

组会报告

徐益

2018 年 11 月 12 日

1 工作内容

1. 完成服务器环境配置;
2. 学习线程绑定 CPU;
3. 编写多线程编码调制模块。

2 服务器环境配置信息

```
1  ubuntu: 16.04
2  gcc:    5.4.0
3  icc:    18.0.2
4  boost:  1.58.0
5  DPDK:   18.05.1
```

3 线程绑定 CPU

3.1 CPU 亲和度 (affinity)

3.1.1 基本概念

亲和度 (affinity) 是一种调度属性 (scheduler property), 它可以将一个进程“绑定”到一个或一组 CPU 上。在 SMP (Symmetric Multi-Processing 对称多处理) 架构下, Linux 调度器 (scheduler) 会根据 CPU affinity 的设置让指定的进程运行在“绑定”的 CPU 上, 而不会在别的 CPU 上运行。

3.1.2 表示方法

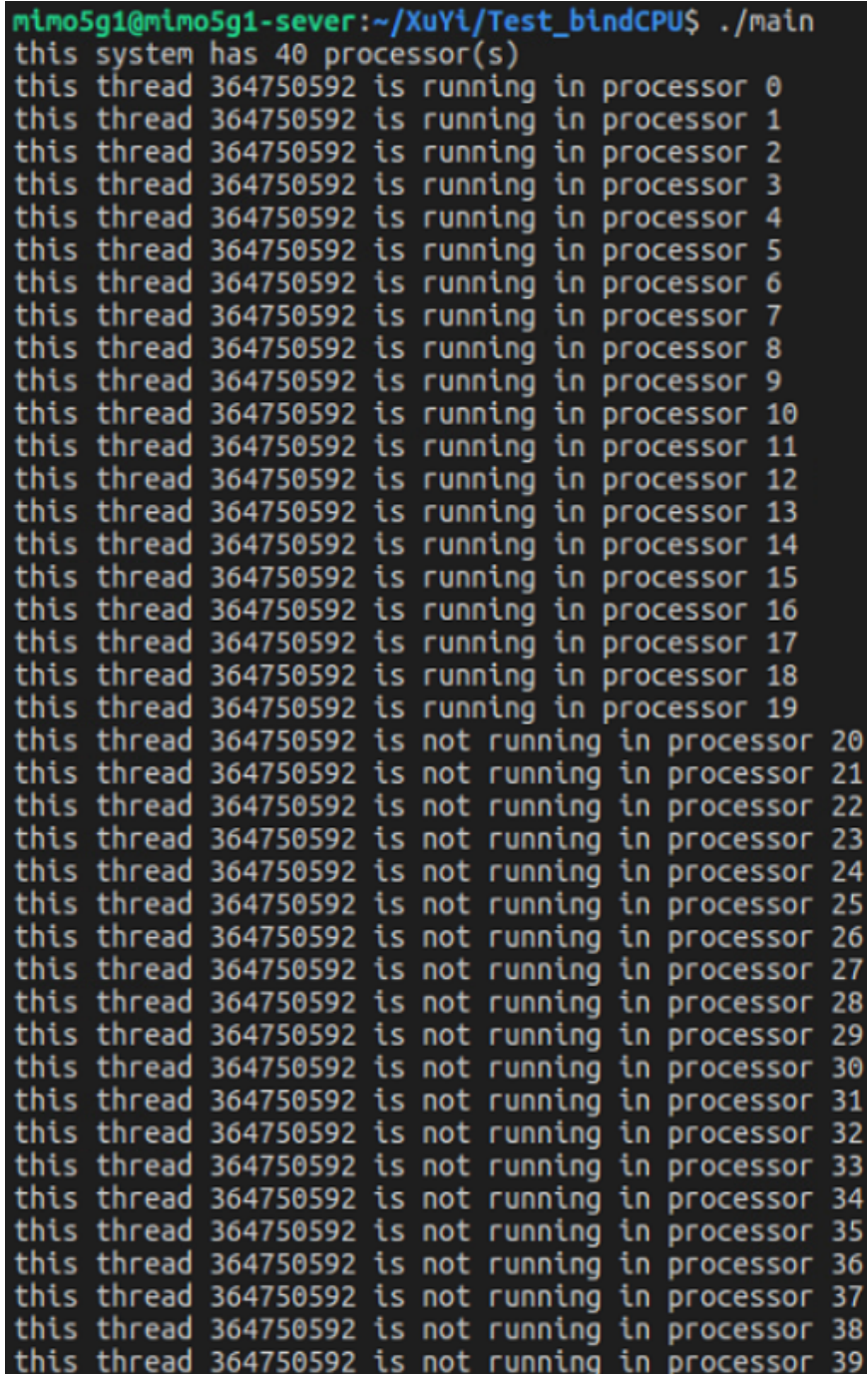
CPU affinity 使用位掩码 (bitmask) 表示, 每一位都表示一个 CPU, 置 1 表示“绑定”。最低位表示第一个逻辑 CPU, 最高位表示最后一个逻辑 CPU。

3.2 核心函数

```
1 NAME
2     pthread_setaffinity_np, pthread_getaffinity_np
3     - set/get CPU affinity of a thread
4
5 SYNOPSIS
6     #define _GNU_SOURCE
7     #include <pthread.h>
8     int pthread_setaffinity_np(pthread_t thread, size_t cpusetsize,
```

```
9         const cpu_set_t *cpuset);
10     int pthread_getaffinity_np(pthread_t thread, size_t cpusetsize,
11                               cpu_set_t *cpuset);
12
13     Compile and link with -pthread.
```

3.3 测试结果



```
mimo5g1@mimo5g1-sever:~/XuYi/Test_bindCPU$ ./main
this system has 40 processor(s)
this thread 364750592 is running in processor 0
this thread 364750592 is running in processor 1
this thread 364750592 is running in processor 2
this thread 364750592 is running in processor 3
this thread 364750592 is running in processor 4
this thread 364750592 is running in processor 5
this thread 364750592 is running in processor 6
this thread 364750592 is running in processor 7
this thread 364750592 is running in processor 8
this thread 364750592 is running in processor 9
this thread 364750592 is running in processor 10
this thread 364750592 is running in processor 11
this thread 364750592 is running in processor 12
this thread 364750592 is running in processor 13
this thread 364750592 is running in processor 14
this thread 364750592 is running in processor 15
this thread 364750592 is running in processor 16
this thread 364750592 is running in processor 17
this thread 364750592 is running in processor 18
this thread 364750592 is running in processor 19
this thread 364750592 is not running in processor 20
this thread 364750592 is not running in processor 21
this thread 364750592 is not running in processor 22
this thread 364750592 is not running in processor 23
this thread 364750592 is not running in processor 24
this thread 364750592 is not running in processor 25
this thread 364750592 is not running in processor 26
this thread 364750592 is not running in processor 27
this thread 364750592 is not running in processor 28
this thread 364750592 is not running in processor 29
this thread 364750592 is not running in processor 30
this thread 364750592 is not running in processor 31
this thread 364750592 is not running in processor 32
this thread 364750592 is not running in processor 33
this thread 364750592 is not running in processor 34
this thread 364750592 is not running in processor 35
this thread 364750592 is not running in processor 36
this thread 364750592 is not running in processor 37
this thread 364750592 is not running in processor 38
this thread 364750592 is not running in processor 39
```

图 1: 测试结果

4 编写多线程编码调制模块

4.1 多线程结构

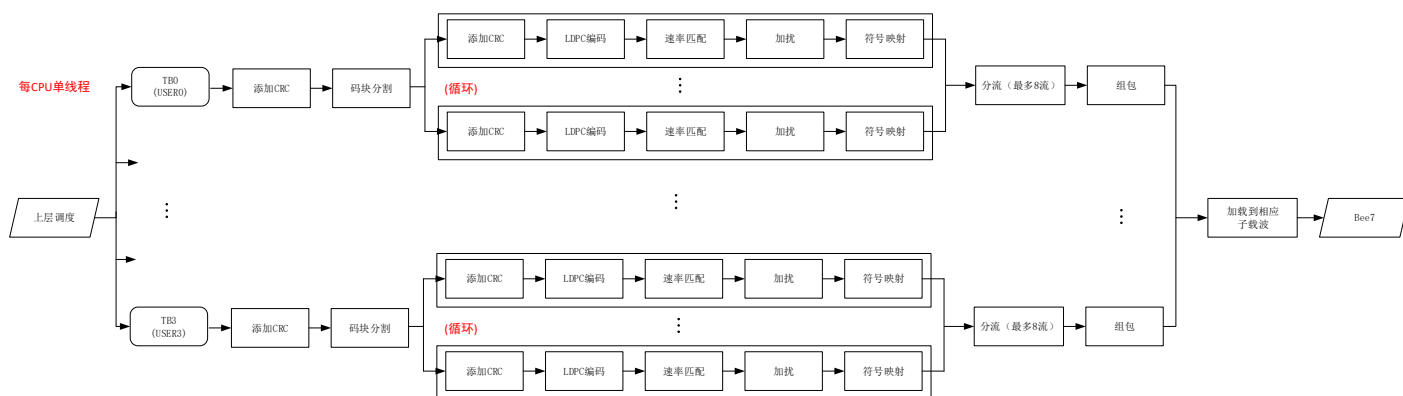


图 2: Tx 结构

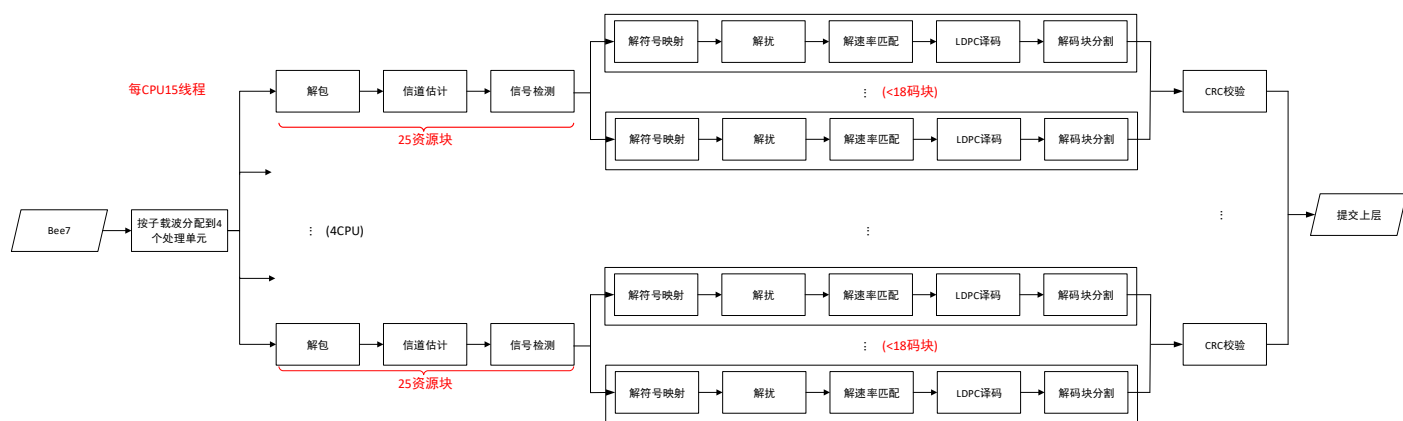


图 3: Rx 结构

4.2 修改点

1. 信号量传递由全局变量改为线程传参;
2. 轮巡式调度改为信号量调度;
3. 尝试简化线程阶段。