

# Linux/LoongArch 系统调用 ABI

本文档描述了 Linux/LoongArch 的系统调用 ABI。

由于当前内核仅有 64 位版本，以下的描述均视为遵循 LP64\* 的过程调用约定。

## 系统调用号与参数

正如其他新近的架构移植，绝大部分 Linux/LoongArch 系统调用号和参数都复用asm-generic 的定义。倒是有些值得一提的点。

- 没有 `renameat`，请使用 `renameat2`。
- 没有 `getrlimit` 或者 `setrlimit`，请使用 `prlimit64`。
- 没有 `fstat` 或者 `newfstatat`，只有 `statx`。  
自己进行系统调用的底层组件应当感知这一事实，如有必要，应自带兼容逻辑。

## 调用方式

目前都通过 `syscall 0` 指令进行系统调用。

尽管当下内核并不检查指令字中的立即数域，我们仍然强烈建议保持其为零，这是为了防止未来它被赋予其他语义而造成您的程序产生非预期结果。

系统调用号应被存放于寄存器 `a7`。

如系统调用有参数，这些参数应如函数调用一般，从 `a0` 到 `a6` 按顺序存放。

系统调用返回时，`a0` 存放返回值，`t0-t8` 则应被视作被破坏 (clobbered)；其他寄存器的值都保持不变。

## 系统调用号

系统调用号来自 `linux kernel`, `include/uapi/asm-generic/unistd.h`

```
#define __NR_io_setup 0
#define __NR_io_destroy 1
#define __NR_io_submit 2
#define __NR_io_cancel 3
#define __NR_io_getevents 4

/* fs/xattr.c */
#define __NR_setxattr 5
#define __NR_lsetxattr 6
#define __NR_fsetxattr 7
#define __NR_getxattr 8
#define __NR_lgetxattr 9
#define __NR_fgetxattr 10
#define __NR_listxattr 11
#define __NR_llistxattr 12
#define __NR_flistxattr 13
#define __NR_removexattr 14
#define __NR_lremovexattr 15
#define __NR_fremovexattr 16

/* fs/dcache.c */
```

```
#define __NR_getcwd 17

/* fs/cookies.c */
#define __NR_lookup_dcookie 18

/* fs/eventfd.c */
#define __NR_eventfd2 19

/* fs/eventpoll.c */
#define __NR_epoll_create1 20
#define __NR_epoll_ctl 21
#define __NR_epoll_pwait 22

/* fs/fcntl.c */
#define __NR_dup 23
#define __NR_dup3 24
#define __NR3264_fcntl 25

/* fs/inotify_user.c */
#define __NR_inotify_init1 26
#define __NR_inotify_add_watch 27
#define __NR_inotify_rm_watch 28

/* fs/ioctl.c */
#define __NR_ioctl 29

/* fs/ioprio.c */
#define __NR_ioprio_set 30
#define __NR_ioprio_get 31

/* fs/locks.c */
#define __NR_flock 32

/* fs/namei.c */
#define __NR_mknodat 33
#define __NR_mkdirat 34
#define __NR_unlinkat 35
#define __NR_symlinkat 36
#define __NR_linkat 37
/* renameat is superseded with flags by renameat2 */
#define __NR_renameat 38

/* fs/namespace.c */
#define __NR_umount2 39
#define __NR_mount 40
#define __NR_pivot_root 41

/* fs/nfsctl.c */
#define __NR_nfsvl 42

/* fs/open.c */
#define __NR3264_statfs 43
#define __NR3264_fstatfs 44
#define __NR3264_truncate 45
#define __NR3264_ftruncate 46
```

```
#define __NR_fallocate 47
#define __NR_faccessat 48
#define __NR_chdir 49
#define __NR_fchdir 50
#define __NR_chroot 51
#define __NR_fchmod 52
#define __NR_fchmodat 53
#define __NR_fchownat 54
#define __NR_fchown 55
#define __NR_openat 56
#define __NR_close 57
#define __NR_vhangup 58

/* fs/pipe.c */
#define __NR_pipe2 59

/* fs/quota.c */
#define __NR_quotactl 60

/* fs/readdir.c */
#define __NR_getdents64 61

/* fs/read_write.c */
#define __NR3264_lseek 62
#define __NR_read 63
#define __NR_write 64
#define __NR_readv 65
#define __NR_writev 66
#define __NR_pread64 67
#define __NR_pwrite64 68
#define __NR_preadv 69
#define __NR_pwritev 70

/* fs/sendfile.c */
#define __NR3264_sendfile 71

/* fs/select.c */
#define __NR_pselect6 72
#define __NR_ppoll 73

/* fs/signalfd.c */
#define __NR_signalfd4 74

/* fs/splice.c */
#define __NR_vmsplice 75
#define __NR_splice 76
#define __NR_tee 77

/* fs/stat.c */
#define __NR_readlinkat 78
#define __NR3264_fstatat 79
#define __NR3264_fstat 80

/* fs/sync.c */
```

```
#define __NR_sync 81
#define __NR_fsync 82
#define __NR_fdatasync 83
#define __NR_sync_file_range2 84
#define __NR_sync_file_range 84

/* fs/timerfd.c */
#define __NR_timerfd_create 85
#define __NR_timerfd_settime 86
#define __NR_timerfd_gettime 87

/* fs/utimes.c */
#define __NR_utimensat 88

/* kernel/acct.c */
#define __NR_acct 89

/* kernel/capability.c */
#define __NR_capget 90
#define __NR_capset 91

/* kernel/exec_domain.c */
#define __NR_personality 92

/* kernel/exit.c */
#define __NR_exit 93
#define __NR_exit_group 94
#define __NR_waitid 95

/* kernel/fork.c */
#define __NR_set_tid_address 96
#define __NR_unshare 97

/* kernel/futex.c */
#define __NR_futex 98
#define __NR_set_robust_list 99
#define __NR_get_robust_list 100

/* kernel/hrtimer.c */
#define __NR_nanosleep 101

/* kernel/itimer.c */
#define __NR_getitimer 102
#define __NR_setitimer 103

/* kernel/kexec.c */
#define __NR_kexec_load 104

/* kernel/module.c */
#define __NR_init_module 105
#define __NR_delete_module 106

/* kernel/posix-timers.c */
#define __NR_timer_create 107
#define __NR_timer_gettime 108
```

```
#define __NR_timer_getoverrun 109
#define __NR_timer_settime 110
#define __NR_timer_delete 111
#define __NR_clock_settime 112
#define __NR_clock_gettime 113
#define __NR_clock_getres 114
#define __NR_clock_nanosleep 115

/* kernel/printk.c */
#define __NR_syslog 116

/* kernel/ptrace.c */
#define __NR_ptrace 117

/* kernel/sched/core.c */
#define __NR_sched_setparam 118
#define __NR_sched_setscheduler 119
#define __NR_sched_getscheduler 120
#define __NR_sched_getparam 121
#define __NR_sched_setaffinity 122
#define __NR_sched_getaffinity 123
#define __NR_sched_yield 124
#define __NR_sched_get_priority_max 125
#define __NR_sched_get_priority_min 126
#define __NR_sched_rr_get_interval 127

/* kernel/signal.c */
#define __NR_restart_syscall 128
#define __NR_kill 129
#define __NR_tkill 130
#define __NR_tgkill 131
#define __NR_sigaltstack 132
#define __NR_rt_sigsuspend 133
#define __NR_rt_sigaction 134
#define __NR_rt_sigprocmask 135
#define __NR_rt_sigpending 136
#define __NR_rt_sigtimedwait 137
#define __NR_rt_sigqueueinfo 138
#define __NR_rt_sigreturn 139

/* kernel/sys.c */
#define __NR_setpriority 140
#define __NR_getpriority 141
#define __NR_reboot 142
#define __NR_setregid 143
#define __NR_setgid 144
#define __NR_setreuid 145
#define __NR_setuid 146
#define __NR_setresuid 147
#define __NR_getresuid 148
#define __NR_setresgid 149
#define __NR_getresgid 150
#define __NR_setfsuid 151
#define __NR_setfsgid 152
#define __NR_times 153
```

```
#define __NR_setpgid 154
#define __NR_getpgid 155
#define __NR_getsid 156
#define __NR_setsid 157
#define __NR_getgroups 158
#define __NR_setgroups 159
#define __NR_uname 160
#define __NR_sethostname 161
#define __NR_setdomainname 162

/* getrlimit and setrlimit are superseded with prlimit64 */
#define __NR_getrlimit 163
#define __NR_setrlimit 164

#define __NR_getrusage 165
#define __NR_umask 166
#define __NR_prctl 167
#define __NR_getcpu 168

/* kernel/time.c */
#define __NR_gettimeofday 169
#define __NR_settimeofday 170
#define __NR_adjtimex 171

/* kernel/sys.c */
#define __NR_getpid 172
#define __NR_getppid 173
#define __NR_getuid 174
#define __NR_geteuid 175
#define __NR_getgid 176
#define __NR_getegid 177
#define __NR_gettid 178
#define __NR_sysinfo 179

/* ipc/mqueue.c */
#define __NR_mq_open 180
#define __NR_mq_unlink 181
#define __NR_mq_timedsend 182
#define __NR_mq_timedreceive 183
#define __NR_mq_notify 184
#define __NR_mq_getsetattr 185

/* ipc/msg.c */
#define __NR_msgget 186
#define __NR_msgctl 187
#define __NR_msgrcv 188
#define __NR_msgsnd 189

/* ipc/sem.c */
#define __NR_semget 190
#define __NR_semctl 191
#define __NR_semtimedop 192
#define __NR_semop 193

/* ipc/shm.c */
```

```
#define __NR_shmget 194
#define __NR_shmctl 195
#define __NR_shmat 196
#define __NR_shmdt 197

/* net/socket.c */
#define __NR_socket 198
#define __NR_socketpair 199
#define __NR_bind 200
#define __NR_listen 201
#define __NR_accept 202
#define __NR_connect 203
#define __NR_getsockname 204
#define __NR_getpeername 205
#define __NR_sendto 206
#define __NR_recvfrom 207
#define __NR_setsockopt 208
#define __NR_getsockopt 209
#define __NR_shutdown 210
#define __NR_sendmsg 211
#define __NR_recvmsg 212

/* mm/filemap.c */
#define __NR_readahead 213

/* mm/nommu.c, also with MMU */
#define __NR_brk 214
#define __NR_munmap 215
#define __NR_mremap 216

/* security/keys/keyctl.c */
#define __NR_add_key 217
#define __NR_request_key 218
#define __NR_keyctl 219

/* arch/example/kernel/sys_example.c */
#define __NR_clone 220
#define __NR_execve 221

#define __NR3264_mmap 222

/* mm/fadvise.c */
#define __NR3264_fadvise64 223

/* mm/, CONFIG_MMU only */
#define __NR_swapon 224
#define __NR_swapoff 225
#define __NR_mprotect 226
#define __NR_msync 227
#define __NR_mlock 228
#define __NR_munlock 229
#define __NR_mlockall 230
#define __NR_munlockall 231
#define __NR_mincore 232
#define __NR_madvise 233
```

```

#define __NR_remap_file_pages 234
#define __NR_mbind 235
#define __NR_get_mempolicy 236
#define __NR_set_mempolicy 237
#define __NR_migrate_pages 238
#define __NR_move_pages 239

#define __NR_rt_tgsigqueueinfo 240
#define __NR_perf_event_open 241
#define __NR_accept4 242
#define __NR_recvmmsg 243

/*
 * Architectures may provide up to 16 syscalls of their own
 * starting with this value.
 */
#define __NR_arch_specific_syscall 244

#define __NR_wait4 260
#define __NR_prlimit64 261
#define __NR_fanotify_init 262
#define __NR_fanotify_mark 263
#define __NR_name_to_handle_at 264
#define __NR_open_by_handle_at 265
#define __NR_clock_adjtime 266
#define __NR_syncfs 267
#define __NR_setns 268
#define __NR_sendmmsg 269
#define __NR_process_vm_readv 270
#define __NR_process_vm_writev 271
#define __NR_kcmp 272
#define __NR_finit_module 273
#define __NR_sched_setattr 274
#define __NR_sched_getattr 275
#define __NR_renameat2 276
#define __NR_seccomp 277
#define __NR_getrandom 278
#define __NR_memfd_create 279
#define __NR_bpf 280
#define __NR_execveat 281
#define __NR_userfaultfd 282
#define __NR_membarrier 283
#define __NR_mlock2 284
#define __NR_copy_file_range 285
#define __NR_preadv2 286
#define __NR_pwritev2 287
#define __NR_pkey_mprotect 288
#define __NR_pkey_alloc 289
#define __NR_pkey_free 290
#define __NR_statx 291
#define __NR_io_pgetevents 292
#define __NR_rseq 293
#define __NR_kexec_file_load 294

/* 295 through 402 are unassigned to sync up with generic numbers, don't use */

```



```
#define __NR_clock_gettime64 403
#define __NR_clock_settime64 404
#define __NR_clock_adjtime64 405
#define __NR_clock_getres_time64 406
#define __NR_clock_nanosleep_time64 407
#define __NR_timer_gettime64 408
#define __NR_timer_settime64 409
#define __NR_timerfd_gettime64 410
#define __NR_timerfd_settime64 411
#define __NR_utimensat_time64 412
#define __NR_pselect6_time64 413
#define __NR_ppoll_time64 414
#define __NR_io_pgetevents_time64 416
#define __NR_recvmmsg_time64 417
#define __NR_mq_timedsend_time64 418
#define __NR_mq_timedreceive_time64 419
#define __NR_semtimedop_time64 420
#define __NR_rt_sigtimedwait_time64 421
#define __NR_futex_time64 422
#define __NR_sched_rr_get_interval_time64 423

#define __NR_pidfd_send_signal 424
#define __NR_io_uring_setup 425
#define __NR_io_uring_enter 426
#define __NR_io_uring_register 427
#define __NR_open_tree 428
#define __NR_move_mount 429
#define __NR_fsopen 430
#define __NR_fsconfig 431
#define __NR_fspick 433
#define __NR_pidfd_open 434
#define __NR_clone3 435
#define __NR_close_range 436

#define __NR_openat2 437
#define __NR_pidfd_getfd 438
#define __NR_faccessat2 439
#define __NR_process_madvise 440
#define __NR_epoll_pwait2 441
#define __NR_mount_setattr 442
#define __NR_quotactl_fd 443

#define __NR_landlock_create_ruleset 444
#define __NR_landlock_add_rule 445
#define __NR_landlock_restrict_self 446

#define __NR_memfd_secret 447
#define __NR_process_mrelease 448

#define __NR_futex_waitv 449

#define __NR_set_mempolicy_home_node 450

#define __NR_syscalls 451
```

```
/*
 * 32 bit systems traditionally used different
 * syscalls for off_t and loff_t arguments, while
 * 64 bit systems only need the off_t version.
 * For new 32 bit platforms, there is no need to
 * implement the old 32 bit off_t syscalls, so
 * they take different names.
 * Here we map the numbers so that both versions
 * use the same syscall table layout.
 */
#define __NR_fcntl __NR3264_fcntl
#define __NR_statfs __NR3264_statfs
#define __NR_fstatfs __NR3264_fstatfs
#define __NR_truncate __NR3264_truncate
#define __NR_ftruncate __NR3264_ftruncate
#define __NR_lseek __NR3264_lseek
#define __NR_sendfile __NR3264_sendfile
#define __NR_newfstatat __NR3264_fstatat
#define __NR_fstat __NR3264_fstat
#define __NR_mmap __NR3264_mmap
#define __NR_fadvise64 __NR3264_fadvise64
#define __NR_stat __NR3264_stat
#define __NR_lstat __NR3264_lstat
#define __NR_fcntl64 __NR3264_fcntl
#define __NR_statfs64 __NR3264_statfs
#define __NR_fstatfs64 __NR3264_fstatfs
#define __NR_truncate64 __NR3264_truncate
#define __NR_ftruncate64 __NR3264_ftruncate
#define __NR_llseek __NR3264_lseek
#define __NR_sendfile64 __NR3264_sendfile
#define __NR_fstatat64 __NR3264_fstatat
#define __NR_fstat64 __NR3264_fstat
#define __NR_mmap2 __NR3264_mmap
#define __NR_fadvise64_64 __NR3264_fadvise64
#define __NR_stat64 __NR3264_stat
#define __NR_lstat64 __NR3264_lstat
```