龙芯 2F 的 oprofile 指南

2012-11-27 by caiwanwei

oprofile 是软硬件协同的性能计数软件，可以提高软件优化工作的效率。oprofile 分为两部分：应用软件和内核模块。

1.应用软件

链接 http://www.loongson.cn/dev/wiki/Oprofile 是龙芯 3A 的 oprofile 源码修改方法和使用方法；

龙芯 2F 的 oprofile 源码修改补丁请见附录 1，使用的版本是 oprofile-0.9.6，使用方法与 3A 相同。

2.内核模块

官方的 Linux kernel 已经支持龙芯 2F 处理器，同样也支持了龙芯 2F 的 oprofile 模块，添加该模块的方法如下（内核版本 3.5.1）：

make ARCH=mips menuconfig，然后选上下面这个模块即可：

```
General setup  --->
   Profiling support
```

附录 1:

```
commit 6ff8e75bb6ddd8bf53bfa8b89b324301bf1d1c8b

Author: root <root@Loong.(none)>

Date:   Mon Nov 26 09:03:22 2012 +0000


    oprofile-0.9.6_loongson2.patch.


diff --git a/events/Makefile.am b/events/Makefile.am

index aaaacb7..6c51f78 100644

--- a/events/Makefile.am

+++ b/events/Makefile.am

@@ -53,6 +53,7 @@ event_files = \

   mips/r12000/events mips/r12000/unit_masks \

   mips/vr5432/events mips/vr5432/unit_masks \

   mips/vr5500/events mips/vr5500/unit_masks \

+  mips/loongson2/events mips/loongson2/unit_masks \

   ppc/7450/events ppc/7450/unit_masks \
```

```
   ppc/e500/events ppc/e500/unit_masks \

   ppc/e500v2/events ppc/e500v2/unit_masks \

diff --git a/events/Makefile.in b/events/Makefile.in

index ce7c3b3..cd357e0 100644

--- a/events/Makefile.in

+++ b/events/Makefile.in

@@ -256,6 +256,7 @@ event_files = \

   mips/r12000/events mips/r12000/unit_masks \

   mips/vr5432/events mips/vr5432/unit_masks \

   mips/vr5500/events mips/vr5500/unit_masks \

+  mips/loongson2/events mips/loongson2/unit_masks \

   ppc/7450/events ppc/7450/unit_masks \

   ppc/e500/events ppc/e500/unit_masks \

   ppc/e500v2/events ppc/e500v2/unit_masks \

diff --git a/events/mips/loongson2/events b/events/mips/loongson2/events

new file mode 100644

index 0000000..ce1caf3

--- /dev/null

+++ b/events/mips/loongson2/events

@@ -0,0 +1,33 @@

+event:0x00 counters:0 um:zero minimum:10000 name:CPU_CLK_UNHALTED : Cycles
outside of haltstate

+event:0x01 counters:0 um:zero minimum:5000 name:BRANCH_INSTRUCTIONS :
Branch instructions

+event:0x02 counters:0 um:zero minimum:400 name:JUMP_INSTRUCTIONS : JR
instructions

+event:0x03 counters:0 um:zero minimum:500 name:JR31_INSTRUCTIONS :
JR(rs=31) instructions

+event:0x04 counters:0 um:zero minimum:500 name:ICACHE_MISSES : Instruction
cache misses

+event:0x05 counters:0 um:zero minimum:500 name:ALU1_ISSUED : ALU1 operation
issued
```

```
+event:0x06 counters:0 um:zero minimum:8000 name:MEM_ISSUED : Memory
read/write issued

+event:0x07 counters:0 um:zero minimum:300 name:FALU1_ISSUED : Float ALU1
operation issued

+event:0x08 counters:0 um:zero minimum:200 name:BHT_BRANCH_INSTRUCTIONS :
BHT prediction instructions

+event:0x09 counters:0 um:zero minimum:200 name:MEM_READ : Read from primary
memory

+event:0x0a counters:0 um:zero minimum:300 name:FQUEUE_FULL : Fix queue full

+event:0x0b counters:0 um:zero minimum:300 name:ROQ_FULL : Reorder queue
full

+event:0x0c counters:0 um:zero minimum:300 name:CP0_QUEUE_FULL : CP0 queue
full

+event:0x0d counters:0 um:zero minimum:300 name:TLB_REFILL : TLB refill
exception

+event:0x0e counters:0 um:zero minimum:5 name:EXCEPTION : Exceptions

+event:0x0f counters:0 um:zero minimum:300 name:INTERNAL_EXCEPTION :
Internal exceptions

+event:0x10 counters:1 um:zero minimum:5000 name:INSTRUCTION_COMMITTED :
Instruction committed

+event:0x11 counters:1 um:zero minimum:500 name:BRANCHES_MISPREDICTED :
Branch mispredicted

+event:0x12 counters:1 um:zero minimum:200 name:JR_MISPREDICTED : JR
mispredicted

+event:0x13 counters:1 um:zero minimum:200 name:JR31_MISPREDICTED : JR31
mispredicted

+event:0x14 counters:1 um:zero minimum:500 name:DCACHE_MISSES : Data cache
misses

+event:0x15 counters:1 um:zero minimum:500 name:ALU2_ISSUED : ALU2 operation
issued

+event:0x16 counters:1 um:zero minimum:500 name:FALU2_ISSUED : FALU2
operation issued

+event:0x17 counters:1 um:zero minimum:500 name:UNCACHED_ACCESS : Uncached
accesses

+event:0x18 counters:1 um:zero minimum:500 name:BHT_MISPREDICTED : Branch
history table mispredicted

+event:0x19 counters:1 um:zero minimum:5000 name:MEM_WRITE : Write to memory

+event:0x1a counters:1 um:zero minimum:500 name:FTQ_FULL : Float queue full
```

```
+event:0x1b counters:1 um:zero minimum:500 name:BRANCH_QUEUE_FULL : Branch
queue full

+event:0x1c counters:1 um:zero minimum:500 name:ITLB_MISSES : Instruction
TLB misses

+event:0x1d counters:1 um:zero minimum:500 name:TOTAL_EXCEPTIONS : Total
exceptions

+event:0x1e counters:1 um:zero minimum:500 name:LOAD_SPECULATION_MISSES :
Load speculation misses

+event:0x1f counters:1 um:zero minimum:500 name:CP0Q_FORWARD_VALID : CP0
queue forward valid

+event:0x20 counters:2 um:zero minimum:100 name:UNALIGNED_ACCESS : Unaligned
access

diff --git a/events/mips/loongson2/unit_masks
b/events/mips/loongson2/unit_masks

new file mode 100644

index 0000000..2ff3710

--- /dev/null

+++ b/events/mips/loongson2/unit_masks

@@ -0,0 +1,2 @@

+name:zero type:mandatory default:0x0

+  0x0 No unit mask

diff --git a/libop/op_cpu_type.c b/libop/op_cpu_type.c

index e168b43..046df86 100644

--- a/libop/op_cpu_type.c

+++ b/libop/op_cpu_type.c

@@ -60,6 +60,7 @@ static struct cpu_descr const cpu_descrs[MAX_CPU_TYPE] = {

   { "Sibyte SB1", "mips/sb1", CPU_MIPS_SB1, 4 },

   { "NEC VR5432", "mips/vr5432", CPU_MIPS_VR5432, 2 },

   { "NEC VR5500", "mips/vr5500", CPU_MIPS_VR5500, 2 },

+  { "ICT LOONGSON2", "mips/loongson2", CPU_MIPS_LOONGSON2, 3},

   { "e500", "ppc/e500", CPU_PPC_E500, 4 },

   { "e500v2", "ppc/e500v2", CPU_PPC_E500_2, 4 },

   { "Core Solo / Duo", "i386/core", CPU_CORE, 2 },
```

```
diff --git a/libop/op_cpu_type.h b/libop/op_cpu_type.h

index 133a4f8..a1f9c72 100644

--- a/libop/op_cpu_type.h

+++ b/libop/op_cpu_type.h

@@ -57,6 +57,7 @@ typedef enum {

    CPU_MIPS_SB1, /**< Broadcom SB1 */

    CPU_MIPS_VR5432, /**< NEC VR5432 */

    CPU_MIPS_VR5500, /**< MIPS VR5500, VR5532 and VR7701 */

+   CPU_MIPS_LOONGSON2,

    CPU_PPC_E500,/**< e500 */

    CPU_PPC_E500_2,  /**< e500v2 */

    CPU_CORE, /**< Core Solo / Duo series */

diff --git a/libop/op_events.c b/libop/op_events.c

index ad95d86..974cb9d 100644

--- a/libop/op_events.c

+++ b/libop/op_events.c

@@ -1060,6 +1060,10 @@ void op_default_event(op_cpu cpu_type, struct
op_default_event_descr * descr)

          descr->name = "INSTRUCTIONS_EXECUTED";

          break;



+      case CPU_MIPS_LOONGSON2:

+         descr->name = "CPU_CLK_UNHALTED";

+         break;

+

       case CPU_PPC_E500:

       case CPU_PPC_E500_2:

       case CPU_PPC_E300:

diff --git a/libutil/op_cpufreq.c b/libutil/op_cpufreq.c

index 78a6333..1bdfb05 100644
```

```
--- a/libutil/op_cpufreq.c
+++ b/libutil/op_cpufreq.c
@@ -53,6 +53,12 @@ double op_cpu_frequency(void)
       }
       /* s390 doesn't provide cpu freq, checked up to 2.6-test4 */

+      /* MIPS LOONGSON2 */
+      if (sscanf(line, "BogoMIPS : %lf", &fval) == 1){
+          fval = fval * 3 / 2;
+          break;
+      }
+
       free(line);
    }

diff --git a/utils/ophelp.c b/utils/ophelp.c
index 5f6c534..e164d0d 100644
--- a/utils/ophelp.c
+++ b/utils/ophelp.c
@@ -617,6 +617,9 @@ int main(int argc, char const * argv[])
           "http://www.necel.com/nesdis/image/U16677EJ3V0UM00.pdf\n";
       break;

+  case CPU_MIPS_LOONGSON2:
+      break;
+
    case CPU_PPC_E500:
    case CPU_PPC_E500_2:
       event_doc =
```