Subject: [PATCH COMMIT] diff-merge-2.6.16.9-20060424
Posted by xemul on Mon, 24 Apr 2006 14:44:09 GMT
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Patch from OpenVZ team <devel@openvz.org>
Merge 2.6.16.9 from /linux/kernel/git/stable/linux-2.6.16.y

From: OpenVZ team <devel@openvz.org>
Date: Mon, 24 Apr 2006 14:41:18 +0000 (+0400)
Subject: Merge 2.6.16.9 from /linux/kernel/git/stable/linux-2.6.16.y
X-Git-Url:
http://10.11.12.17/cgi-bin/gitweb.cgi?p=kernel;a=commitdiff;h=35ceb3e3ef2337a0d9639297f708a
588c1073bd2

Merge 2.6.16.9 from /linux/kernel/git/stable/linux-2.6.16.y

```
--- a/arch/i386/kernel/cpu/amd.c
+++ b/arch/i386/kernel/cpu/amd.c
@@ -207,6 +207,8 @@ static void __init init_amd(struct cpuin
   set_bit(X86_FEATURE_K7, c->x86_capability);
   break;
  }
+ if (c->x86 >= 6)
+  set_bit(X86_FEATURE_FXSAVE_LEAK, c->x86_capability);

  display_cacheinfo(c);

--- a/arch/x86_64/kernel/process.c
+++ b/arch/x86_64/kernel/process.c
@@ -548,8 +548,6 @@ __switch_to(struct task_struct *prev_p,
  int cpu = smp_processor_id();
  struct tss_struct *tss = &per_cpu(init_tss, cpu);

- unlazy_fpu(prev_p);
-
  /*
   * Reload esp0, LDT and the page table pointer:
   */
@@ -612,6 +610,12 @@ __switch_to(struct task_struct *prev_p,
  prev->userrsp = read_pda(oldrsp);
  write_pda(oldrsp, next->userrsp);
  write_pda(pcurrent, next_p);
+
+  /* This must be here to ensure both math_state_restore() and
```

```
+    kernel_fpu_begin() work consistently.
+    And the AMD workaround requires it to be after DS reload. */
+ unlazy_fpu(prev_p);
+
  write_pda(kernelstack,
     task_stack_page(next_p) + THREAD_SIZE - PDA_STACKOFFSET);

--- a/arch/x86_64/kernel/setup.c
+++ b/arch/x86_64/kernel/setup.c
@@ -909,6 +909,10 @@ static int __init init_amd(struct cpuinf
  if (c->x86 == 15 && ((level >= 0x0f48 && level < 0x0f50) || level >= 0x0f58))
   set_bit(X86_FEATURE_REP_GOOD, &c->x86_capability);

+ /* Enable workaround for FXSAVE leak */
+ if (c->x86 >= 6)
+  set_bit(X86_FEATURE_FXSAVE_LEAK, &c->x86_capability);
+
  r = get_model_name(c);
  if (!r) {
   switch (c->x86) {
--- a/include/asm-i386/cpufeature.h
+++ b/include/asm-i386/cpufeature.h
@@ -70,6 +70,7 @@
 #define X86_FEATURE_P3  (3*32+ 6) /* P3 */
 #define X86_FEATURE_P4  (3*32+ 7) /* P4 */
 #define X86_FEATURE_CONSTANT_TSC (3*32+ 8) /* TSC ticks at a constant rate */
+#define X86_FEATURE_FXSAVE_LEAK (3*32+10) /* FXSAVE leaks FOP/FIP/FOP */

 /* Intel-defined CPU features, CPUID level 0x00000001 (ecx), word 4 */
 #define X86_FEATURE_XMM3 (4*32+ 0) /* Streaming SIMD Extensions-3 */
--- a/include/asm-i386/i387.h
+++ b/include/asm-i386/i387.h
@@ -13,6 +13,7 @@

 #include <linux/sched.h>
 #include <linux/init.h>
+#include <linux/kernel_stat.h>
 #include <asm/processor.h>
 #include <asm/sigcontext.h>
 #include <asm/user.h>
@@ -38,17 +39,38 @@ extern void init_fpu(struct task_struct
 extern void kernel_fpu_begin(void);
 #define kernel_fpu_end() do { stts(); preempt_enable(); } while(0)

+/* We need a safe address that is cheap to find and that is already
+   in L1 during context switch. The best choices are unfortunately
+   different for UP and SMP */
+#ifdef CONFIG_SMP
```

```
+#define safe_address (__per_cpu_offset[0])
+#else
+#define safe_address (kstat_cpu(0).cpustat.user)
+#endif
+
 /*
  * These must be called with preempt disabled
  */
 static inline void __save_init_fpu( struct task_struct *tsk )
 {
+ /* Use more nops than strictly needed in case the compiler
+    varies code */
  alternative_input(
-  "fnsave %1 ; fwait ;" GENERIC_NOP2,
-  "fxsave %1 ; fnclex",
+  "fnsave %[fx] ;fwait;" GENERIC_NOP8 GENERIC_NOP4,
+  "fxsave %[fx]\n"
+  "bt $7,%[fsw] ; jc 1f ; fnclex\n1:",
    X86_FEATURE_FXSR,
-  "m" (tsk->thread.i387.fxsave)
-  :"memory");
+  [fx] "m" (tsk->thread.i387.fxsave),
+  [fsw] "m" (tsk->thread.i387.fxsave.swd) : "memory");
+ /* AMD K7/K8 CPUs don't save/restore FDP/FIP/FOP unless an exception
+    is pending.  Clear the x87 state here by setting it to fixed
+       values. __per_cpu_offset[0] is a random variable that should be in L1 */
+ alternative_input(
+  GENERIC_NOP8 GENERIC_NOP2,
+  "emms\n\t"    /* clear stack tags */
+  "fildl %[addr]",  /* set F?P to defined value */
+  X86_FEATURE_FXSAVE_LEAK,
+  [addr] "m" (safe_address));
  task_thread_info(tsk)->status &= ~TS_USEDFPU;
 }

--- a/include/asm-x86_64/cpufeature.h
+++ b/include/asm-x86_64/cpufeature.h
@@ -64,6 +64,7 @@
 #define X86_FEATURE_REP_GOOD (3*32+ 4) /* rep microcode works well on this CPU */
 #define X86_FEATURE_CONSTANT_TSC (3*32+5) /* TSC runs at constant rate */
 #define X86_FEATURE_SYNC_RDTSC  (3*32+6)  /* RDTSC syncs CPU core */
+#define X86_FEATURE_FXSAVE_LEAK (3*32+7)  /* FIP/FOP/FDP leaks through FXSAVE */

 /* Intel-defined CPU features, CPUID level 0x00000001 (ecx), word 4 */
 #define X86_FEATURE_XMM3 (4*32+ 0) /* Streaming SIMD Extensions-3 */
--- a/include/asm-x86_64/i387.h
+++ b/include/asm-x86_64/i387.h
@@ -72,6 +72,23 @@ extern int set_fpregs(struct task_struct
```

```
 #define set_fpu_swd(t,val) ((t)->thread.i387.fxsave.swd = (val))
 #define set_fpu_fxsr_twd(t,val) ((t)->thread.i387.fxsave.twd = (val))

+#define X87_FSW_ES (1 << 7) /* Exception Summary */
+
+/* AMD CPUs don't save/restore FDP/FIP/FOP unless an exception
+   is pending. Clear the x87 state here by setting it to fixed
+   values. The kernel data segment can be sometimes 0 and sometimes
+   new user value. Both should be ok.
+   Use the PDA as safe address because it should be already in L1. */
+static inline void clear_fpu_state(struct i387_fxsave_struct *fx)
+{
+ if (unlikely(fx->swd & X87_FSW_ES))
+   asm volatile("fnclex");
+ alternative_input(ASM_NOP8 ASM_NOP2,
+           "    emms\n"  /* clear stack tags */
+           "    fildl %%gs:0", /* load to clear state */
+       X86_FEATURE_FXSAVE_LEAK);
+}
+
 static inline int restore_fpu_checking(struct i387_fxsave_struct *fx)
 {
  int err;
@@ -119,6 +136,7 @@ static inline int save_i387_checking(str
 #endif
  if (unlikely(err))
   __clear_user(fx, sizeof(struct i387_fxsave_struct));
+ /* No need to clear here because the caller clears USED_MATH */
  return err;
 }

@@ -149,7 +167,7 @@ static inline void __fxsave_clear(struct
     "i" (offsetof(__typeof__(*tsk),
           thread.i387.fxsave)));
 #endif
- __asm__ __volatile__("fnclex");
+ clear_fpu_state(&tsk->thread.i387.fxsave);
 }

 static inline void kernel_fpu_begin(void)
```

File Attachments

1) diff-merge-2.6.16.9-20060424, downloaded 480 times