NAME

syslog, klogctl – read and/or clear kernel message ring buffer; set console_loglevel

SYNOPSIS

int syslog(int *type***, char ****bufp***, int** *len***);**
/* No wrapper provided in glibc */

/* The glibc interface */
#include <sys/klog.h>

int klogctl(int *type***, char ****bufp***, int** *len***);**

DESCRIPTION

Note: Probably, you are looking for the C library function **syslog**(), which talks to **syslogd(8);** see syslog(3) for details.

This page describes the kernel **syslog**() system call, which is used to control the kernel *printk*() buffer; the glibc wrapper function for the system call is called **klogctl**().

The kernel log buffer

The kernel has a cyclic buffer of length **LOG_BUF_LEN** in which messages given as arguments to the kernel function **printk**() are stored (regardless of their log level). In early kernels, **LOG_BUF_LEN** had the value 4096; from kernel 1.3.54, it was 8192; from kernel 2.1.113, it was 16384; since kernel 2.4.23/2.6, the value is a kernel configuration option (**CONFIG_LOG_BUF_SHIFT**, default value dependent on the architecture). Since Linux 2.6.6, the size can be queried with command type 10 (see below).

Commands

The *type* argument determines the action taken by this function. The list below specifies the values for *type*. The symbolic names are defined in the kernel source, but are not exported to user space; you will either need to use the numbers, or define the names yourself.

SYSLOG_ACTION_CLOSE (0)
Close the log. Currently a NOP.

SYSLOG_ACTION_OPEN (1)
Open the log. Currently a NOP.

SYSLOG_ACTION_READ (2)
Read from the log. The call waits until the kernel log buffer is nonempty, and then reads at most *len* bytes into the buffer pointed to by *bufp*. The call returns the number of bytes read. Bytes read from the log disappear from the log buffer: the information can be read only once. This is the function executed by the kernel when a user program reads */proc/kmsg*.

SYSLOG_ACTION_READ_ALL (3)
Read all messages remaining in the ring buffer, placing them in the buffer pointed to by *bufp*. The call reads the last *len* bytes from the log buffer (nondestructively), but will not read more than was written into the buffer since the last "clear ring buffer" command (see command 5 below)). The call returns the number of bytes read.

SYSLOG_ACTION_READ_CLEAR (4)
Read and clear all messages remaining in the ring buffer. The call does precisely the same as for a *type* of 3, but also executes the "clear ring buffer" command.

SYSLOG_ACTION_CLEAR (5)
The call executes just the "clear ring buffer" command. The *bufp* and *len* arguments are ignored.

This command does not really clear the ring buffer. Rather, it sets a kernel bookkeeping variable that determines the results returned by commands 3 (**SYSLOG_ACTION_READ_ALL**) and 4 (**SYSLOG_ACTION_READ_CLEAR**). This command has no effect on commands 2 (**SYSLOG_ACTION_READ**) and 9 (**SYSLOG_ACTION_SIZE_UNREAD**).

SYSLOG_ACTION_CONSOLE_OFF (6)
The command saves the current value of *console_loglevel* and then sets *console_loglevel* to *minimum_console_loglevel*, so that no messages are printed to the console. Before Linux 2.6.32, the command simply sets *console_loglevel* to *minimum_console_loglevel*. See the discussion of */proc/sys/kernel/printk*, below.

The *bufp* and *len* arguments are ignored.

SYSLOG_ACTION_CONSOLE_ON (7)
If a previous **SYSLOG_ACTION_CONSOLE_OFF** command has been performed, this command restores *console_loglevel* to the value that was saved by that command. Before Linux 2.6.32, this command simply sets *console_loglevel* to *default_console_loglevel*. See the discussion of */proc/sys/kernel/printk*, below.

The *bufp* and *len* arguments are ignored.

SYSLOG_ACTION_CONSOLE_LEVEL (8)
The call sets *console_loglevel* to the value given in *len*, which must be an integer between 1 and 8 (inclusive). The kernel silently enforces a minimum value of *minimum_console_loglevel* for *len*. See the *log level* section for details. The *bufp* argument is ignored.

SYSLOG_ACTION_SIZE_UNREAD (9) (since Linux 2.4.10)
The call returns the number of bytes currently available to be read from the kernel log buffer via command 2 (**SYSLOG_ACTION_READ**). The *bufp* and *len* arguments are ignored.

SYSLOG_ACTION_SIZE_BUFFER (10) (since Linux 2.6.6)
This command returns the total size of the kernel log buffer. The *bufp* and *len* arguments are ignored.

All commands except 3 and 10 require privilege. In Linux kernels before 2.6.37, command types 3 and 10 are allowed to unprivileged processes; since Linux 2.6.37, these commands are allowed to unprivileged processes only if */proc/sys/kernel/dmesg_restrict* has the value 0. Before Linux 2.6.37, "privileged" means that the caller has the **CAP_SYS_ADMIN** capability. Since Linux 2.6.37, "privileged" means that the caller has either the **CAP_SYS_ADMIN** capability (now deprecated for this purpose) or the (new) **CAP_SYSLOG** capability.

/proc/sys/kernel/printk
/proc/sys/kernel/printk is a writable file containing four integer values that influence kernel *printk()* behavior when printing or logging error messages. The four values are:

console_loglevel
Only messages with a log level lower than this value will be printed to the console. The default value for this field is **DEFAULT_CONSOLE_LOGLEVEL** (7), but it is set to 4 if the kernel command line contains the word "quiet", 10 if the kernel command line contains the word "debug", and to 15 in case of a kernel fault (the 10 and 15 are just silly, and equivalent to 8). The value of *console_loglevel* can be set (to a value in the range 1–8) by a **syslog**() call with a *type* of 8.

default_message_loglevel
This value will be used as the log level for *printk()* messages that do not have an explicit level. Up to and including Linux 2.6.38, the hard-coded default value for this field was 4 (**KERN_WARNING**); since Linux 2.6.39, the default value is a defined by the kernel configuration option **CONFIG_DEFAULT_MESSAGE_LOGLEVEL**, which defaults to 4.

minimum_console_loglevel
The value in this field is the minimum value to which *console_loglevel* can be set.

default_console_loglevel
This is the default value for *console_loglevel*.

The log level

Every *printk*() message has its own log level. If the log level is not explicitly specified as part of the message, it defaults to *default_message_loglevel*. The conventional meaning of the log level is as follows:

Kernel constant	Level value	Meaning
KERN_EMERG	0	System is unusable
KERN_ALERT	1	Action must be taken immediately
KERN_CRIT	2	Critical conditions
KERN_ERR	3	Error conditions
KERN_WARNING	4	Warning conditions
KERN_NOTICE	5	Normal but significant condition
KERN_INFO	6	Informational
KERN_DEBUG	7	Debug-level messages

The kernel *printk()* routine will print a message on the console only if it has a log level less than the value of *console_loglevel*.

RETURN VALUE

For *type* equal to 2, 3, or 4, a successful call to **syslog**() returns the number of bytes read. For *type* 9, **syslog**() returns the number of bytes currently available to be read on the kernel log buffer. For *type* 10, **syslog**() returns the total size of the kernel log buffer. For other values of *type*, 0 is returned on success.

In case of error, −1 is returned, and *errno* is set to indicate the error.

ERRORS

EINVAL
Bad arguments (e.g., bad *type*; or for *type* 2, 3, or 4, *buf* is NULL, or *len* is less than zero; or for *type* 8, the *level* is outside the range 1 to 8).

ENOSYS
This **syslog**() system call is not available, because the kernel was compiled with the **CONFIG_PRINTK** kernel-configuration option disabled.

EPERM
An attempt was made to change *console_loglevel* or clear the kernel message ring buffer by a process without sufficient privilege (more precisely: without the **CAP_SYS_ADMIN** or **CAP_SYSLOG** capability).

ERESTARTSYS
System call was interrupted by a signal; nothing was read. (This can be seen only during a trace.)

CONFORMING TO

This system call is Linux-specific and should not be used in programs intended to be portable.

NOTES

From the very start, people noted that it is unfortunate that a system call and a library routine of the same name are entirely different animals.

SEE ALSO

dmesg(1), syslog(3), capabilities(7)

COLOPHON

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