

guider: a system-wide performance analyzer

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guider

- A system-wide performance analyzer
 - thread analysis
 - function analysis
 - top analysis
 - file analysis
- Open-source contribution
 - <https://github.com/iipeace/guider>

Function Analysis

- Dig deeper into your machine



Requirement

- Linux kernel (≥ 3.0)
- Python (≥ 2.7)
- Kernel configuration
 - CONFIG_FTRACE
 - CONFIG_TRACING, CONFIG_TRACING_SUPPORT
 - CONFIG_EVENT_TRACING
 - CONFIG_TRACEPOINTS
 - CONFIG_DYNAMIC_FTRACE
 - CONFIG_FTRACE_SYSCALLS
 - CONFIG_STACKTRACE, CONFIG_STACKTRACE_SUPPORT, CONFIG_USER_STACKTRACE_SUPPORT
 - CONFIG_UPROBES, CONFIG_UPROBE_EVENT
 - CONFIG_KPROBES, CONFIG_KPROBE_EVENTS
- Kernel patch
 - ust_arm_apcs.patch (only for ARM)

Installation

- git

```
$ git clone https://github.com/iipeace/guider.git
```

```
$ cd guider
```

```
# make && make install
```

- pip

```
# pip install --pre guider
```

Test code (basic)

- memTest()
 - Alloc 10MB to memory
- diskTest()
 - Read 10MB from disk
- cpuTest()
 - Spin in a loop

```
#include <stdio.h>
#include <fcntl.h>

char *g_buf = NULL;
long g_bufsize = 1024 * 1024 * 10; // 10MB

void memTest() {
    long cnt;
    g_buf = (char *)malloc(g_bufsize);
    memset(g_buf, (char)0, g_bufsize); // ALLOC 10MB
}

void diskTest() {
    int fd = open("testBin", O_RDONLY);
    read(fd, g_buf, g_bufsize); // READ 10MB
}

void cpuTest() {
    long idx;
    while(1); // SPIN
    for(idx= 0; idx< g_bufsize * 100; idx++)
        NULL; // SPIN
}

void faultTest() {
    char res = *((char *)0); // SEGFALT
}

void startTest() {
    memTest();
    diskTest();
    cpuTest();
    //faultTest();
}

int main() {
    startTest();
    return 0;
}
```

Function analysis (basic)

```
$ gcc test.c -rdynamic -fno-omit-frame-pointer
```

```
# guider record -f -s ./ -e mb -u
```

```
$ ./a.out &
```

```
# guider stop
```

```
# guider ./guider.dat -o ./ -l $(which addr2line) -r /
```

```
View guider.out
```

Run in background

Trace also memory and block

Save trace file in current directory

Function mode

Set root path

Set addr2line path

Save report file in current directory

Function analysis (basic)

[Function Thread Info] [Elapsed: 1565470.501] [Start: 2063704.322] [Threads: 36] [LogSize: 8525 KB]

Name	Tid	Pid	Target	CPU	MEM	(USER	/ BUF	/ KERN	)	UFREE	HEAP	BLK_RD	BLK_WR	CUSTOM	DIE	NEW
a.out	30807	----	*	87.0%	20800k	12520k/	16k/	8264k	)	72k	0k	10396k	0k	0		v
guider	30804	30804	*	5.2%	8864k	8k/	8552k/	304k	)	0k	0k	4k	8508k	0		
synergyc	3445	3443	*	4.9%	0k	0k/	0k/	0k	)	0k	0k	0k	0k	0		
chromium-browser	16887	16887	*	1.2%	244k	232k/	0k/	12k	)	160k	0k	0k	0k	0		
chromium-browser	4084	4084	*	0.2%	216k	216k/	0k/	0k	)	0k	0k	0k	0k	0		
Plex DLNA Serve	26078	3007	*	0.2%	0k	0k/	0k/	0k	)	32k	0k	0k	24k	0		
ksoftirqd/1	37	37	*	0.2%	0k	0k/	0k/	0k	)	0k	0k	0k	0k	0		
irqbalance	1300	1300	*	0.1%	16k	0k/	0k/	16k	)	4k	0k	0k	0k	0		
ksoftirqd/4	52	52	*	0.1%	0k	0k/	0k/	0k	)	0k	0k	0k	0k	0		
ksoftirqd/2	42	42	*	0.1%	0k	0k/	0k/	0k	)	0k	0k	0k	0k	0		
Plex Media Serv	2961	2953	*	0.1%	232k	0k/	232k/	0k	)	0k	0k	232k	0k	0		
Plex DLNA Serve	25949	3007	*	0.1%	0k	0k/	0k/	0k	)	0k	0k	0k	0k	0		
chromium-browser	3709	3709	*	0.1%	0k	0k/	0k/	0k	)	0k	0k	0k	0k	0		
Plex DLNA Serve	26525	3007	*	0.1%	44k	0k/	12k/	32k	)	12k	0k	0k	36k	0		
chromium-browser	4051	4051	*	0.1%	132k	132k/	0k/	0k	)	4k	0k	0k	0k	0		
python	2992	2963	*	0.1%	0k	0k/	0k/	0k	)	0k	0k	0k	0k	0		
Plex DLNA Serve	26520	3007	*	0.1%	0k	0k/	0k/	0k	)	0k	0k	0k	24k	0		
chromium-browser	4015	4015	*	0.1%	0k	0k/	0k/	0k	)	4k	0k	0k	0k	0		
chromium-browser	4260	4260	*	0.0%	8k	8k/	0k/	0k	)	0k	0k	0k	0k	0		
Chrome_CacheThr	3754	3709	*	0.0%	272k	0k/	272k/	0k	)	0k	0k	268k	8k	0		
Xorg	1774	1774	*	0.0%	4k	0k/	0k/	4k	)	4k	0k	0k	0k	0		
Plex DLNA Serve	26077	3007	*	0.0%	0k	0k/	0k/	0k	)	0k	0k	0k	24k	0		
BrowserBlocking	3749	3709	*	0.0%	168k	16k/	152k/	0k	)	0k	0k	160k	24k	0		
chromium-browser	4005	4005	*	0.0%	8k	8k/	0k/	0k	)	48k	0k	0k	0k	0		
chromium-browser	12210	12210	*	0.0%	68k	56k/	0k/	12k	)	936k	0k	0k	0k	0		
unity-settings-	2017	2017	*	0.0%	4k	0k/	0k/	4k	)	4k	0k	0k	0k	0		
jbd2/sda2-8	309	309	*	0.0%	16k	0k/	16k/	0k	)	0k	0k	0k	20k	0		
gmain	1093	1090	*	0.0%	4k	0k/	4k/	0k	)	0k	0k	4k	0k	0		
kworker/u24:2	30483	30483	*	0.0%	0k	0k/	0k/	0k	)	0k	0k	0k	0k	0		
Plex DLNA Serve	3263	3007	*	0.0%	0k	0k/	0k/	0k	)	0k	0k	0k	0k	0		
chromium-browser	4359	4359	*	0.0%	60k	48k/	0k/	12k	)	924k	0k	0k	0k	0		
bash	3541	3541	*	0.0%	80k	72k/	0k/	8k	)	0k	0k	0k	0k	0		
screen	3460	3460	*	0.0%	4k	0k/	0k/	4k	)	4k	0k	0k	0k	0		
Plex Media Serv	30795	2953	*	0.0%	16k	16k/	0k/	0k	)	0k	0k	0k	0k	0		
Plex DLNA Serve	3015	3007	*	0.0%	8k	0k/	8k/	0k	)	0k	0k	0k	8k	0		
gmain	2676	2636	*	0.0%	8k	0k/	8k/	0k	)	0k	0k	8k	0k	0		

```
# guider ./guider.dat -o ./ -l $(which addr2line) -r / -g 30807
```

View guider.out

Function analysis (basic)

```
void cpuTest() {
    long idx;
    while(1); // SPIN
    for(idx= 0; idx< g_bufsize * 100; idx++)
        NULL; // SPIN
}
```

[Function CPU Info] [Cnt: 820] [Interval: 21ms] (USER)

```
=====
Usage | Function | Binary | Source
=====
99.5% | cpuTest | /media/disk/work/test/a.out | /home/iipeace/work/test/guiderTest.c:20 (discr
+ 100.0% | <- startTest [/media/disk/work/test/a.out] <- main [/media/disk/work/test/a.out]
| <- __libc_start_main [/lib/x86_64-linux-gnu/libc-2.19.so]
-----
0.2% | memset | /lib/x86_64-linux-gnu/libc-2.19.so | /build/eglibc-oGUzWx/eglibc-2.19/string/./sysde
emset.S:80
+ 100.0% | <- startTest [/media/disk/work/test/a.out] <- main [/media/disk/work/test/a.out]
| <- __libc_start_main [/lib/x86_64-linux-gnu/libc-2.19.so]
-----
0.2% | __read | /lib/x86_64-linux-gnu/libc-2.19.so | /build/eglibc-oGUzWx/eglibc-2.19/io/./sysdeps/i
-template.S:81
+ 100.0% | <- startTest [/media/disk/work/test/a.out] <- main [/media/disk/work/test/a.out]
| <- __libc_start_main [/lib/x86_64-linux-gnu/libc-2.19.so]
=====
```

[Function CPU Info] [Cnt: 820] [Interval: 21ms] (KERNEL)

```
=====
Usage | Function
=====
100.0% | hrtimer_interrupt
+ 99.5% | <- local_apic_timer_interrupt <- smp_apic_timer_interrupt <- apic_timer_interrupt
+ 0.2% | <- local_apic_timer_interrupt <- smp_apic_timer_interrupt <- apic_timer_interrupt <- print_context_stack <- dump_trace
| <- save_stack_trace <- __ftrace_trace_stack
+ 0.1% | <- local_apic_timer_interrupt <- smp_apic_timer_interrupt <- apic_timer_interrupt <- __do_page_fault <- do_page_fault <- page_fault
+ 0.1% | <- local_apic_timer_interrupt <- smp_apic_timer_interrupt <- apic_timer_interrupt <- __kernel_text_address <- print_context_stack
| <- dump_trace <- save_stack_trace
=====
```

Function analysis (basic)

```
[Function Memory Info] [Total: 20816KB] [Alloc: 20836KB(3165)] [Free: 180KB(45)] (USER)
```

```
=====
Usage ( Ushr / Buf / Ker ) | _____ Function _____ | _____ Binary _____ | _____ Source _____
=====
10256K( 2048/ 0/ 8208) | memset | /lib/x86_64-linux-gnu/libc-2.19.so | /build/eglibc-oGUzwX/eglibc-
./sysdeps/x86_64/memset.S:80
+ 10256K( 2048/ 0/ 8208) | <- startTest [/media/disk/work/test/a.out] <- main [/media/disk/work/test/a.out]
<- __libc_start_main [/lib/x86_64-linux-gnu/libc-2.19.so]
=====
12K( 12/ 0/ 0) | elf_machine_rela_relative | /lib/x86_64-linux-gnu/ld-2.19.so | /build/eglibc-oGUzwX/eglibc-
/sysdeps/x86_64/dl-machine.h:493
+ 12K( 12/ 0/ 0) | <- dl_main [/lib/x86_64-linux-gnu/ld-2.19.so] <- _dl_sysdep_start [/lib/x86_64-linux-gnu/ld-2.19.so]
=====
8K( 8/ 0/ 0) | realloc | /lib/x86_64-linux-gnu/ld-2.19.so | /build/eglibc-oGUzwX/eglibc-
./sysdeps/x86_64/multiarch/./memcpy.S:167
+ 4K( 4/ 0/ 0) | <- _dl_map_object [/lib/x86_64-linux-gnu/ld-2.19.so]
=====
8K( 4/ 0/ 4) | sysmalloc | /malloc.c:2337
=====
[Function Memory Info] [Total: 20816KB] [Alloc: 20836KB(3165)]
=====
Usage ( Ushr / Buf / Ker ) | _____
=====
```

```
void memTest() {
    long cnt;
    g_buf = (char *)malloc(g_bufsize);
    memset(g_buf, (char)0, g_bufsize); // ALLOC 10MB
}
```

```
=====
10396K( 10380/ 16/ 0) | __page_cache_alloc
+ 10112K( 10112/ 0/ 0) | <- __do_page_cache_readahead <- ondemand_readahead <- page_cache_async_readahead <- generic_file_aio_read
<- do_sync_read <- vfs_read <- Sys_read <- system_call_fastpath
+ 256K( 256/ 0/ 0) | <- __do_page_cache_readahead <- ondemand_readahead <- page_cache_sync_readahead <- generic_file_aio_read
<- do_sync_read <- vfs_read <- Sys_read <- system_call_fastpath
+ 12K( 12/ 0/ 0) | <- __do_page_cache_readahead <- ondemand_readahead <- page_cache_sync_readahead <- generic_file_aio_read
<- do_sync_read <- vfs_read <- kernel_read <- prepare_binprm <- do_execve_common.isra.23 <- Sys_execve
<- stub_execve
+ 12K( 0/ 12/ 0) | <- find_or_create_page <- __getblk <- ext4_get_branch <- ext4_ind_map_blocks <- ext4_map_blocks <- __ext4_get_block
<- ext4_get_block <- do_mpage_readpage <- mpage_readpages <- ext4_readpages <- __do_page_cache_readahead
<- ondemand_readahead <- page_cache_async_readahead <- generic_file_aio_read <- do_sync_read <- vfs_read <- Sys_read
<- system_call_fastpath
+ 4K( 0/ 4/ 0) | <- find_or_create_page <- __getblk <- ext4_get_branch <- ext4_ind_map_blocks <- ext4_map_blocks <- __ext4_get_block
<- ext4_get_block <- do_mpage_readpage <- mpage_readpages <- ext4_readpages <- __do_page_cache_readahead
<- ondemand_readahead <- page_cache_sync_readahead <- generic_file_aio_read <- do_sync_read <- vfs_read <- Sys_read
<- system_call_fastpath
=====
8192K( 0/ 0/ 8192) | do_huge_pmd_anonymous_page
+ 8192K( 0/ 0/ 8192) | <- handle_mm_fault <- __do_page_fault <- do_page_fault <- page_fault
=====
2096K( 2096/ 0/ 0) | handle_mm_fault
+ 2088K( 2088/ 0/ 0) | <- __do_page_fault <- do_page_fault <- page_fault
+ 4K( 4/ 0/ 0) | <- __get_user_pages <- get_user_pages <- copy_strings.isra.17 <- copy_strings_kernel <- do_execve_common.isra.23
<- Sys_execve <- stub_execve
+ 4K( 4/ 0/ 0) | <- __do_page_fault <- do_page_fault <- page_fault <- load_elf_binary <- search_binary_handler
<- do_execve_common.isra.23 <- Sys_execve <- stub_execve
=====
```

Function analysis (basic)

```
void diskTest() {
    int fd = open("testBin", O_RDONLY);
    read(fd, g_buf, g_bufsize); // READ 10MB
}
```

[Function BLK_RD Info] [Size: 10396KB] [Cnt: 90] (USER)

Usage	Function	Binary	Source
10384K	__read	/lib/x86_64-linux-gnu/libc-2.19.so	/build/eglibc-oGuzwX/eglibc-2.19/io/./sysdeps/v
+ 10384K	-<- startTest [/media/disk/work/test/a.out] <- main [/media/disk/work/test/a.out] <- __libc_start_main [/lib/x86_64-linux-gnu/libc-2.19.so]		
12K	00007ff6563001e7	??	

[Function BLK_RD Info] [Size: 10396KB] [Cnt: 90] (KERNEL)

Usage	Function	Binary	Source
10396K	submit_bio		
+ 10016K	<- mpage_readpages <- ext4_readpages <- __do_page_cache_readahead <- ondemand_readahead <- page_cache_async_readahead <- generic_file_aio_read <- do_sync_read <- vfs_read <- Sys_read <- system_call_fastpath		
+ 128K	<- mpage_readpages <- ext4_readpages <- __do_page_cache_readahead <- ondemand_readahead <- page_cache_sync_readahead <- generic_file_aio_read <- do_sync_read <- vfs_read <- Sys_read <- system_call_fastpath		
+ 96K	<- do_mpage_readpage <- mpage_readpages <- ext4_readpages <- __do_page_cache_readahead <- ondemand_readahead <- page_cache_async_readahead <- generic_file_aio_read <- do_sync_read <- vfs_read <- Sys_read <- system_call_fastpath		
+ 80K	<- do_mpage_readpage <- mpage_readpages <- ext4_readpages <- __do_page_cache_readahead <- ondemand_readahead <- page_cache_sync_readahead <- generic_file_aio_read <- do_sync_read <- vfs_read <- Sys_read <- system_call_fastpath		
+ 48K	<- do_mpage_readpage <- mpage_readpages <- ext4_readpages <- __do_page_cache_readahead <- ondemand_readahead <- page_cache_sync_readahead <- generic_file_aio_read <- do_sync_read <- vfs_read <- Sys_read <- system_call_fastpath		
+ 12K	<- _submit_bh <- bh_submit_read <- ext4_get_branch <- ext4_ind_map_blocks <- ext4_map_blocks <- ext4_get_block <- ext4_get_block <- do_mpage_readpage <- mpage_readpages <- ext4_readpages <- __do_page_cache_readahead <- ondemand_readahead <- page_cache_async_readahead <- generic_file_aio_read <- do_sync_read <- vfs_read <- Sys_read <- system_call_fastpath		
+ 12K	<- mpage_readpages <- ext4_readpages <- __do_page_cache_readahead <- ondemand_readahead <- page_cache_sync_readahead <- generic_file_aio_read <- do_sync_read <- vfs_read <- kernel_read <- prepare_binprm <- do_execve_common.isra.23 <- Sys_execve <- stub_execve		
+ 4K	<- _submit_bh <- bh_submit_read <- ext4_get_branch <- ext4_ind_map_blocks <- ext4_map_blocks <- ext4_get_block <- ext4_get_block <- do_mpage_readpage <- mpage_readpages <- ext4_readpages <- __do_page_cache_readahead <- ondemand_readahead <- page_cache_sync_readahead <- generic_file_aio_read <- do_sync_read <- vfs_read <- Sys_read <- system_call_fastpath		

Test code (advanced)

- diskTest()
 - Open "testBin" file
- faultTest()
 - Access violation

```
#include <stdio.h>
#include <fcntl.h>

char *g_buf = NULL;
long g_bufsize = 1024 * 1024 * 10; // 10MB

void memTest() {
    long cnt;
    g_buf = (char *)malloc(g_bufsize);
    memset(g_buf, (char)0, g_bufsize); // ALLOC 10MB
}

void diskTest() {
    int fd = open("testBin", O_RDONLY);
    read(fd, g_buf, g_bufsize); // READ 10MB
}

void cpuTest() {
    long idx;
    while(1); // SPIN
    for(idx= 0; idx< g_bufsize * 100; idx++)
        NULL; // SPIN
}

void faultTest() {
    char res = *((char *)0); // SEGFAULT
}

void startTest() {
    //memTest();
    diskTest();
    //cpuTest();
    faultTest();
}

int main() {
    startTest();
    return 0;
}
```

Function analysis (advanced)

```
$ gcc test.c -rdynamic -fno-omit-frame-pointer
```

```
# guider record -f -s ./ -u -ep \  
-K file:getname:NONE:**string, open:sys open:NONE;, segflt:bad area:NONE:
```

Save trace data immediately

```
$ ./a.out &
```

Trace bad_area function to detect fault

```
# guider stop
```

Trace sys_open function

Trace getname function including return value

```
# guider ./guider.dat -o ./ -l $(which addr2line) -r / -a
```

Show all information

```
View guider.out
```

Set root path

Set addr2line path

Save report file in current directory

Function analysis (advanced)

[Function Thread Info] [Elapsed: 1565467.778] [Start: 2067574.135] [Threads: 25] [LogSize: 408 KB]

Name	Tid	Pid	Target	CPU	MEM (USER / BUF / KERN)	UFREE	HEAP	BLK_RD	BLK_WR	CUSTOM	DIE	NEW
synergyc	3445	3443	*	30.1%	0k(0k/ 0k/ 0k)	0k|	0k|	0k|	0k|	0|		
guider	968	968	*	22.3%	0k(0k/ 0k/ 0k)	0k|	0k|	0k|	0k|	375|		
apport	976	-----	*	21.4%	0k(0k/ 0k/ 0k)	0k|	0k|	0k|	0k|	413|	v	v
chromium-browse	16887	16887	*	9.7%	0k(0k/ 0k/ 0k)	0k|	0k|	0k|	0k|	0|		
chromium-browse	4084	4084	*	1.9%	0k(0k/ 0k/ 0k)	0k|	0k|	0k|	0k|	0|		
chromium-browse	4051	4051	*	1.9%	0k(0k/ 0k/ 0k)	0k|	0k|	0k|	0k|	0|		
Chrome_ChildIOT	4085	4084	*	1.0%	0k(0k/ 0k/ 0k)	0k|	0k|	0k|	0k|	0|		
ksoftirqd/1	37	37	*	1.0%	0k(0k/ 0k/ 0k)	0k|	0k|	0k|	0k|	0|		
BrowserBlocking	3807	3709	*	1.0%	0k(0k/ 0k/ 0k)	0k|	0k|	0k|	0k|	0|		
<...>	3755	3709	*	1.0%	0k(0k/ 0k/ 0k)	0k|	0k|	0k|	0k|	0|		
Plex DLNA Serve	26077	3007	*	1.0%	0k(0k/ 0k/ 0k)	0k|	0k|	0k|	0k|	4|		
Plex DLNA Serve	26078	3007	*	1.0%	0k(0k/ 0k/ 0k)	0k|	0k|	0k|	0k|	4|		
Plex DLNA Serve	26520	3007	*	1.0%	0k(0k/ 0k/ 0k)	0k|	0k|	0k|	0k|	4|		
Plex DLNA Serve	26525	3007	*	1.0%	0k(0k/ 0k/ 0k)	0k|	0k|	0k|	0k|	4|		
Chrome_ChildIOT	4052	4051	*	1.0%	0k(0k/ 0k/ 0k)	0k|	0k|	0k|	0k|	0|		
bash	3541	3541	*	1.0%	0k(0k/ 0k/ 0k)	0k|	0k|	0k|	0k|	0|		
screen	3460	3460	*	1.0%	0k(0k/ 0k/ 0k)	0k|	0k|	0k|	0k|	0|		
gmain	2676	2636	*	1.0%	0k(0k/ 0k/ 0k)	0k|	0k|	0k|	0k|	0|		
ksoftirqd/5	57	57	*	1.0%	0k(0k/ 0k/ 0k)	0k|	0k|	0k|	0k|	0|		
rs:main Q:Reg	975	955	*	0.0%	0k(0k/ 0k/ 0k)	0k|	0k|	0k|	0k|	20|		
a.out	972	-----	*	0.0%	0k(0k/ 0k/ 0k)	0k|	0k|	0k|	0k|	12|	v	v
kworker/u24:1	31749	31749	*	0.0%	0k(0k/ 0k/ 0k)	0k|	0k|	0k|	0k|	0|		
Plex DLNA Serve	966	-----	*	0.0%	0k(0k/ 0k/ 0k)	0k|	0k|	0k|	0k|	0|	v	
Plex DLNA Serve	3115	3007	*	0.0%	0k(0k/ 0k/ 0k)	0k|	0k|	0k|	0k|	0|		

```
# guider ./guider.dat -o ./ -l $(which addr2line) -r / -a -g 972
```

View guider.out

Function analysis (advanced)

File names opened

[Function segflt_enter, open_enter, segflt_exit, file_enter, file_exit, open_exit History] [Cnt: 12] [Total: 12]

Event	Info
file_exit	(Sys_execve+0xf9/0x50 <ffffffff811c9179> <- getname <ffffffff811d1680>) arg1="/.a.out" by a.out(972) [007] [User] | 00007ff6563001e7[??] [Kernel] | stub_execve
file_exit	(do_sys_open+0xf9/0x2a0 <ffffffff811c0549> <- getname <ffffffff811d1680>) arg1="/etc/ld.so.cache" by a.out(972) [008] [User] | realloc[/lib/x86_64-linux-gnu/ld-2.19.so] [Kernel] | Sys_open <- [unknown/kretprobe'd]
open_exit	(system_call_fastpath+0x1a/0x1f <ffffffff8173a9dd> <- Sys_open <ffffffff811c06f0>) by a.out(972) [008] [User] | realloc[/lib/x86_64-linux-gnu/ld-2.19.so] [Kernel] | 0
file_exit	(do_sys_open+0xf9/0x2a0 <ffffffff811c0549> <- getname <ffffffff811d1680>) arg1="/lib/x86_64-linux-gnu/libc.so.6" by a.out(972) [008] [User] | realloc[/lib/x86_64-linux-gnu/ld-2.19.so] [Kernel] | Sys_open <- [unknown/kretprobe'd]
open_exit	(system_call_fastpath+0x1a/0x1f <ffffffff8173a9dd> <- Sys_open <ffffffff811c06f0>) by a.out(972) [008] [User] | realloc[/lib/x86_64-linux-gnu/ld-2.19.so] [Kernel] | 0
file_exit	(do_sys_open+0xf9/0x2a0 <ffffffff811c0549> <- getname <ffffffff811d1680>) arg1="testBin" by a.out(972) [008] [User] | open64[/lib/x86_64-linux-gnu/libc-2.19.so] <- startTest[/media/disk/work/test/a.out] [Kernel] | <- main[/media/disk/work/test/a.out] <- __libc_start_main[/lib/x86_64-linux-gnu/libc-2.19.so] [Kernel] | Sys_open <- [unknown/kretprobe'd]
open_exit	(system_call_fastpath+0x1a/0x1f <ffffffff8173a9dd> <- Sys_open <ffffffff811c06f0>) by a.out(972) [008] [User] | __open64[/lib/x86_64-linux-gnu/libc-2.19.so] [Kernel] | 0
segflt_exit	(__do_page_fault+0x462/0x560 <ffffffff817362a2> <- bad_area <ffffffff81722b0e>) by a.out(972) [008] [User] | __read[/lib/x86_64-linux-gnu/libc-2.19.so] <- startTest[/media/disk/work/test/a.out] [Kernel] | <- main[/media/disk/work/test/a.out] <- __libc_start_main[/lib/x86_64-linux-gnu/libc-2.19.so] [Kernel] | do_page_fault <- page_fault <- file_read_actor <- generic_file_aio_read <- do_sync_read <- vfs_read <- Sys_read <- system_call_fastpath
segflt_exit	(__do_page_fault+0x462/0x560 <ffffffff817362a2> <- bad_area <ffffffff81722b0e>) by a.out(972) [008] [User] | __read[/lib/x86_64-linux-gnu/libc-2.19.so] <- startTest[/media/disk/work/test/a.out] [Kernel] | <- main[/media/disk/work/test/a.out] <- __libc_start_main[/lib/x86_64-linux-gnu/libc-2.19.so] [Kernel] | do_page_fault <- page_fault <- file_read_actor <- generic_file_aio_read <- do_sync_read <- vfs_read <- Sys_read <- system_call_fastpath
segflt_exit	(__do_page_fault+0x462/0x560 <ffffffff817362a2> <- bad_area <ffffffff81722b0e>) by a.out(972) [008] [User] | faultTest[/media/disk/work/test/a.out] <- startTest[/media/disk/work/test/a.out] <- main[/media/disk/work/test/a.out] [Kernel] | <- __libc_start_main[/lib/x86_64-linux-gnu/libc-2.19.so] [Kernel] | do_page_fault <- page_fault

Call sequence of open

Call sequence of segmentation fault

Restrictions

- Target threads should be alive during profiling
 - If target threads should be killed then use `-e p` option when recording
- Relevant binaries should be built with bellow options
 - `-rdynamic -fno-omit-frame-pointer`
- A kernel patch is needed to trace user stack in ARM machine
 - `ust_arm_apcs.patch`
- the max length of a call chain is restricted by 8

Thanks 😊

<https://github.com/iipeace/guider>