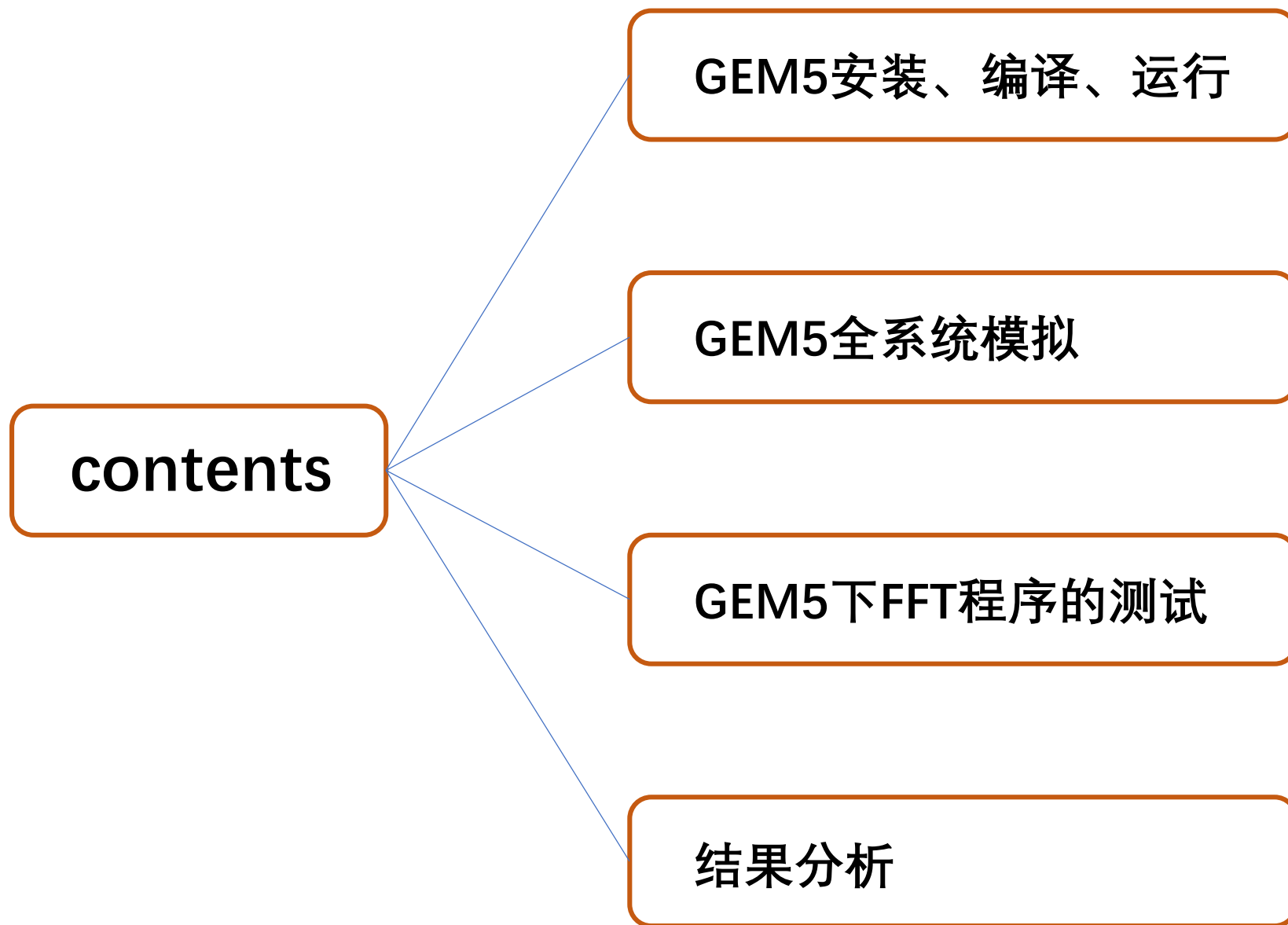


GEM5下FFT的全系统模拟

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GEM5安装、编译、运行

PART ONE

环境配置

- gcc 4.6及以上版本
- python 2.5-2.7
- SCons 0.98.1及以上版本
- SWIG 2.0.4及以上版本
- zlib任何最近的版本
- m4
- protobuf 2.1及以上版本

```
◆ sudo apt-get install  
mercurial scons swig gcc m4  
python python-dev libgoogle-  
perftools-dev g++  
libprotobuf-dev  
◆ sudo apt-get install build-  
essential
```

GEM5安装

◆ `hg clone http://repo.gem5.org/gem5`

GEM5编译

◆ `scons build/X86/gem5.opt`

GEM5测试

◆ `cd ~/gem5`

◆ `build/X86/gem5.opt configs/example/se.py -c
tests/test-progs/hello/bin/x86/linux/hello`

GEM5全系统模拟

PART TWO

下载文件

- ◆ 下载X86架构对应的全系统文件，也就是disk
- ◆ 下载alpha对应的全系统文件（linux-bigswap2.img）

添加环境变量

.bashrc文件

```
export M5_PATH=$M5_PATH:/home/zzh/gem5/fs-image/
```

报错1

- ◆ Can' t find a path to system files.
- ◆ 修改gem5目录下的configs/common/SysPath.py, 将目录改成当前目录

报错2

- ◆ Can' t find file 'x86root.img' on path.
- ◆ 修改Benchmarks.py文件, 将x86root.img改为 linux-x86.img

报错3

- ◆ Error opening /home/zzh/gem5/fs-image/disks/linux-bigswap2.img
- ◆ sudo

成功启动

```
ting@ting-INVALID:~/gem5$ sudo build/X86/gem5.opt configs/example/fs.py
gem5 Simulator System.  http://gem5.org
gem5 is copyrighted software; use the --copyright option for details.

gem5 compiled Dec 16 2018 23:59:43
gem5 started Dec 17 2018 13:33:39
gem5 executing on ting-INVALID, pid 12364
command line: build/X86/gem5.opt configs/example/fs.py

Global frequency set at 1000000000000 ticks per second
warn: DRAM device capacity (8192 Mbytes) does not match the address range
info: kernel located at: /home/ting/gem5/fs-image/binaries/x86_64-vmLinux
Listening for com 1 connection on port 3456
0: rtc: Real-time clock set to Sun Jan 1 00:00:00 2012
0: system.remote_gdb: listening for remote gdb on port 7000
warn: Reading current count from inactive timer.
**** REAL SIMULATION ****
info: Entering event queue @ 0. Starting simulation...
warn: Don't know what interrupt to clear for console.
warn: x86 cpuid: unknown family 0x8086
88047608000: system.pc.com_1.device: attach terminal 0
warn: Tried to clear PCI interrupt 14
warn: Unknown mouse command 0xe1.
warn: instruction 'wbinvd' unimplemented
warn: instruction 'prefetch_nta' unimplemented
warn: instruction 'prefetch_nta' unimplemented
```

连接FS模 拟的全系统

```
VFS: Mounted root (ext2 filesystem).  
Freeing unused kernel memory: 232k freed  
INIT: version 2.86 booting  
mounting filesystems...  
loading script...  
Script from M5 readfile is empty, starting bash shell...  
(none) / #
```

GEM5下FFT程序的测试

PART THREE

挂载

- ◆ `sudo mount -o,loop,offset=32256 fs-image/disks/linux-x86.img /mnt`
- ◆ `sudo cp mountfile/TestGauss2 /mnt`
- ◆ `sudo umount /mnt`

运行

- ◆ `g++ fft.cpp -o fft`
- ◆ `./fft`

```
(none) / # g++ fft.cpp -o fft
(none) / # serial8250: too much work for irq4
./fft
bash: ./fft: No such file or directory
(none) / # ./fft
```

结果分析

PART FOUR

结果分析

本地

```
60      -0.166   +0.000   60
61      -1.269   +0.000   61
62      -1.295   +32.000   62
63      -2.834   +0.000   63
running time :0.000492 s
```

GEM5

```
60      -0.166   +0.000   60
61      -1.269   +0.000   61
62      -1.295   +32.000   62
63      -2.834   +0.000   63
running time :0.001667 s
```

3.5

结果分析

- ◆ 目前的GEM5实际上是M5和GEM5的一个紧耦合版本，存储问题导致性能下降。
- ◆ 在模拟系统中需要更多的指令来解释运行中的指令
- ◆ 也许用模拟器来测试功能是否完善是比较可行的，测试性能的话，与实际情况相比，可能会存在比较大的误差。

THANK YOU!

