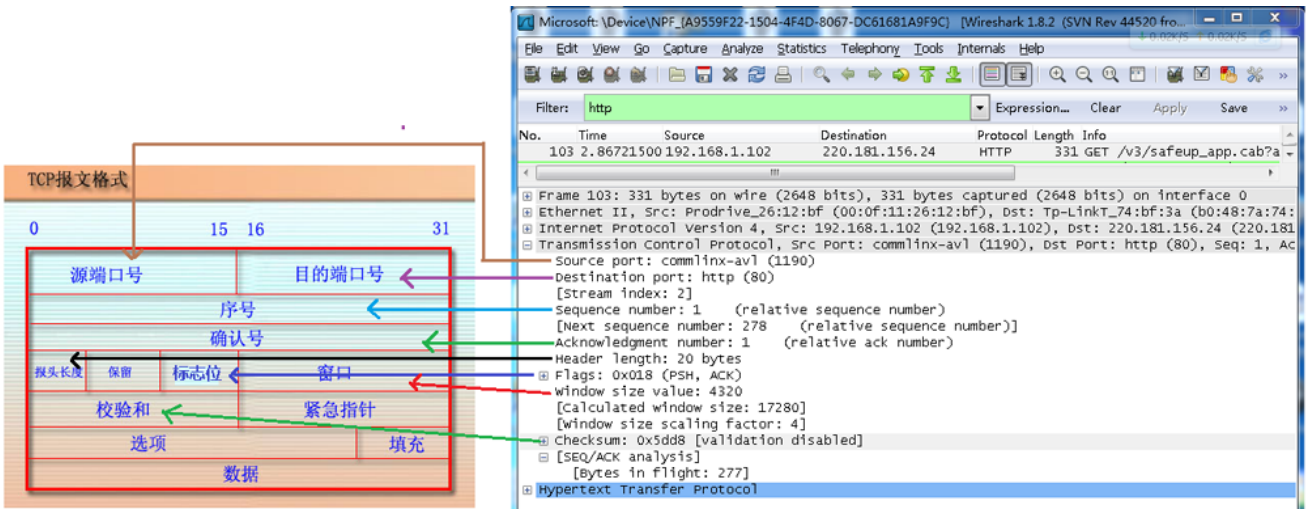
tcpdump 就是证据

tcpdump - dump traffic on a network

```
tcpdump -i eth0 '(tcp port 80)' -v  -w dump.pcap （服务器nginx 模拟一次请求）
sz dump.pcap
```



> 网络层负责ip数据报的产生以及ip数据包在逻辑网络上的路由转发(选择哪个路径)
>
> 传输层提供端到端通信服务层次,提供可靠及非可靠连接（保证路径上传输可靠 tcp ）

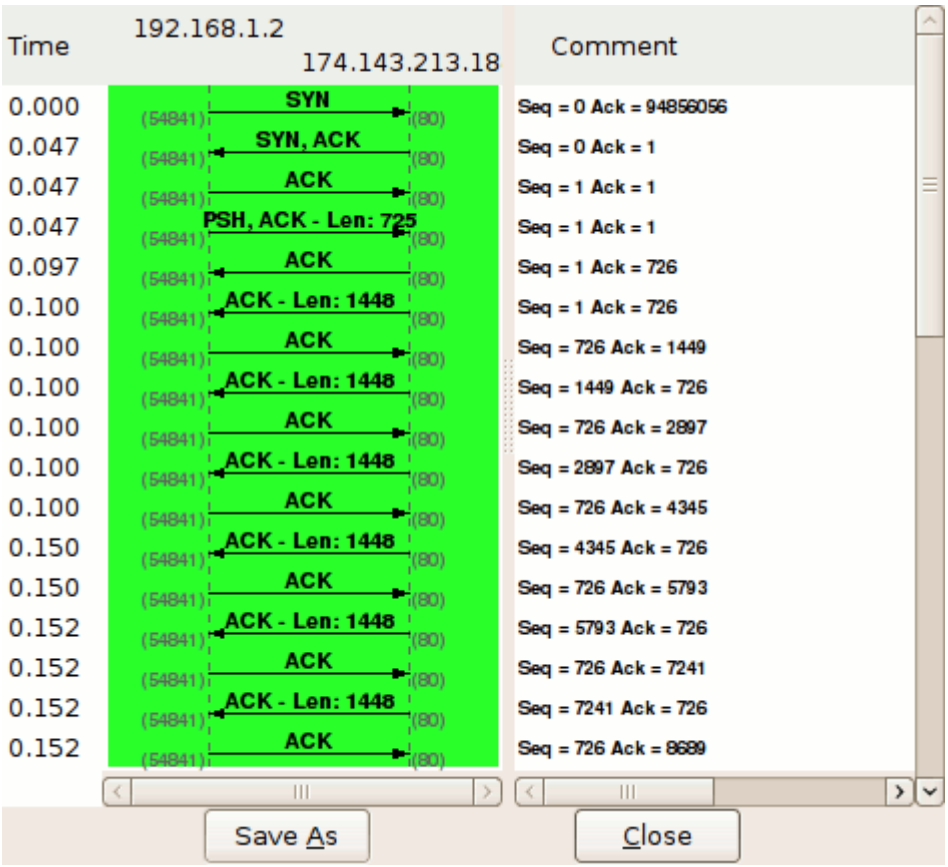


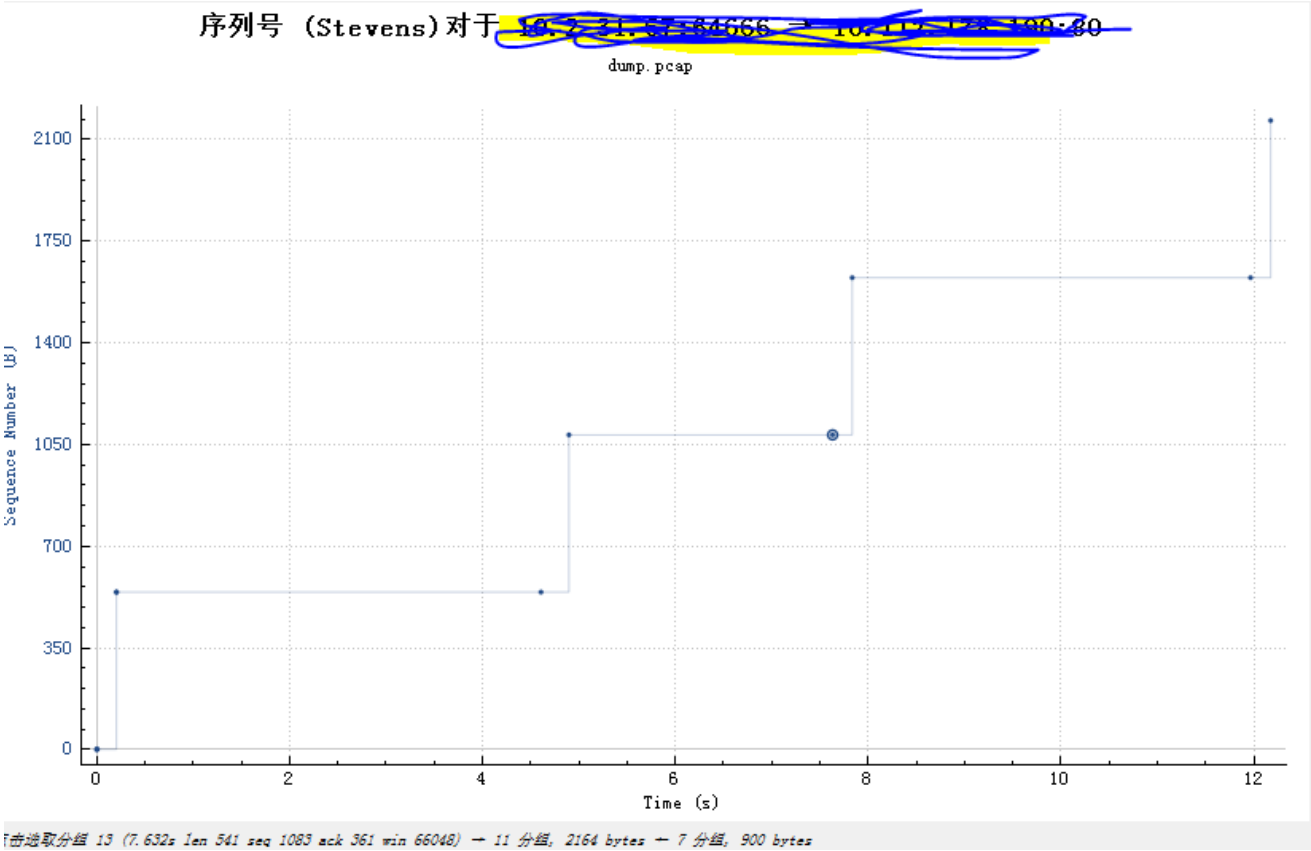
- TCP序列号（Sequence Number）和确认号（Acknowledgment Number）

> Next sequence number:=Sequence number+len(data) Sequence number=Next sequence number
> Acknowledgment number: Sequence number

为了更好的理解在整个TCP会话期间，TCP序列号和确认号是如何工作的，我们可以使用Wireshark内置的绘制流功能，选择菜单栏中的 **Statistics** ->**Flow Graph...**->**TCP flow** ->**OK**

- 这个是老版本的





- 数据传输

```
[TCP Segment Len: 541]
Sequence number: 542    (relative sequence number)
[Next sequence number: 1083    (relative sequence number)]
Acknowledgment number: 181    (relative ack number)
Sequence number: 181    (relative sequence number)
[Next sequence number: 361    (relative sequence number)]
Acknowledgment number: 1083    (relative ack number)
```

> 看序列号完整行

- 连接

	Time	Delta	Source	Destination	Length	Protocol	Info
24	5.069188	0.000000	10.0.0.145	157.166.238.17	66	TCP	54433 → 80 [SYN] Seq=0 Win=8192 Len=0 MSS=1460 WS
27	5.143961	0.074773	157.166.238.17	10.0.0.145	66	TCP	80 → 54433 [SYN, ACK] Seq=0 Ack=1 Win=4380 Len=0
28	5.144071	0.000110	10.0.0.145	157.166.238.17	54	TCP	54433 → 80 [ACK] Seq=1 Ack=1 Win=17520 Len=0
29	5.144274	0.000203	10.0.0.145	157.166.238.17	1032	HTTP	GET / HTTP/1.1

> 三次握手

- 释放

> 四次握手

参考

1. https://danielmiessler.com/study/tcpdump/
2. Understanding TCP Sequence and Acknowledgment Numberss
3. https://www.youtube.com/watch?v=AX2D_n1yZko
4. How TCP Works - The Handshake https://www.youtube.com/watch?v=HCHFX5O1IaQ
5. https://blog.csdn.net/a19881029/article/details/38091243

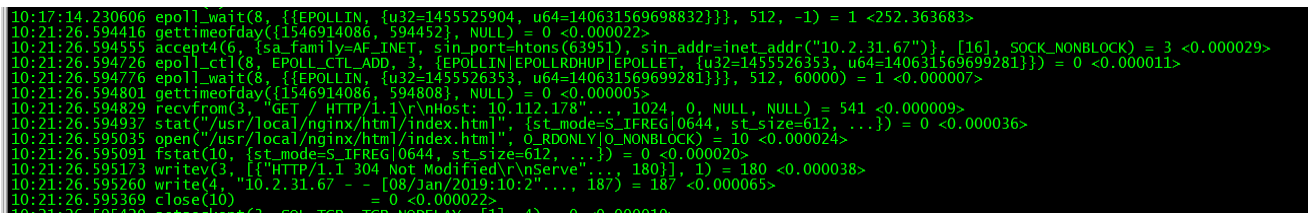
----------【未完待续 这是最基本的使用】----------

扩展阅读

strace - trace system calls and signals

```
strace -o output.txt -T -tt -e trace=all -p 6107(nginx)
```

```
[10:16:34.228468 -tt 在输出中的每一行前加上时间信息,微秒级]
[writev(3, [{"HTTP/1.1 304 Not Modified\r\nServe"..., 180}], 1) = 180 -e trace=all
只跟踪指定的系统 调用.例如:-e trace=open,close,rean,write表示只跟踪这四个系统调用.
默认的为set=all.
-e trace=file
只跟踪有关文件操作的系统调用.
-e trace=process
只跟踪有关进程控制的系统调用.
-e trace=network
跟踪与网络有关的所有系统调用.
-e strace=signal
跟踪所有与系统信号有关的 系统调用]
[ <0.000041> -T 显示每一调用所耗的时间. ]
```



Fiddler