

LINUX System Call Quick Reference

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Introduction

System call is the services provided by Linux kernel. In C programming, it often uses functions defined in **libc** which provides a wrapper for many system calls. Manual page section 2 provides more information about system calls. To get an overview, use “man 2 intro” in a command shell.

It is also possible to invoke **syscall()** function directly. Each system call has a function number defined in **<syscall.h>** or **<unistd.h>**. Internally, system call is invoked by software interrupt 0x80 to transfer control to the kernel. System call table is defined in Linux kernel source file “**arch/i386/kernel/entry.S**”.

System Call Example

```
#include <syscall.h>
#include <unistd.h>
#include <stdio.h>
#include <sys/types.h>

int main(void) {
    long ID1, ID2;
    /*-----*/
    /* direct system call      */
    /* SYS_getpid (func no. is 20) */
    /*-----*/
    ID1 = syscall(SYS_getpid);
    printf ("syscall(SYS_getpid)=%ld\n", ID1);

    /*-----*/
    /* "libc" wrapped system call */
    /* SYS_getpid (Func No. is 20) */
    /*-----*/
    ID2 = getpid();
    printf ("getpid()=%ld\n", ID2);

    return(0);
}
```

System Call Quick Reference

No	Func Name	Description	Source
1	exit	terminate the current process	kernel/exit.c
2	fork	create a child process	arch/i386/kernel/process.c
3	read	read from a file descriptor	fs/read_write.c
4	write	write to a file descriptor	fs/read_write.c
5	open	open a file or device	fs/open.c
6	close	close a file descriptor	fs/open.c
7	waitpid	wait for process termination	kernel/exit.c

8	creat	create a file or device ("man 2 open" for information)	fs/open.c
9	link	make a new name for a file	fs/namei.c
10	unlink	delete a name and possibly the file it refers to	fs/namei.c
11	execve	execute program	arch/i386/kernel/process.c
12	chdir	change working directory	fs/open.c
13	time	get time in seconds	kernel/time.c
14	mknod	create a special or ordinary file	fs/namei.c
15	chmod	change permissions of a file	fs/open.c
16	lchown	change ownership of a file	fs/open.c
18	stat	get file status	fs/stat.c
19	lseek	reposition read/write file offset	fs/read_write.c
20	getpid	get process identification	kernel/sched.c
21	mount	mount filesystems	fs/super.c
22	umount	unmount filesystems	fs/super.c
23	setuid	set real user ID	kernel/sys.c
24	getuid	get real user ID	kernel/sched.c
25	stime	set system time and date	kernel/time.c
26	ptrace	allows a parent process to control the execution of a child process	arch/i386/kernel/ptrace.c
27	alarm	set an alarm clock for delivery of a signal	kernel/sched.c
28	fstat	get file status	fs/stat.c
29	pause	suspend process until signal	arch/i386/kernel/sys_i386.c
30	utime	set file access and modification times	fs/open.c
33	access	check user's permissions for a file	fs/open.c
34	nice	change process priority	kernel/sched.c
36	sync	update the super block	fs/buffer.c
37	kill	send signal to a process	kernel/signal.c
38	rename	change the name or location of a file	fs/namei.c
39	mkdir	create a directory	fs/namei.c
40	rmdir	remove a directory	fs/namei.c
41	dup	duplicate an open file descriptor	fs/fcntl.c
42	pipe	create an interprocess channel	arch/i386/kernel/sys_i386.c
43	times	get process times	kernel/sys.c
45	brk	change the amount of space allocated for the calling process's data segment	mm/mmap.c
46	setgid	set real group ID	kernel/sys.c
47	getgid	get real group ID	kernel/sched.c
48	sys_signal	ANSI C signal handling	kernel/signal.c
49	geteuid	get effective user ID	kernel/sched.c
50	getegid	get effective group ID	kernel/sched.c

51	<u>acct</u>	enable or disable process accounting	<i>kernel/acct.c</i>	91	<u>munmap</u>	unmap pages of memory	<i>mm/mmap.c</i>
52	<u>umount2</u>	unmount a file system	<i>fs/super.c</i>	92	<u>truncate</u>	set a file to a specified length	<i>fs/open.c</i>
54	<u>ioctl</u>	control device	<i>fs/ioctl.c</i>	93	<u>ftruncate</u>	set a file to a specified length	<i>fs/open.c</i>
55	<u>fcntl</u>	file control	<i>fs/fcntl.c</i>	94	<u>fchmod</u>	change access permission mode of file	<i>fs/open.c</i>
56	<u>mpx</u>	(unimplemented)		95	<u>fchown</u>	change owner and group of a file	<i>fs/open.c</i>
57	<u>setpgid</u>	set process group ID	<i>kernel/sys.c</i>	96	<u>getpriority</u>	get program scheduling priority	<i>kernel/sys.c</i>
58	<u>ulimit</u>	(unimplemented)		97	<u>setpriority</u>	set program scheduling priority	<i>kernel/sys.c</i>
59	<u>olduname</u>	obsolete uname system call	<i>arch/i386/kernel/sys_i386.c</i>	98	<u>profil</u>	execut ion time profile	
60	<u>umask</u>	set file creation mask	<i>kernel/sys.c</i>	99	<u>statfs</u>	get file system statistics	<i>fs/open.c</i>
61	<u>chroot</u>	change root directory	<i>fs/open.c</i>	100	<u>fstatfs</u>	get file system statistics	<i>fs/open.c</i>
62	<u>ustat</u>	get file system statistics	<i>fs/super.c</i>	101	<u>ioperm</u>	set port input/output permissions	<i>arch/i386/kernel/ioport.c</i>
63	<u>dup2</u>	duplicate a file descriptor	<i>fs/fcntl.c</i>	102	<u>socketcall</u>	socket system calls	<i>net/socket.c</i>
64	<u>getppid</u>	get parent process ID	<i>kernel/sched.c</i>	103	<u>syslog</u>	read and/or clear kernel message ring buffer	<i>kernel/printk.c</i>
65	<u>getpgrp</u>	get the process group ID	<i>kernel/sys.c</i>	104	<u>setitimer</u>	set value of interval timer	<i>kernel/itimer.c</i>
66	<u>setsid</u>	creates a session and sets the process group ID	<i>kernel/sys.c</i>	105	<u>getitimer</u>	get value of interval timer	<i>kernel/itimer.c</i>
67	<u>sigaction</u>	POSIX signal handling functions	<i>arch/i386/kernel/signal.c</i>	106	<u>sys_newstat</u>	get file status	<i>fs/stat.c</i>
68	<u>sgetmask</u>	ANSI C signal handling	<i>kernel/signal.c</i>	107	<u>sys_newlstat</u>	get file status	<i>fs/stat.c</i>
69	<u>ssetmask</u>	ANSI C signal handling	<i>kernel/signal.c</i>	108	<u>sys_newfstat</u>	get file status	<i>fs/stat.c</i>
70	<u>setreuid</u>	set real and effective user IDs	<i>kernel/sys.c</i>	109	<u>olduname</u>	get name and information about current kernel	<i>arch/i386/kernel/sys_i386.c</i>
71	<u>setregid</u>	set real and effective group IDs	<i>kernel/sys.c</i>	110	<u>iopl</u>	change I/O privilege level	<i>arch/i386/kernel/ioport.c</i>
72	<u>sigsuspend</u>	install a signal mask and suspend caller until signal	<i>arch/i386/kernel/signal.c</i>	111	<u>vhangup</u>	virtually hangup the current tty	<i>fs/open.c</i>
73	<u>sigpending</u>	examine signals that are blocked and pending	<i>kernel/signal.c</i>	112	<u>idle</u>	make process 0 idle	<i>arch/i386/kernel/process.c</i>
74	<u>sethostname</u>	set hostname	<i>kernel/sys.c</i>	113	<u>vm86old</u>	enter virtual 8086 mode	<i>arch/i386/kernel/vm86.c</i>
75	<u>setrlimit</u>	set maximum system resource consumption	<i>kernel/sys.c</i>	114	<u>wait4</u>	wait for process termination, BSD style	<i>kernel/exit.c</i>
76	<u>getrlimit</u>	get maximum system resource consumption	<i>kernel/sys.c</i>	115	<u>swapoff</u>	stop swapping to file/device	<i>mm/swapfile.c</i>
77	<u>getrusage</u>	get maximum system resource consumption	<i>kernel/sys.c</i>	116	<u>sysinfo</u>	returns information on overall system statistics	<i>kernel/info.c</i>
78	<u>gettimeofday</u>	get the date and time	<i>kernel/time.c</i>	117	<u>ipc</u>	System V IPC system calls	<i>arch/i386/kernel/sys_i386.c</i>
79	<u>settimeofday</u>	set the date and time	<i>kernel/time.c</i>	118	<u>fsync</u>	synchronize a file's complete in-core state with that on disk	<i>fs/buffer.c</i>
80	<u>getgroups</u>	get list of supplementary group IDs	<i>kernel/sys.c</i>	119	<u>sigreturn</u>	return from signal handler and cleanup stack frame	<i>arch/i386/kernel/signal.c</i>
81	<u>setgroups</u>	set list of supplementary group IDs	<i>kernel/sys.c</i>	120	<u>clone</u>	create a child process	<i>arch/i386/kernel/process.c</i>
82	<u>old_select</u>	sync. I/O multiplexing	<i>arch/i386/kernel/sys_i386.c</i>	121	<u>setdomainname</u>	set domain name	<i>kernel/sys.c</i>
83	<u>symlink</u>	make a symbolic link to a file	<i>fs/namei.c</i>	122	<u>uname</u>	get name and information about current kernel	<i>kernel/sys.c</i>
84	<u>lstat</u>	get file status	<i>fs/stat.c</i>	123	<u>modify_ldt</u>	get or set ldt	<i>arch/i386/kernel/ldt.c</i>
85	<u>readlink</u>	read the contents of a symbolic link	<i>fs/stat.c</i>	124	<u>adjtimex</u>	tune kernel clock	<i>kernel/time.c</i>
86	<u>uselib</u>	select shared library	<i>fs/exec.c</i>	125	<u>mprotect</u>	set protection of memory mapping	<i>mm/mprotect.c</i>
87	<u>swapon</u>	start swapping to file/device	<i>mm/swapfile.c</i>	126	<u>sigprocmask</u>	POSIX signal handling functions	<i>kernel/signal.c</i>
88	<u>reboot</u>	reboot or enable/disable Ctrl-Alt-Del	<i>kernel/sys.c</i>	127	<u>create_module</u>	create a loadable module entry	<i>kernel/module.c</i>
89	<u>old_readdir</u>	read directory entry	<i>fs/readdir.c</i>	128	<u>init_module</u>	initialize a loadable module entry	<i>kernel/module.c</i>
90	<u>old_mmap</u>	map pages of memory	<i>arch/i386/kernel/sys_i386.c</i>	129	<u>delete_module</u>	delete a loadable module entry	<i>kernel/module.c</i>

130	<u>get_kernel_syms</u>	retrieve exported kernel and module symbols	kernel/module.c	167	<u>query_module</u>	query the kernel for various bits pertain ing to modules	kernel/module.c
131	<u>quotactl</u>	manipulate disk quotas	fs/dquot.c	168	<u>poll</u>	wait for some event on a file descriptor	fs/select.c
132	<u>getpgid</u>	get process group ID	kernel/sys.c	169	<u>nfservctl</u>	syscall interface to kernel nfs daemon	fs/filesystems.c
133	<u>fchdir</u>	change working directory	fs/open.c	170	<u>setresgid</u>	set real, effective and saved user or group ID	kernel/sys.c
134	<u>bdflush</u>	start, flush, or tune buffer-dirty-flush daemon	fs/buffer.c	171	<u>getresgid</u>	get real, effective and saved user or group ID	kernel/sys.c
135	<u>sysfs</u>	get file system type information	fs/super.c	172	<u>prctl</u>	operations on a process	kernel/sys.c
136	<u>personality</u>	set the process execution domain	kernel/exec_domain.c	173	<u>rt_sigreturn</u>		arch/i386/kernel/signal.c
137	<u>afs_syscall</u>	(unimplemented)		174	<u>rt_sigaction</u>		kernel/signal.c
138	<u>setfsuid</u>	set user identity used for file system checks	kernel/sys.c	175	<u>rt_sigprocmask</u>		kernel/signal.c
139	<u>setfsgid</u>	set group identity used for file system checks	kernel/sys.c	176	<u>rt_sigpending</u>		kernel/signal.c
140	<u>sys_llseek</u>	move extended read/write file pointer	fs/read_write.c	177	<u>rt_sigtimedwait</u>		kernel/signal.c
141	<u>getdents</u>	read directory entries	fs/readdir.c	178	<u>rt_sigqueueinfo</u>		kernel/signal.c
142	<u>select</u>	sync. I/O multiplexing	fs/select.c	179	<u>rt_sigsuspend</u>		arch/i386/kernel/signal.c
143	<u>flock</u>	apply or remove an advisory lock on an open file	fs/locks.c	180	<u>pread</u>	read from a file descriptor at a given offset	fs/read_write.c
144	<u>msync</u>	synchronize a file with a memory map	mm/filemap.c	181	<u>sys_pwrite</u>	write to a file descriptor at a given offset	fs/read_write.c
145	<u>readv</u>	read data into multiple buffers	fs/read_write.c	182	<u>chown</u>	change ownership of a file	fs/open.c
146	<u>writev</u>	write data into multiple buffers	fs/read_write.c	183	<u>getcwd</u>	Get current working directory	fs/dcache.c
147	<u>sys_getsid</u>	get process group ID of session leader	kernel/sys.c	184	<u>capget</u>	get process capabilities	kernel/capability.c
148	<u>fdatasync</u>	synchronize a file's in-core data with that on disk	fs/buffer.c	185	<u>capset</u>	set process capabilities	kernel/capability.c
149	<u>sysctl</u>	read/write system parameters	kernel/sysctl.c	186	<u>sigaltstack</u>	set/get signal stack context	arch/i386/kernel/signal.c
150	<u>mlock</u>	lock pages in memory	mm/mlock.c	187	<u>sendfile</u>	transfer data between file descriptors	mm/filemap.c
151	<u>munlock</u>	unlock pages in memory	mm/mlock.c	188	<u>getpmsg</u>	(unimplemented)	
152	<u>mlockall</u>	disable paging for calling process	mm/mlock.c	189	<u>putpmsg</u>	(unimplemented)	
153	<u>munlockall</u>	reenable paging for calling process	mm/mlock.c	190	<u>vfork</u>	create a child process and block parent	arch/i386/kernel/process.c
154	<u>sched_setparam</u>	set scheduling parameters	kernel/sched.c				
155	<u>sched_getparam</u>	get scheduling parameters	kernel/sched.c				
156	<u>sched_setscheduler</u>	set scheduling algorithm parameters	kernel/sched.c				
157	<u>sched_getscheduler</u>	get scheduling algorithm parameters	kernel/sched.c				
158	<u>sched_yield</u>	yield the processor	kernel/sched.c				
159	<u>sched_get_priority_max</u>	get max static priority range	kernel/sched.c				
160	<u>sched_get_priority_min</u>	get min static priority range	kernel/sched.c				
161	<u>sched_rr_get_interval</u>	get the SCHED_RR interval for the named process	kernel/sched.c				
162	<u>nanosleep</u>	pause execution for a specified time (nano seconds)	kernel/sched.c				
163	<u>mremap</u>	re-map a virtual memory address	mm/mremap.c				
164	<u>setresuid</u>	set real, effective and saved user or group ID	kernel/sys.c				
165	<u>getresuid</u>	get real, effective and saved user or group ID	kernel/sys.c				
166	<u>vm86</u>	enter virtual 8086 mode	arch/i386/kernel/vm86.c				