



Linux Ubuntu 26.04 Manual Pages on command 'libnftables.3'

\$ man libnftables.3

LIBNFTABLES(3)

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NAME

libnftables - nftables frontend library

SYNOPSIS

```
#include <nftables/libnftables.h>

struct nft_ctx *nft_ctx_new(uint32_t flags);

void nft_ctx_free(struct nft_ctx *ctx);

bool nft_ctx_get_dry_run(struct nft_ctx *ctx);

void nft_ctx_set_dry_run(struct nft_ctx *ctx, bool dry);

unsigned int nft_ctx_input_get_flags(struct nft_ctx *ctx);

unsigned int nft_ctx_input_set_flags(struct nft_ctx *ctx, unsigned int flags);

unsigned int nft_ctx_output_get_flags(struct nft_ctx *ctx);

void nft_ctx_output_set_flags(struct nft_ctx *ctx, unsigned int flags);

unsigned int nft_ctx_output_get_debug(struct nft_ctx *ctx);

void nft_ctx_output_set_debug(struct nft_ctx *ctx, unsigned int mask);

FILE *nft_ctx_set_output(struct nft_ctx *ctx, FILE *fp);

int nft_ctx_buffer_output(struct nft_ctx *ctx);

int nft_ctx_unbuffer_output(struct nft_ctx *ctx);

const char *nft_ctx_get_output_buffer(struct nft_ctx *ctx);

FILE *nft_ctx_set_error(struct nft_ctx *ctx, FILE *fp);

int nft_ctx_buffer_error(struct nft_ctx *ctx);

int nft_ctx_unbuffer_error(struct nft_ctx *ctx);

const char *nft_ctx_get_error_buffer(struct nft_ctx *ctx);
```

```

int nft_ctx_add_include_path(struct nft_ctx *ctx, const char *path);

void nft_ctx_clear_include_paths(struct nft_ctx *ctx);

int nft_ctx_add_var(struct nft_ctx *ctx, const char *var);

void nft_ctx_clear_vars(struct nft_ctx *ctx);

int nft_run_cmd_from_buffer(struct nft_ctx* *nft, const char *buf);

int nft_run_cmd_from_filename(struct nft_ctx *nft,
                             const char *filename);

```

Link with -lnftables.

DESCRIPTION

This library was designed with nftables integration into applications in mind. Its API is therefore kept as simple as possible, which somewhat limits its flexibility. Due to support for JSON markup of input and output though, convenience in constructing and parsing of input and output data may be achieved by using a third-party library such as libjansson.

At the very basic level, one has to allocate a new object of type struct nft_ctx using nft_ctx_new() function, then pass commands via nft_run_cmd_from_buffer() or nft_run_cmd_from_filename() functions. By default, any output is written to stdout (or stderr for error messages). These file pointers may be changed using nft_ctx_set_output() and nft_ctx_set_error() functions. On top of that, it is possible to have any output buffered by the library for later retrieval as a static buffer. See nft_ctx_buffer_output() and nft_ctx_buffer_error() functions for details.

nft_ctx_new() and nft_ctx_free()

These functions aid in nft context management. In order to make use of the library, at least one context object has to be allocated. The context holds temporary data such as caches, library configuration and (if enabled) output and error buffers.

The nft_ctx_new() function allocates and returns a new context object. The parameter flags is unused at this point and should be set to zero. For convenience, the macro NFT_CTX_DEFAULT is defined to that value.

The nft_ctx_free() function frees the context object pointed to by ctx, including any caches or buffers it may hold.

nft_ctx_get_dry_run() and nft_ctx_set_dry_run()

Dry-run setting controls whether ruleset changes are actually committed on kernel side or not. It allows one to check whether a given operation would succeed without making actual changes to the ruleset. The default setting is false.

The `nft_ctx_get_dry_run()` function returns the dry-run setting's value contained in `ctx`.

The `nft_ctx_set_dry_run()` function sets the dry-run setting in `ctx` to the value of `dry`.

`nft_ctx_input_get_flags()` and `nft_ctx_input_set_flags()`

The flags setting controls the input format.

```
enum {  
    NFT_CTX_INPUT_NO_DNS = (1 << 0),  
    NFT_CTX_INPUT_JSON  = (1 << 1),  
};
```

`NFT_CTX_INPUT_NO_DNS`

Avoid resolving IP addresses with blocking `getaddrinfo()`. In that case, only plain IP addresses are accepted.

`NFT_CTX_INPUT_JSON`: When parsing the input, first try to interpret the input as JSON before falling back to the nftables format. This behavior is implied when setting the `NFT_CTX_OUTPUT_JSON` flag.

The `nft_ctx_input_get_flags()` function returns the input flags setting's value in `ctx`.

The `nft_ctx_input_set_flags()` function sets the input flags setting in `ctx` to the value of `val` and returns the previous flags.

`nft_ctx_output_get_flags()` and `nft_ctx_output_set_flags()`

The flags setting controls the output format.

```
enum {  
    NFT_CTX_OUTPUT_REVERSEDNS  = (1 << 0),  
    NFT_CTX_OUTPUT_SERVICE     = (1 << 1),  
    NFT_CTX_OUTPUT_STATELESS   = (1 << 2),  
    NFT_CTX_OUTPUT_HANDLE      = (1 << 3),  
    NFT_CTX_OUTPUT_JSON        = (1 << 4),  
    NFT_CTX_OUTPUT_ECHO        = (1 << 5),  
    NFT_CTX_OUTPUT_GUID        = (1 << 6),  
    NFT_CTX_OUTPUT_NUMERIC_PROTO = (1 << 7),  
    NFT_CTX_OUTPUT_NUMERIC_PRIO = (1 << 8),  
    NFT_CTX_OUTPUT_NUMERIC_SYMBOL = (1 << 9),  
    NFT_CTX_OUTPUT_NUMERIC_TIME  = (1 << 10),  
    NFT_CTX_OUTPUT_NUMERIC_ALL   = (NFT_CTX_OUTPUT_NUMERIC_PROTO |  
    NFT_CTX_OUTPUT_NUMERIC_PRIO |
```

```

NFT_CTX_OUTPUT_NUMERIC_SYMBOL |
NFT_CTX_OUTPUT_NUMERIC_TIME),
NFT_CTX_OUTPUT_TERSE      = (1 << 11),
};

```

NFT_CTX_OUTPUT_REVERSEDNS

Reverse DNS lookups are performed for IP addresses when printing. Note that this may add significant delay to list commands depending on DNS resolver speed.

NFT_CTX_OUTPUT_SERVICE

Print port numbers as services as described in the `/etc/services` file.

NFT_CTX_OUTPUT_STATELESS

If stateless output has been requested, then stateful data is not printed. Stateful data refers to those objects that carry run-time data, e.g. the counter statement holds packet and byte counter values, making it stateful.

NFT_CTX_OUTPUT_HANDLE

Upon insertion into the ruleset, some elements are assigned a unique handle for identification purposes. For example, when deleting a table or chain, it may be identified either by name or handle. Rules on the other hand must be deleted by handle, because there is no other way to uniquely identify them. This flag makes ruleset listings include handle values.

NFT_CTX_OUTPUT_JSON

If enabled at compile-time, `libnftables` accepts input in JSON format and is able to print output in JSON format as well. See `libnftables-json(5)` for a description of the supported schema. This flag enables JSON output format. If the flag is set, the input will first be tried as JSON format, before falling back to `nftables` format. This flag implies `NFT_CTX_INPUT_JSON`.

NFT_CTX_OUTPUT_ECHO

The echo setting makes `libnftables` print the changes once they are committed to the kernel, just like a running instance of `nft monitor` would. Amongst other things, this allows one to retrieve an added rule's handle atomically.

NFT_CTX_OUTPUT_GUID

Display UID and GID as described in the `/etc/passwd` and `/etc/group` files.

NFT_CTX_OUTPUT_NUMERIC_PROTO

Display layer 4 protocol numerically.

NFT_CTX_OUTPUT_NUMERIC_PRIO

Display base chain priority numerically.

NFT_CTX_OUTPUT_NUMERIC_SYMBOL

Display expression datatype as numeric value.

NFT_CTX_OUTPUT_NUMERIC_TIME

Display time, day and hour values in numeric format.

NFT_CTX_OUTPUT_NUMERIC_ALL

Display all numerically.

NFT_CTX_OUTPUT_TERSE

If terse output has been requested, then the contents of sets are not printed.

The `nft_ctx_output_get_flags()` function returns the output flags setting's value in `ctx`.

The `nft_ctx_output_set_flags()` function sets the output flags setting in `ctx` to the value of `val`.

`nft_ctx_output_get_debug()` and `nft_ctx_output_set_debug()`

Libnftables supports separate debugging of different parts of its internals. To facilitate this, debugging output is controlled via a bit mask. The bits are defined as such:

```
enum nft_debug_level {  
    NFT_DEBUG_SCANNER      = 0x1,  
    NFT_DEBUG_PARSER       = 0x2,  
    NFT_DEBUG_EVALUATION   = 0x4,  
    NFT_DEBUG_NETLINK      = 0x8,  
    NFT_DEBUG_MNL          = 0x10,  
    NFT_DEBUG_PROTO_CTX    = 0x20,  
    NFT_DEBUG_SEGTREE      = 0x40,  
};
```

NFT_DEBUG_SCANNER

Print LEX debug output.

NFT_DEBUG_PARSER

Print YACC debug output.

NFT_DEBUG_EVALUATION

Print debug information about evaluation phase.

NFT_DEBUG_NETLINK

Print netlink debug output.

NFT_DEBUG_MNL

Print libmnl debug output.

NFT_DEBUG_PROTO_CTX

Print protocol context debug output.

NFT_DEBUG_SEGTREE

Print segtree (i.e. interval sets) debug output.

The `nft_ctx_output_get_debug()` function returns the debug output setting's value in ctx.

The `nft_ctx_output_set_debug()` function sets the debug output setting in ctx to the value of mask.

Controlling library standard and error output

By default, any output from the library (e.g., after a list command) is written to stdout and any error messages are written to stderr. To give applications control over them, there are functions to assign custom file pointers as well as having the library buffer what would be written for later retrieval in a static buffer. This buffer is guaranteed to be null-terminated and must not be freed. Note that the retrieval functions rewind the buffer position indicator. Further library output will probably overwrite the buffer content and potentially render it invalid (due to reallocation).

The `nft_ctx_set_output()` and `nft_ctx_set_error()` functions set the output or error file pointer in ctx to the value of fp. They return the previous value to aid in temporary file pointer overrides. On error, these functions return NULL. This happens only if fp is NULL or invalid (tested using `ferror()` function).

The `nft_ctx_buffer_output()` and `nft_ctx_buffer_error()` functions enable library standard or error output buffering. The functions return zero on success, non-zero otherwise. This may happen if the internal call to `fopencookie()` failed.

The `nft_ctx_unbuffer_output()` and `nft_ctx_unbuffer_error()` functions disable library standard or error output buffering. On failure, the functions return non-zero which may only happen if buffering was not enabled at the time the function was called.

The `nft_ctx_get_output_buffer()` and `nft_ctx_get_error_buffer()` functions return a pointer to the buffered output (which may be empty).

`nft_ctx_add_include_path()` and `nft_ctx_clear_include_path()`

The include command in nftables rulesets allows one to outsource parts of the ruleset into a different file. The include path defines where these files are searched for. Libnftables allows one to have a list of those paths which are searched in order. The default include

path list contains a single compile-time defined entry (typically /etc/).

The `nft_ctx_add_include_path()` function extends the list of include paths in `ctx` by the one given in `path`. The function returns zero on success or non-zero if memory allocation failed.

The `nft_ctx_clear_include_paths()` function removes all include paths, even the built-in default one.

`nft_ctx_add_var()` and `nft_ctx_clear_vars()`

The `define` command in `nftables` ruleset allows one to define variables.

The `nft_ctx_add_var()` function extends the list of variables in `ctx`. The variable must be given in the format `key=value`. The function returns zero on success or non-zero if the variable is malformed.

The `nft_ctx_clear_vars()` function removes all variables.

`nft_run_cmd_from_buffer()` and `nft_run_cmd_from_filename()`

These functions perform the actual work of parsing user input into `nftables` commands and executing them.

The `nft_run_cmd_from_buffer()` function passes the command(s) contained in `buf` (which must be null-terminated) to the library, respecting settings and state in `nft`.

The `nft_run_cmd_from_filename()` function passes the content of `filename` to the library, respecting settings and state in `nft`.

Both functions return zero on success. A non-zero return code indicates an error while parsing or executing the command. This event should be accompanied by an error message written to library error output.

EXAMPLE

```
#include <stdio.h>

#include <string.h>

#include <nftables/libnftables.h>

int main(void)
{
    char *list_cmd = "list ruleset";

    struct nft_ctx *nft;

    const char *output, *p;

    char buf[256];

    int rc = 0;

    nft = nft_ctx_new(NFT_CTX_DEFAULT);
```

```

if (!nft)
    return 1;
while (1) {
    if (nft_ctx_buffer_output(nft) ||
        nft_run_cmd_from_buffer(nft, list_cmd)) {
        rc = 1;
        break;
    }
    output = nft_ctx_get_output_buffer(nft);
    if (strlen(output)) {
        printf("\nThis is the current ruleset:\n| ");
        for (p = output; *(p + 1); p++) {
            if (*p == '\n')
                printf("\n| ");
            else
                putchar(*p);
        }
        putchar('\n');
    } else {
        printf("\nCurrent ruleset is empty.\n");
    }
    nft_ctx_unbuffer_output(nft);
    printf("\nEnter command ('q' to quit): ");
    fflush(stdout);
    fgets(buf, 256, stdin);
    if (strlen(buf))
        buf[strlen(buf) - 1] = '\0';
    if (buf[0] == 'q' && buf[1] == '\0')
        break;
    if (nft_run_cmd_from_buffer(nft, buf)) {
        rc = 1;
        break;
    }
}

```



```
}  
nft_ctx_free(nft);  
return rc;  
}
```

SEE ALSO

libnftables-json(5), nft(8)

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LIBNFTABLES(3)