

# **The Linux Kernel Tracepoint API**

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# Chapter 1. Introduction

Tracepoints are static probe points that are located in strategic points throughout the kernel. 'Probes' register/unregister with tracepoints via a callback mechanism. The 'probes' are strictly typed functions that are passed a unique set of parameters defined by each tracepoint.

From this simple callback mechanism, 'probes' can be used to profile, debug, and understand kernel behavior. There are a number of tools that provide a framework for using 'probes'. These tools include Systemtap, ftrace, and LTTng.

Tracepoints are defined in a number of header files via various macros. Thus, the purpose of this document is to provide a clear accounting of the available tracepoints. The intention is to understand not only what tracepoints are available but also to understand where future tracepoints might be added.

The API presented has functions of the form:

`trace_tracepointname(function parameters)`. These are the tracepoints callbacks that are found throughout the code. Registering and unregistering probes with these callback sites is covered in the `Documentation/trace/*` directory.



# Chapter 2. IRQ

## trace\_irq\_handler\_entry

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### Name

`trace_irq_handler_entry` — called immediately before the irq action handler

### Synopsis

```
void trace_irq_handler_entry (int irq, struct irqaction *  
action);
```

### Arguments

*irq*

irq number

*action*

pointer to struct irqaction

### Description

The struct irqaction pointed to by *action* contains various information about the handler, including the device name, *action->name*, and the device id, *action->dev\_id*. When used in conjunction with the `irq_handler_exit` tracepoint, we can figure out irq handler latencies.

# trace\_irq\_handler\_exit

## LINUX

Kernel Hackers Manual May 2010

### Name

`trace_irq_handler_exit` — called immediately after the irq action handler returns

### Synopsis

```
void trace_irq_handler_exit (int irq, struct irqaction *  
action, int ret);
```

### Arguments

*irq*

irq number

*action*

pointer to struct irqaction

*ret*

return value

### Description

If the *ret* value is set to `IRQ_HANDLED`, then we know that the corresponding *action->handler* successfully handled this irq. Otherwise, the irq might be a shared irq line, or the irq was not handled successfully. Can be used in conjunction with the `irq_handler_entry` to understand irq handler latencies.



# trace\_softirq\_entry

## LINUX

Kernel Hackers Manual May 2010

### Name

`trace_softirq_entry` — called immediately before the softirq handler

### Synopsis

```
void trace_softirq_entry (struct softirq_action * h, struct  
softirq_action * vec);
```

### Arguments

*h*

pointer to struct `softirq_action`

*vec*

pointer to first struct `softirq_action` in `softirq_vec` array

### Description

The *h* parameter, contains a pointer to the struct `softirq_action` which has a pointer to the action handler that is called. By subtracting the *vec* pointer from the *h* pointer, we can determine the softirq number. Also, when used in combination with the `softirq_exit` tracepoint we can determine the softirq latency.

# trace\_softirq\_exit

## LINUX

Kernel Hackers Manual May 2010

### Name

`trace_softirq_exit` — called immediately after the softirq handler returns

### Synopsis

```
void trace_softirq_exit (struct softirq_action * h, struct  
softirq_action * vec);
```

### Arguments

*h*

pointer to struct `softirq_action`

*vec*

pointer to first struct `softirq_action` in `softirq_vec` array

### Description

The *h* parameter contains a pointer to the struct `softirq_action` that has handled the softirq. By subtracting the *vec* pointer from the *h* pointer, we can determine the softirq number. Also, when used in combination with the `softirq_entry` tracepoint we can determine the softirq latency.