

Bionic Buffalo Tech Note #105

Thread-Safe and Thread-Unsafe Procedure List

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Introduction

This is a list of common library routines, categorized as to whether they are assumed to be thread-safe or thread-unsafe. This list is taken from various sources, and is not authoritative. The assumption may be correct or incorrect in various environments, especially in non-compliant systems.

The routines listed here include procedures from POSIX, X/OPEN, GNU, and other libraries. Not all routines may be available on all platforms.

Generally, POSIX routines not listed here (such as `fread()`, `malloc()`, and so on) may be assumed to be thread-safe.

The table has two columns. When two different routines are listed on the same row, the left column is a non-reentrant procedure, and the right column is its reentrant equivalent. The prototypes for reentrant and non-reentrant versions of the same procedure are usually different. Often, there is no known equivalent in any environment for a given unsafe procedure. When a function has two versions, the performance of the unsafe version sometimes is better.

In two cases (`ctermid()` and `tmpnam()`), the same procedure is reentrant with a non-NULL argument, and not thread-safe if the argument is NULL.

Three special cases are the file locking procedures `flockfile()`, `ftrylockfile()`, and `funlockfile()`. Although the standard locking functions (such as `flock()`) are also thread-safe, the behaviour of the three procedures listed here is different. The standard procedures (such as `flock()`) lock a file against access by other processes, but not against access by different threads in the same process. The procedures `flockfile()`, `ftrylockfile()`, and `funlockfile()` lock a file against access by all other threads and processes, including access by different threads of the same procedure.

Thread-Safe and Thread-Unsafe Procedure List

<i>Thread-Unsafe</i>	<i>Thread-Safe</i>
asctime	asctime_r
basename	
catgets	
crypt	crypt_r
ctermid (NULL)	ctermid (not_NULL)
ctime	ctime_r
dbm_clearerr	
dbm_close	
dbm_delete	
dbm_error	
dbm_fetch	
dbm_firstkey	
dbm_nextkey	
dbm_open	
dbm_store	
dirname	
dlerror	
drand48	drand48_r
ecvt	ecvt_r
encrypt	encrypt_r
endgrent	
endpwent	
endutxent	
erand48	erand48_r
fcvt	
fgetpwent	fgetpwent_r
	flockfile
	ftrylockfile
	funlockfile

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<i>Thread-Unsafe</i>	<i>Thread-Safe</i>
ftw	
gamma	
gcvt	
	getaddrinfo
getc_unlocked	getc
getchar_unlocked	getchar
getdate	
getenv	
getgrent	getgrent_r
getgrgid	getgrgid_r
getgrname	getgrname_r
gethostbyaddr	gethostbyaddr_r
gethostbyname	gethostbyname_r
gethostbyname2	gethostbyname2_r
gethostent	
getlogin	getlogin_r
getmnt	getmnt_r
	getnameinfo
getnetbyaddr	
getnetbyname	
getnetent	
getnetgrent	
getopt	
getprotobyname	
getprotobynumber	
getprotoent	
getpwent	getpwent_r
getpwnam	getpwnam_r
getpwuid	getpwuid_r
getservbyname	
getservbyport	

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<i>Thread-Unsafe</i>	<i>Thread-Safe</i>
getservent	
getutid	getutid_r
getutline	getutline_r
getutxent	
getutxid	
getutxline	
getw	
gmtime	gmtime_r
hcreate	hcreate_r
hdestroy	hdestroy_r
hsearch	hsearch_r
inet_ntoa	
jrand48	jrand48_r
l64a	
lcong48	lcong48_r
lgamma	lgamma_r
lgammaf	lgammaf_r
lgammal	lgammal_r
localeconv	
localtime	localtime_r
lrand48	lrand48_r
mrnd48	mrnd48_r
nftw	
nl_langinfo	
nrnd48	nrnd48_r
ptsname	ptsname_r
putc_unlocked	putc
putchar_unlocked	putchar
putenv	
pututxline	
qecvt	qecvt_r

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<i>Thread-Unsafe</i>	<i>Thread-Safe</i>
qfcvt	qfcvt_r
rand	rand_r
readdir	readdir_r
seed48	seed48_r
setgrent	
setkey	setkey_r
setpwent	
setutxent	
srand48	srand48_r
strerror	strerror_r
strtok	strtok_r
strtol	strtol_l
strtoll	strtoll_r
tmpnam (NULL)	tmpnam (non_NULL)
ttyname	ttyname_r
unsetenv	
wcstombs	
wctomb	

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