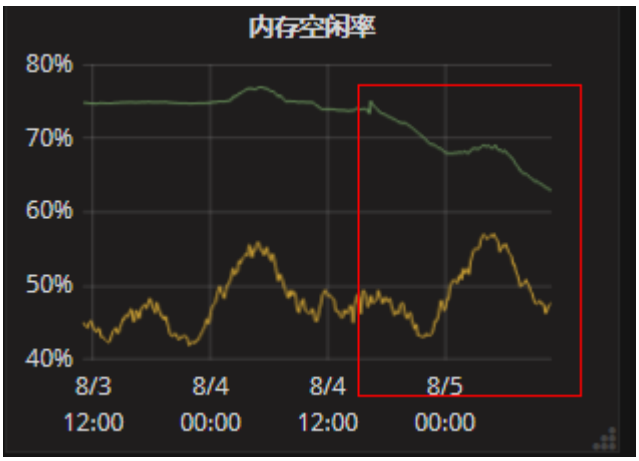
问题说明：



8.4 16:21 更新了服务后，绿线一直往下走，内存使用率增加

更新内容：

增加牌局数据向活动中心上报（udp）

使用top查看该服务进程使用内存情况，也还算正常，如下图：

```
 4158 appuser   20   0  971372 175840   3084 S   2.9  0.5   1861:51 push
 4080 appuser   20   0 1167724 175068   3124 S   3.8  0.5   1862:41 push
 4119 appuser   20   0 1036908 174364   3112 S   2.9  0.5   1861:51 push
21162 appuser   20   0 1095476 172152   4180 S   2.9  0.5   1481:45 gateway
 6569 appuser   20   0 1019872 159396   7332 S   0.0  0.5   3:29.61 datasource
 6356 appuser   20   0 1216480 158500   7344 S   0.5  0.5   3:27.39 datasource
 6394 appuser   20   0 1085408 157848   7460 S   0.0  0.5   3:29.79 datasource
 6434 appuser   20   0 1159140 156732   7436 S   0.0  0.5   3:28.24 datasource
 6320 appuser   20   0 1216480 156640   7452 S   0.5  0.5   3:27.74 datasource
 7146 appuser   20   0 1085408 156232   7352 S   1.0  0.5   3:24.60 datasource
16343 appuser   20   0 1339792 147876   3720 S   2.4  0.5   1441:40 status
16381 appuser   20   0 1396620 144752   3476 S   2.9  0.4   1426:49 status
```

但是总内存使用从5.9G --> 10G

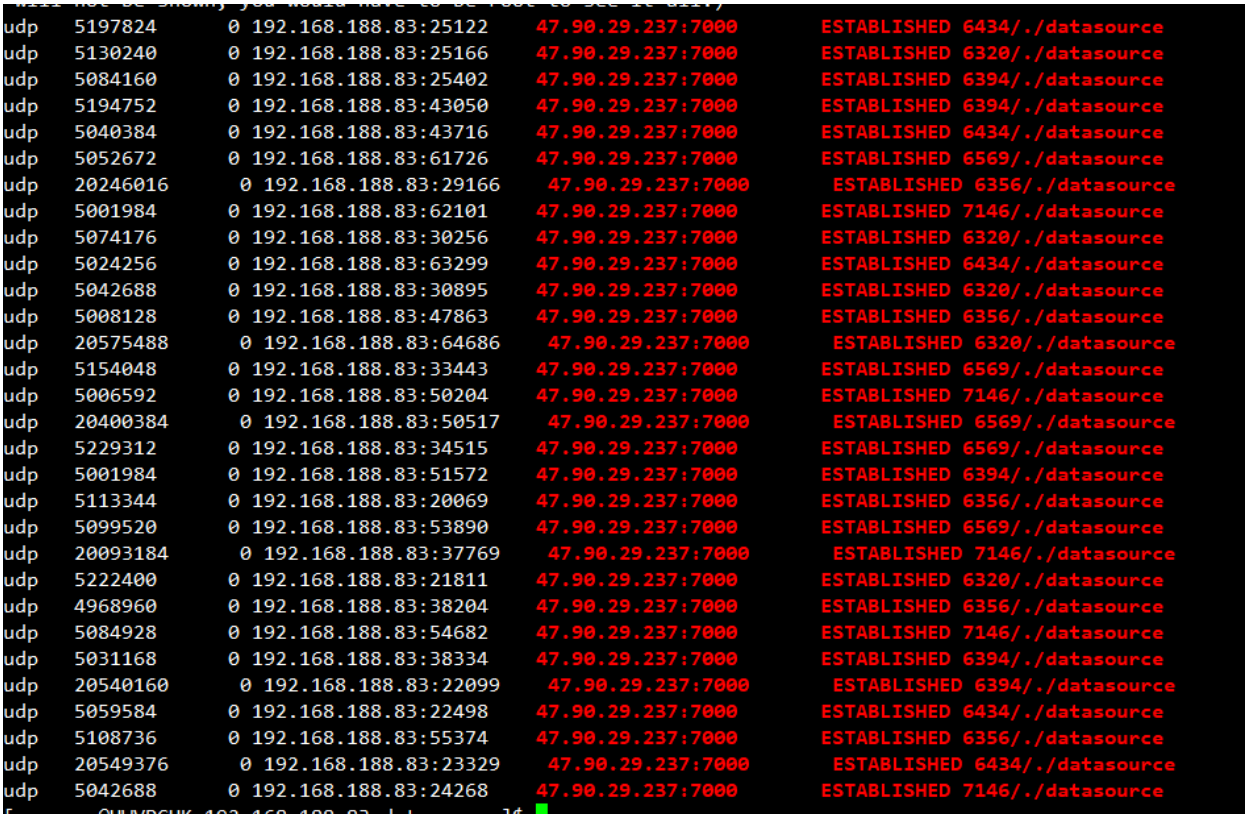
```
[appuser@HWVPCHK-192-168-188-83 datasource]$ free -hm
              total        used        free      shared  buff/cache   available
Mem:            31G        5.9G        628M        1.6G         24G         23G
Swap:          7.8G          0B        7.8G
```

```
[appuser@HWVPCHK-192-168-188-83 datasource]$ free -hm
              total        used        free      shared  buff/cache   available
Mem:            31G         10G        676M        1.6G         19G         18G
Swap:          7.8G          0B        7.8G
```

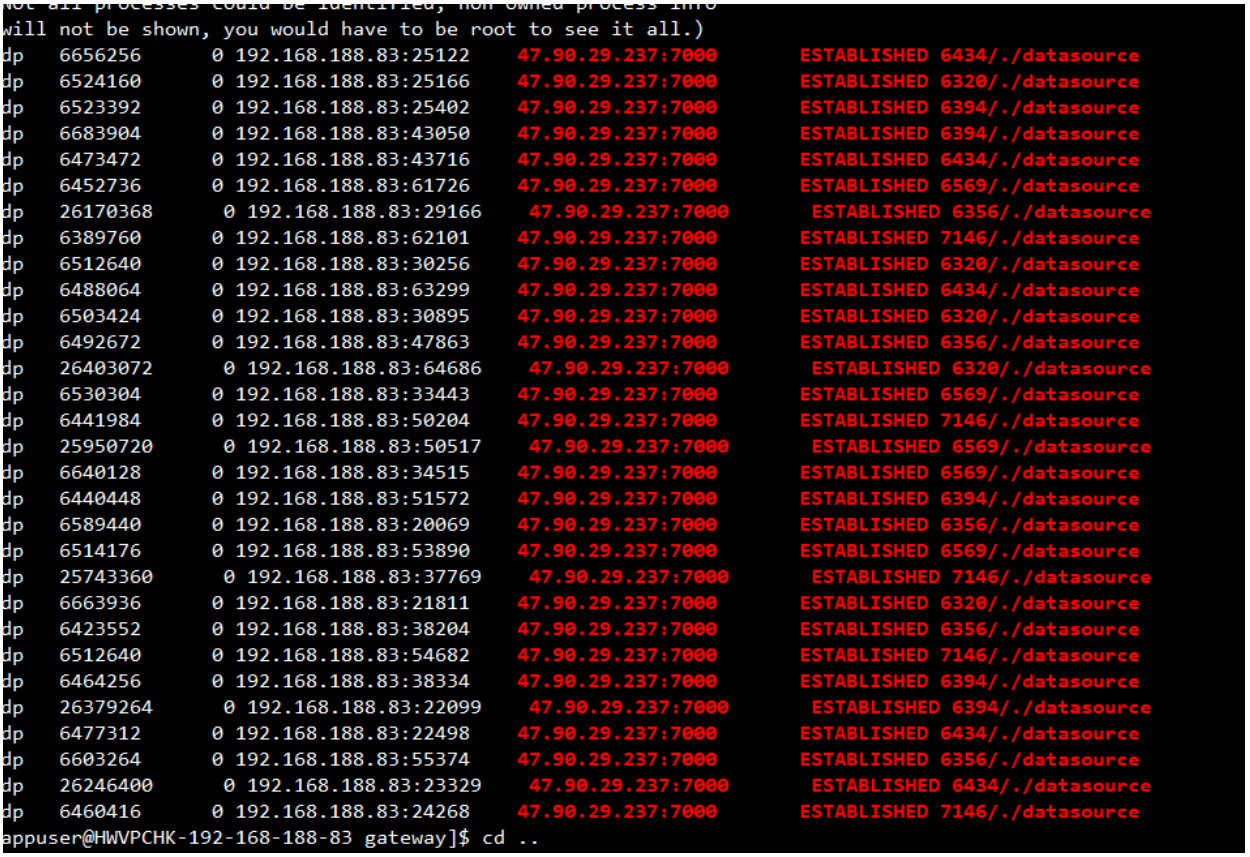
解决问题：

1. 首先确定服务更新内容为增加udp数据上报（数据上报较为频繁），udp连接ip为47.90.29.237，查看udp连接情况

netstat -anup | grep datasource



```
udp   5197824      0 192.168.188.83:25122    47.90.29.237:7000       ESTABLISHED 6434/./datasource
udp   5130240      0 192.168.188.83:25166    47.90.29.237:7000       ESTABLISHED 6320/./datasource
udp   5084160      0 192.168.188.83:25402    47.90.29.237:7000       ESTABLISHED 6394/./datasource
udp   5194752      0 192.168.188.83:43050    47.90.29.237:7000       ESTABLISHED 6394/./datasource
udp   5040384      0 192.168.188.83:43716    47.90.29.237:7000       ESTABLISHED 6434/./datasource
udp   5052672      0 192.168.188.83:61726    47.90.29.237:7000       ESTABLISHED 6569/./datasource
udp   20246016      0 192.168.188.83:29166    47.90.29.237:7000       ESTABLISHED 6356/./datasource
udp   5001984      0 192.168.188.83:62101    47.90.29.237:7000       ESTABLISHED 7146/./datasource
udp   5074176      0 192.168.188.83:30256    47.90.29.237:7000       ESTABLISHED 6320/./datasource
udp   5024256      0 192.168.188.83:63299    47.90.29.237:7000       ESTABLISHED 6434/./datasource
udp   5042688      0 192.168.188.83:30895    47.90.29.237:7000       ESTABLISHED 6320/./datasource
udp   5008128      0 192.168.188.83:47863    47.90.29.237:7000       ESTABLISHED 6356/./datasource
udp   20575488      0 192.168.188.83:64686    47.90.29.237:7000       ESTABLISHED 6320/./datasource
udp   5154048      0 192.168.188.83:33443    47.90.29.237:7000       ESTABLISHED 6569/./datasource
udp   5006592      0 192.168.188.83:50204    47.90.29.237:7000       ESTABLISHED 7146/./datasource
udp   20400384      0 192.168.188.83:50517    47.90.29.237:7000       ESTABLISHED 6569/./datasource
udp   5229312      0 192.168.188.83:34515    47.90.29.237:7000       ESTABLISHED 6569/./datasource
udp   5001984      0 192.168.188.83:51572    47.90.29.237:7000       ESTABLISHED 6394/./datasource
udp   5113344      0 192.168.188.83:20069    47.90.29.237:7000       ESTABLISHED 6356/./datasource
udp   5099520      0 192.168.188.83:53890    47.90.29.237:7000       ESTABLISHED 6569/./datasource
udp   20093184      0 192.168.188.83:37769    47.90.29.237:7000       ESTABLISHED 7146/./datasource
udp   5222400      0 192.168.188.83:21811    47.90.29.237:7000       ESTABLISHED 6320/./datasource
udp   4968960      0 192.168.188.83:38204    47.90.29.237:7000       ESTABLISHED 6356/./datasource
udp   5084928      0 192.168.188.83:54682    47.90.29.237:7000       ESTABLISHED 7146/./datasource
udp   5031168      0 192.168.188.83:38334    47.90.29.237:7000       ESTABLISHED 6394/./datasource
udp   20540160      0 192.168.188.83:22099    47.90.29.237:7000       ESTABLISHED 6394/./datasource
udp   5059584      0 192.168.188.83:22498    47.90.29.237:7000       ESTABLISHED 6434/./datasource
udp   5108736      0 192.168.188.83:55374    47.90.29.237:7000       ESTABLISHED 6356/./datasource
udp   20549376      0 192.168.188.83:23329    47.90.29.237:7000       ESTABLISHED 6434/./datasource
udp   5042688      0 192.168.188.83:24268    47.90.29.237:7000       ESTABLISHED 7146/./datasource
```



```
will not be shown, you would have to be root to see it all.)
dp   6656256      0 192.168.188.83:25122    47.90.29.237:7000       ESTABLISHED 6434/./datasource
dp   6524160      0 192.168.188.83:25166    47.90.29.237:7000       ESTABLISHED 6320/./datasource
dp   6523392      0 192.168.188.83:25402    47.90.29.237:7000       ESTABLISHED 6394/./datasource
dp   6683904      0 192.168.188.83:43050    47.90.29.237:7000       ESTABLISHED 6394/./datasource
dp   6473472      0 192.168.188.83:43716    47.90.29.237:7000       ESTABLISHED 6434/./datasource
dp   6452736      0 192.168.188.83:61726    47.90.29.237:7000       ESTABLISHED 6569/./datasource
dp   26170368      0 192.168.188.83:29166    47.90.29.237:7000       ESTABLISHED 6356/./datasource
dp   6389760      0 192.168.188.83:62101    47.90.29.237:7000       ESTABLISHED 7146/./datasource
dp   6512640      0 192.168.188.83:30256    47.90.29.237:7000       ESTABLISHED 6320/./datasource
dp   6488064      0 192.168.188.83:63299    47.90.29.237:7000       ESTABLISHED 6434/./datasource
dp   6503424      0 192.168.188.83:30895    47.90.29.237:7000       ESTABLISHED 6320/./datasource
dp   6492672      0 192.168.188.83:47863    47.90.29.237:7000       ESTABLISHED 6356/./datasource
dp   26403072      0 192.168.188.83:64686    47.90.29.237:7000       ESTABLISHED 6320/./datasource
dp   6530304      0 192.168.188.83:33443    47.90.29.237:7000       ESTABLISHED 6569/./datasource
dp   6441984      0 192.168.188.83:50204    47.90.29.237:7000       ESTABLISHED 7146/./datasource
dp   25950720      0 192.168.188.83:50517    47.90.29.237:7000       ESTABLISHED 6569/./datasource
dp   6640128      0 192.168.188.83:34515    47.90.29.237:7000       ESTABLISHED 6569/./datasource
dp   6440448      0 192.168.188.83:51572    47.90.29.237:7000       ESTABLISHED 6394/./datasource
dp   6589440      0 192.168.188.83:20069    47.90.29.237:7000       ESTABLISHED 6356/./datasource
dp   6514176      0 192.168.188.83:53890    47.90.29.237:7000       ESTABLISHED 6569/./datasource
dp   25743360      0 192.168.188.83:37769    47.90.29.237:7000       ESTABLISHED 7146/./datasource
dp   6663936      0 192.168.188.83:21811    47.90.29.237:7000       ESTABLISHED 6320/./datasource
dp   6423552      0 192.168.188.83:38204    47.90.29.237:7000       ESTABLISHED 6356/./datasource
dp   6512640      0 192.168.188.83:54682    47.90.29.237:7000       ESTABLISHED 7146/./datasource
dp   6464256      0 192.168.188.83:38334    47.90.29.237:7000       ESTABLISHED 6394/./datasource
dp   26379264      0 192.168.188.83:22099    47.90.29.237:7000       ESTABLISHED 6394/./datasource
dp   6477312      0 192.168.188.83:22498    47.90.29.237:7000       ESTABLISHED 6434/./datasource
dp   6603264      0 192.168.188.83:55374    47.90.29.237:7000       ESTABLISHED 6356/./datasource
dp   26246400      0 192.168.188.83:23329    47.90.29.237:7000       ESTABLISHED 6434/./datasource
dp   6460416      0 192.168.188.83:24268    47.90.29.237:7000       ESTABLISHED 7146/./datasource
appuser@HWVPCHK-192-168-188-83 gateway]$ cd ..
```

业务中每个服务实例创建5个连接，所以6个实例，总共有30条连接数据

查看udp使用内存情况：

```
[appuser@HWVPCHK-192-168-188-83 datasource]$ cat /proc/net/sockstat
sockets: used 487
TCP: inuse 275 orphan 0 tw 17 alloc 276 mem 104
UDP: inuse 73 mem 64367
UDPLITE: inuse 0
RAW: inuse 0
FRAG: inuse 0 memory 0
```

```
[appuser@HWVPCHK-192-168-188-96 api-store]$ cat /proc/net/sockstat
sockets: used 1689
TCP: inuse 516 orphan 6 tw 120 alloc 1411 mem 444
UDP: inuse 81 mem 32
UDPLITE: inuse 0
RAW: inuse 0
FRAG: inuse 0 memory 0
```

2. 使用netstat查看数据发现异常：

recv-Q:网络接收队列（第二列）

表示收到的数据已经在本地接收缓冲，但是还有多少没有被进程取走，recv()

如果接收队列Recv-Q一直处于阻塞状态，可能是遭受了拒绝服务 denial-of-service 攻击。

send-Q:网路发送队列（第三列）

对方没有收到的数据或者说没有Ack的,还是本地缓冲区.

如果发送队列Send-Q不能很快的清零，可能是有应用向外发送数据包过快，或者是对方接收数据包不够快。

这两个值通常应该为0，如果不为0可能是有问题的。packets在两个队列里都不应该有堆积状态。可接受短暂的非0情况。

从图中可以看到recv-Q中堆积了大量的数据包,并且持续增长，说明收到很多数据没有被进程取走。

3. 查看代码：

发现只是想ucp socket中写数据，并没有读出数据，导致了接收数据堆积问题

```go
//发送，ipPorts-》"ip1:port1,ip2:port2"
//      uid -》 玩家id
//      datatype -》 上报类型
//      data - 》 对应的上报结构体 比如Game，Match，Pay
func (s *activityClient) Send(uid int64, datatype string, data interface{}) error {
    activityReportCommon := &ActivityReportCommon{
        Appid:    APPID,
        Mid:      uid,
        Datatype: datatype,
        Data:     data,
    }
    dataByte, err := json.Marshal(activityReportCommon)
    if err != nil {
        plog.Warn("activity Report json Marshal err:", err)
        return err
    }
    conn, err := s.getUdpObj()
    if err != nil {
        plog.Warn("activity Report getUdpObj err:", err)
        return err
    }
    num, wErr := conn.Write(dataByte)
    if wErr != nil {
        plog.Warn("activity Report conn Write err:", wErr)
        return wErr
    }
    plog.Debug("activity Report:", string(dataByte), num, conn.RemoteAddr())
    return nil
}
```

4. 代码优化，增加读取数据逻辑：

```go
    num, wErr := conn.Write(dataByte)
    if wErr != nil {
        plog.Warn("activity Report conn Write err:", wErr)
        return wErr
    }
    plog.Debug("activity Report:", string(dataByte), num, conn.RemoteAddr())

    recv := make([]byte, 50) // succ-2020-08-05 11:50:36
    num2, _ := conn.Read(recv)
    if num2 != 24 || string(recv[:4]) != "succ" {
        plog.Warnf("activity report fail:%s,data:%s", string(recv), string(dataByte))
    }
    fmt.Println("client read data:", string(recv))
    return nil
```

结果：

Recv-Q,send-Q 都为0

```
[appuser@HWVPCHK-192-168-188-83 datasource]$ netstat -anup | grep "47.90.29.*datasource"
(Not all processes could be identified, non-owned process info
 will not be shown, you would have to be root to see it all.)
udp        0      0 192.168.188.83:57387    47.90.29.237:7000       ESTABLISHED 6205/./datasource
udp        0      0 192.168.188.83:41432    47.90.29.237:7000       ESTABLISHED 6289/./datasource
udp        0      0 192.168.188.83:25221    47.90.29.237:7000       ESTABLISHED 6205/./datasource
udp        0      0 192.168.188.83:58432    47.90.29.237:7000       ESTABLISHED 6341/./datasource
udp        0      0 192.168.188.83:58441    47.90.29.237:7000       ESTABLISHED 6087/./datasource
udp        0      0 192.168.188.83:25712    47.90.29.237:7000       ESTABLISHED 6087/./datasource
udp        0      0 192.168.188.83:43459    47.90.29.237:7000       ESTABLISHED 6341/./datasource
udp        0      0 192.168.188.83:60663    47.90.29.237:7000       ESTABLISHED 6205/./datasource
udp        0      0 192.168.188.83:44316    47.90.29.237:7000       ESTABLISHED 6087/./datasource
udp        0      0 192.168.188.83:28083    47.90.29.237:7000       ESTABLISHED 6289/./datasource
udp        0      0 192.168.188.83:44996    47.90.29.237:7000       ESTABLISHED 6393/./datasource
udp        0      0 192.168.188.83:28683    47.90.29.237:7000       ESTABLISHED 6341/./datasource
udp        0      0 192.168.188.83:46897    47.90.29.237:7000       ESTABLISHED 6168/./datasource
udp        0      0 192.168.188.83:46980    47.90.29.237:7000       ESTABLISHED 6087/./datasource
udp        0      0 192.168.188.83:64367    47.90.29.237:7000       ESTABLISHED 6289/./datasource
udp        0      0 192.168.188.83:48432    47.90.29.237:7000       ESTABLISHED 6393/./datasource
udp        0      0 192.168.188.83:32671    47.90.29.237:7000       ESTABLISHED 6289/./datasource
udp        0      0 192.168.188.83:49725    47.90.29.237:7000       ESTABLISHED 6341/./datasource
udp        0      0 192.168.188.83:33973    47.90.29.237:7000       ESTABLISHED 6168/./datasource
udp        0      0 192.168.188.83:34746    47.90.29.237:7000       ESTABLISHED 6087/./datasource
udp        0      0 192.168.188.83:34956    47.90.29.237:7000       ESTABLISHED 6168/./datasource
udp        0      0 192.168.188.83:35584    47.90.29.237:7000       ESTABLISHED 6393/./datasource
udp        0      0 192.168.188.83:35954    47.90.29.237:7000       ESTABLISHED 6168/./datasource
udp        0      0 192.168.188.83:54781    47.90.29.237:7000       ESTABLISHED 6168/./datasource
udp        0      0 192.168.188.83:38953    47.90.29.237:7000       ESTABLISHED 6393/./datasource
udp        0      0 192.168.188.83:23334    47.90.29.237:7000       ESTABLISHED 6205/./datasource
udp        0      0 192.168.188.83:23494    47.90.29.237:7000       ESTABLISHED 6289/./datasource
udp        0      0 192.168.188.83:56936    47.90.29.237:7000       ESTABLISHED 6205/./datasource
udp        0      0 192.168.188.83:56950    47.90.29.237:7000       ESTABLISHED 6341/./datasource
udp        0      0 192.168.188.83:57160    47.90.29.237:7000       ESTABLISHED 6393/./datasource
```

```
[appuser@HWVPCHK-192-168-188-83 datasource]$ cat /proc/net/sockstat
sockets: used 479
TCP: inuse 267 orphan 0 tw 27 alloc 268 mem 116
UDP: inuse 73 mem 33
UDPLITE: inuse 0
RAW: inuse 0
FRAG: inuse 0 memory 0
```

udp mem使用从64367 降至33

```
[appuser@HWVPCHK-192-168-188-83 datasource]$ free -hm
              total        used        free      shared  buff/cache   available
Mem:            31G        5.8G        7.1G        1.5G         18G         23G
Swap:          7.8G          0B        7.8G
```

内存使用从12G --> 5.8G 恢复正常

结论：

Recv-Q：表示收到的数据中还有多少没有被进程取走（通过recv）

Send-Q：表示需要发送的数据还有多少没有被发出

所以，一般来说这两个值都是0，如果不为0且持续增长，那就表明程序出现了问题。

比如Recv-Q的数字持续增长，表示没有进程去取这些收到的数据。比如使用select+recv来收数据的时候，由于select有1024这个限制，所以如果socket的FD大于1024的时候，就会导致这个socket FD上的数据不会被select检测到从而导致recv不会被调用。
所以，通过netstat的这两个值就可以简单判断程序收不到包到底是包没到还是包没有被进程recv。