组会报告

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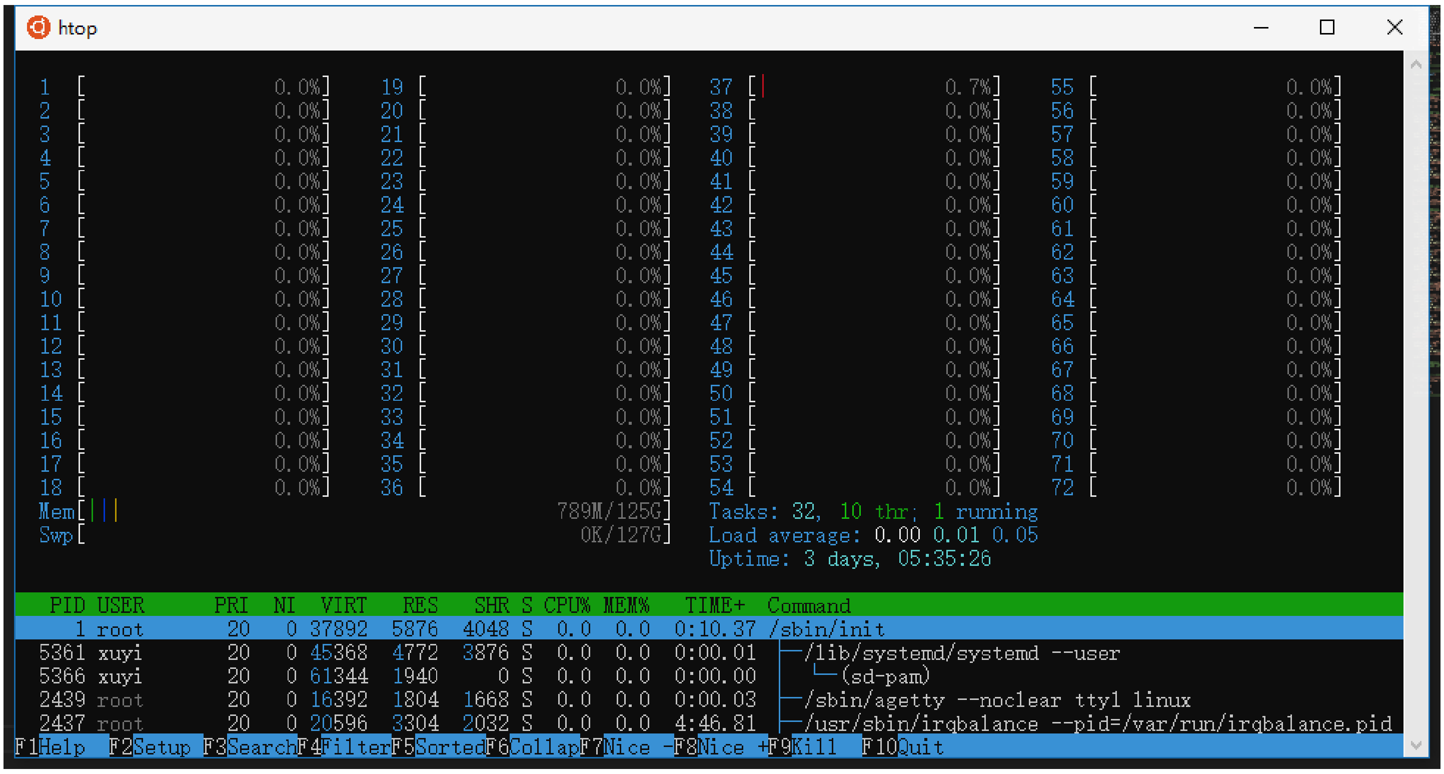
2018 年 12 月 10 日

1 工作内容

1. 多线程系统优化；
2. 准备开题报告。

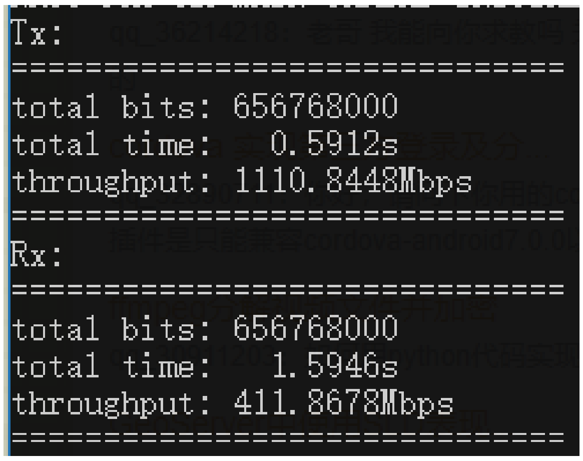
2 多线程系统优化

2.1 关闭超线程



```
htop

  1  [              0.0%]   19 [              0.0%]   37 [|             0.7%]   55 [              0.0%]
  2  [              0.0%]   20 [              0.0%]   38 [              0.0%]   56 [              0.0%]
  3  [              0.0%]   21 [              0.0%]   39 [              0.0%]   57 [              0.0%]
  4  [              0.0%]   22 [              0.0%]   40 [              0.0%]   58 [              0.0%]
  5  [              0.0%]   23 [              0.0%]   41 [              0.0%]   59 [              0.0%]
  6  [              0.0%]   24 [              0.0%]   42 [              0.0%]   60 [              0.0%]
  7  [              0.0%]   25 [              0.0%]   43 [              0.0%]   61 [              0.0%]
  8  [              0.0%]   26 [              0.0%]   44 [              0.0%]   62 [              0.0%]
  9  [              0.0%]   27 [              0.0%]   45 [              0.0%]   63 [              0.0%]
  10 [              0.0%]   28 [              0.0%]   46 [              0.0%]   64 [              0.0%]
  11 [              0.0%]   29 [              0.0%]   47 [              0.0%]   65 [              0.0%]
  12 [              0.0%]   30 [              0.0%]   48 [              0.0%]   66 [              0.0%]
  13 [              0.0%]   31 [              0.0%]   49 [              0.0%]   67 [              0.0%]
  14 [              0.0%]   32 [              0.0%]   50 [              0.0%]   68 [              0.0%]
  15 [              0.0%]   33 [              0.0%]   51 [              0.0%]   69 [              0.0%]
  16 [              0.0%]   34 [              0.0%]   52 [              0.0%]   70 [              0.0%]
  17 [              0.0%]   35 [              0.0%]   53 [              0.0%]   71 [              0.0%]
  18 [              0.0%]   36 [              0.0%]   54 [              0.0%]   72 [              0.0%]
  Mem[|||                                 789M/125G]   Tasks: 32, 10 thr; 1 running
  Swp[                                      0K/127G]   Load average: 0.00 0.01 0.05
                                                       Uptime: 3 days, 05:35:26

   PID USER      PRI  NI  VIRT   RES   SHR S CPU% MEM%   TIME+  Command
     1 root       20   0 37892  5876  4048 S  0.0  0.0  0:10.37 /sbin/init
  5361 xuyi       20   0 45368  4772  3876 S  0.0  0.0  0:00.01 ├─/lib/systemd/systemd --user
  5366 xuyi       20   0 61344  1940     0 S  0.0  0.0  0:00.00 │  └─(sd-pam)
  2439 root       20   0 16392  1804  1668 S  0.0  0.0  0:00.03 ├─/sbin/agetty --noclear tty1 linux
  2437 root       20   0 20596  3304  2032 S  0.0  0.0  4:46.81 ├─/usr/sbin/irqbalance --pid=/var/run/irqbalance.pid
F1Help  F2Setup F3SearchF4FilterF5SortedF6CollapF7Nice -F8Nice +F9Kill  F10Quit
```

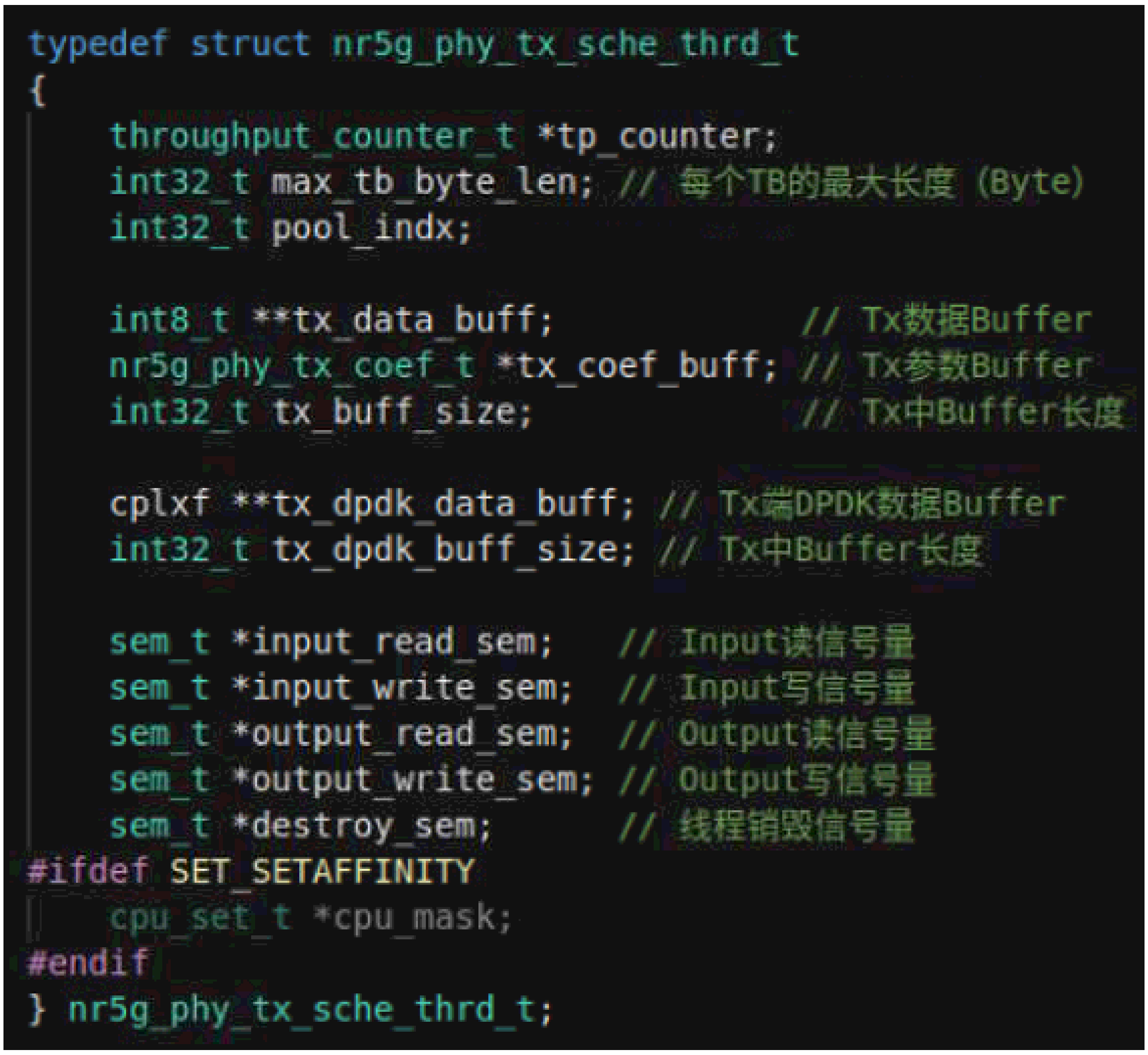
图 1: 关闭超线程后



```
Tx:
================================
total bits: 656768000
total time:   0.5912s
throughput: 1110.8448Mbps
================================
Rx:
================================
total bits: 656768000
total time:   1.5946s
throughput: 411.8678Mbps
================================
```

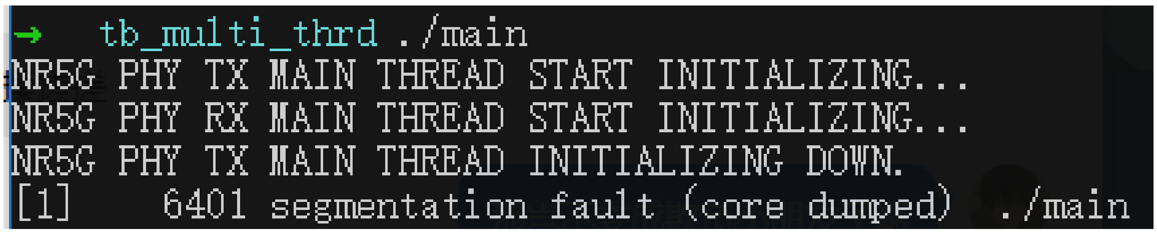
图 2: 吞吐量

2.2 线程绑定 CPU



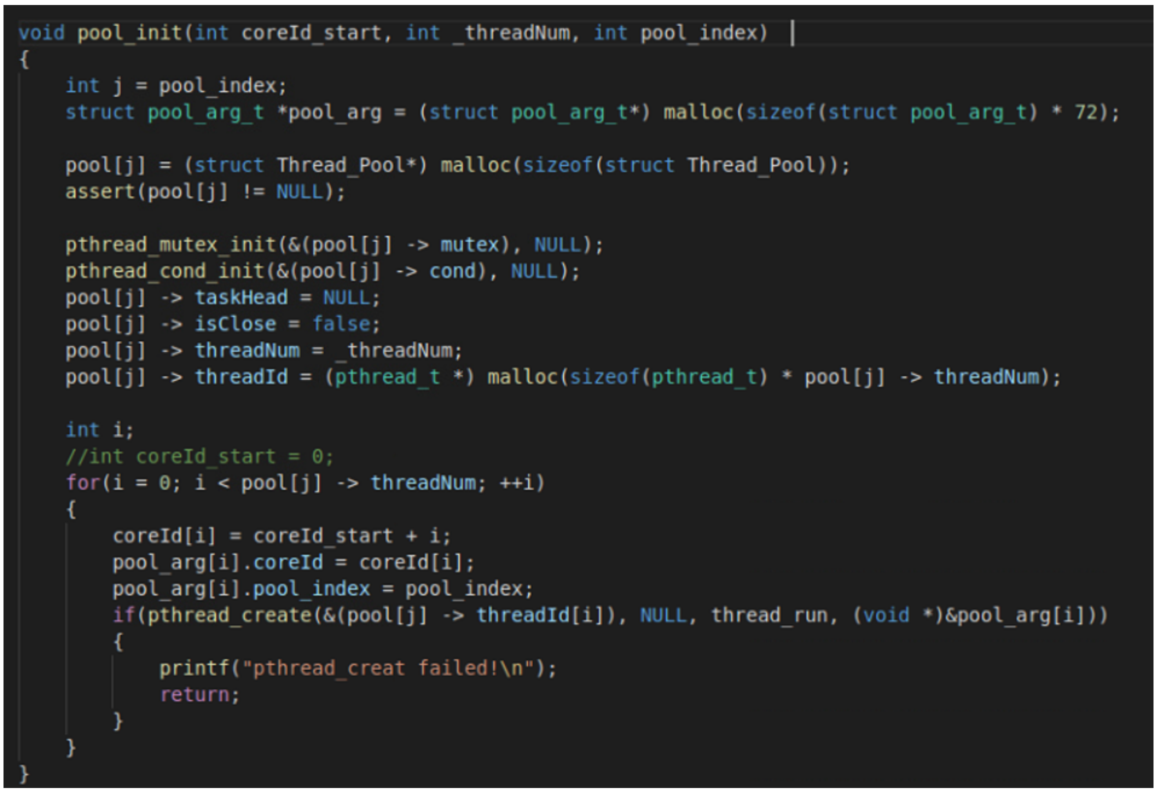
```c
typedef struct nr5g_phy_tx_sche_thrd_t
{
    throughput_counter_t *tp_counter;
    int32_t max_tb_byte_len; // 每个TB的最大长度 (Byte)
    int32_t pool_indx;

    int8_t **tx_data_buff;              // Tx数据Buffer
    nr5g_phy_tx_coef_t *tx_coef_buff; // Tx参数Buffer
    int32_t tx_buff_size;               // Tx中Buffer长度

    cplxf **tx_dpdk_data_buff; // Tx端DPDK数据Buffer
    int32_t tx_dpdk_buff_size; // Tx中Buffer长度

    sem_t *input_read_sem;    // Input读信号量
    sem_t *input_write_sem;   // Input写信号量
    sem_t *output_read_sem;   // Output读信号量
    sem_t *output_write_sem;  // Output写信号量
    sem_t *destroy_sem;       // 线程销毁信号量
#ifdef SET_SETAFFINITY
    cpu_set_t *cpu_mask;
#endif
} nr5g_phy_tx_sche_thrd_t;
```

图 3: 方案



```
→  tb_multi_thrd ./main
NR5G PHY TX MAIN THREAD START INITIALIZING...
NR5G PHY RX MAIN THREAD START INITIALIZING...
NR5G PHY TX MAIN THREAD INITIALIZING DOWN.
[1]    6401 segmentation fault (core dumped)  ./main
```

图 4: 错误



```c
void pool_init(int coreId_start, int _threadNum, int pool_index)
{
    int j = pool_index;
    struct pool_arg_t *pool_arg = (struct pool_arg_t*) malloc(sizeof(struct pool_arg_t) * 72);

    pool[j] = (struct Thread_Pool*) malloc(sizeof(struct Thread_Pool));
    assert(pool[j] != NULL);

    pthread_mutex_init(&(pool[j] -> mutex), NULL);
    pthread_cond_init(&(pool[j] -> cond), NULL);
    pool[j] -> taskHead = NULL;
    pool[j] -> isClose = false;
    pool[j] -> threadNum = _threadNum;
    pool[j] -> threadId = (pthread_t *) malloc(sizeof(pthread_t) * pool[j] -> threadNum);

    int i;
    //int coreId_start = 0;
    for(i = 0; i < pool[j] -> threadNum; ++i)
    {
        coreId[i] = coreId_start + i;
        pool_arg[i].coreId = coreId[i];
        pool_arg[i].pool_index = pool_index;
        if(pthread_create(&(pool[j] -> threadId[i]), NULL, thread_run, (void *)&pool_arg[i]))
        {
            printf("pthread_creat failed!\n");
            return;
        }
    }
}
```

图 5: 可能原因

3 准备开题报告