



IBM Systems & Technology Group  
Cell/Quasar Ecosystem & Solutions Enablement

# Hands-on SPU Timing Analysis

Cell Programming Workshop  
Cell/Quasar Ecosystem & Solutions Enablement

## Class Objectives

- Use the static timing analysis tool to determine SIMD loop performance

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## Class Agenda

- **Issue the command to produce the timing file**
- **Interpret the timing data**

## SPE Static Timing Analysis

- **Static timing analyzer is provided in the SDK with the SPE XLC and GCC compilers**
- **Provides a static timing analysis of compiled SPE code**
  - based on issue rules, pipeline latencies, and static dependencies
  - assumes all branches not taken
  - cannot account for data-dependent behavior

## SIMD - Example 5 in /opt/cell\_class/Hands-on/SIMD

- **By setting SPU\_TIMING = 1 as either an environment variable or in the SPU Makefile and executing:**

```
make <spu_source>.s
```

**a static timing report is generated with the extension `.s.timing`**

- **Another way is to issue the command**

```
SPU_TIMING=1 make <spu_source>.s
```

# Example 5

## mult1.s.timing

```

.file      "mult1.c"

0D 01
1D 0123
0D 12
1D 1234
0 -34
0 -5678
0d ----90
1d ----1234

0D 23
1D 2345

0D 34
1D 345678
0D 45
1D 4

0d 56
1d -678901
1 789012
0 89
0d ----345678
1d -----901234
0D 01

1D 0123
0D 1
1D 1234

.text
.align    3
.global   mult1
.type     mult1, @function

mult1:
    cgti    $2,$6,-1
    shlqbyi $10,$3,0
    ai      $3,$6,3
    shlqbyi $9,$4,0
    selb    $3,$3,$6,$2
    rotmai  $8,$3,-2
    cgti    $2,$8,0
    brnz    $2,.L8

.L2:
    il      $3,0
    bi      $1r

.L8:
    il      $7,0
    hbra    .L9,.L4
    il      $6,0
    lnop

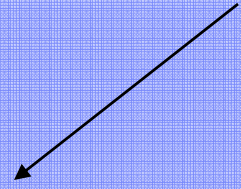
.L4:
    ai      $7,$7,1
    lqx     $2,$10,$6
    lqx     $3,$9,$6
    ceq     $4,$8,$7
    fm      $2,$2,$3
    stqx    $2,$5,$6
    ai      $6,$6,16

.L9:
    brz     $4,.L4
    nop     $127
    br      .L2

.size     mult1,.-mult1
.ident    "GCC: (GNU) 4.0.2 (CELL 3-2, Apr 11 2006)"
    
```

spu\_mul stalling  
on load

Multiplication  
loop



## Key Observations/Notes

- **Performance becomes readily apparent by looking for “-” in the timing area**
  - Overall slope of timing area
- **Suggestions for a fix?**

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