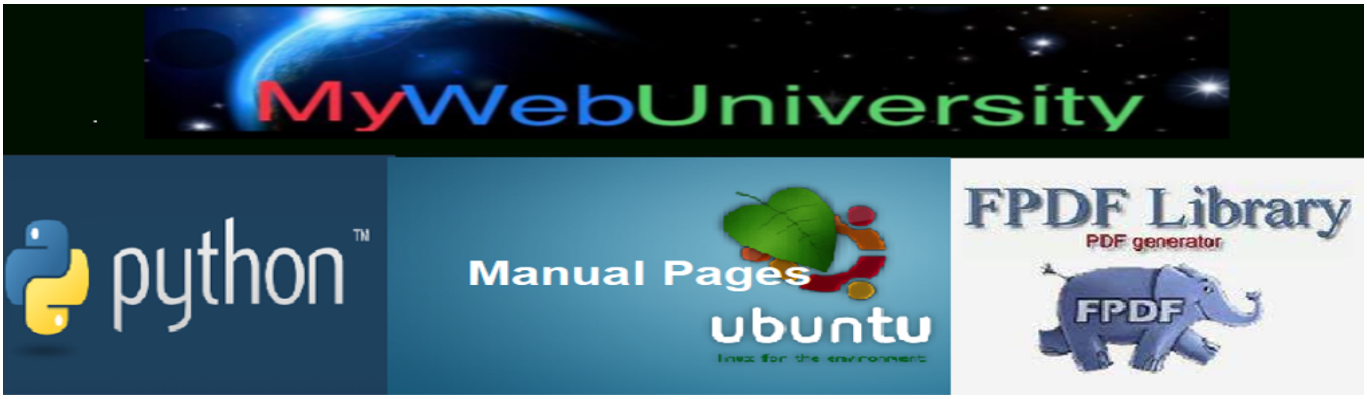

Rocky Enterprise Linux 9.2 Manual Pages on command 'STAILQ_INSERT_TAIL.3'

$ man STAILQ_INSERT_TAIL.3

STAILQ(3) Linux Programmer's Manual STAILQ(3)

NAME

STAILQ_CONCAT, STAILQ_EMPTY, STAILQ_ENTRY, STAILQ_FIRST, STAILQ_FOREACH, STAILQ_HEAD, STAILQ_HEAD_INITIALIZER, STAILQ_INIT, STAILQ_INSERT_AFTER, STAILQ_INSERT_HEAD, STAILQ_IN? SERT_TAIL, STAILQ_NEXT, STAILQ_REMOVE, STAILQ_REMOVE_HEAD, - implementation of a singly linked tail queue

SYNOPSIS

```
#include <sys/queue.h>

void STAILQ_CONCAT(STAILQ_HEAD *head1, STAILQ_HEAD *head2);

int STAILQ_EMPTY(STAILQ_HEAD *head);

STAILQ_ENTRY(TYPE);

struct TYPE *STAILQ_FIRST(STAILQ_HEAD *head);

STAILQ_FOREACH(struct TYPE *var, STAILQ_HEAD *head, STAILQ_ENTRY NAME);

STAILQ_HEAD(HEADNAME, TYPE);

STAILQ_HEAD STAILQ_HEAD_INITIALIZER(STAILQ_HEAD head);

void STAILQ_INIT(STAILQ_HEAD *head);

void STAILQ_INSERT_AFTER(STAILQ_HEAD *head, struct TYPE *listelm,
        struct TYPE *elm, STAILQ_ENTRY NAME);

void STAILQ_INSERT_HEAD(STAILQ_HEAD *head, struct TYPE *elm,
        STAILQ_ENTRY NAME);

void STAILQ_INSERT_TAIL(STAILQ_HEAD *head, struct TYPE *elm,
        STAILQ_ENTRY NAME);

struct TYPE *STAILQ_NEXT(struct TYPE *elm, STAILQ_ENTRY NAME);
```

void STAILQ_REMOVE(STAILQ_HEAD *head, struct TYPE *elm, TYPE,

STAILQ_ENTRY NAME);

void STAILQ_REMOVE_HEAD(STAILQ_HEAD *head, STAILQ_ENTRY NAME);

DESCRIPTION

These macros define and operate on singly linked tail queues.

In the macro definitions, TYPE is the name of a user-defined structure, that must contain a field of type STAILQ_ENTRY, named NAME. The argument HEADNAME is the name of a user-de? fined structure that must be declared using the macro STAILQ_HEAD().

A singly linked tail queue is headed by a structure defined by the STAILQ_HEAD() macro. This structure contains a pair of pointers, one to the first element in the tail queue and the other to the last element in the tail queue. The elements are singly linked for mini? mum space and pointer manipulation overhead at the expense of O(n) removal for arbitrary elements. New elements can be added to the tail queue after an existing element, at the head of the tail queue, or at the end of the tail queue. A STAILQ_HEAD structure is de? clared as follows:

STAILQ_HEAD(HEADNAME, TYPE) head;

where struct HEADNAME is the structure to be defined, and struct TYPE is the type of the elements to be linked into the tail queue. A pointer to the head of the tail queue can later be declared as:

struct HEADNAME *headp;

(The names head and headp are user selectable.)

The macro STAILQ_HEAD_INITIALIZER() evaluates to an initializer for the tail queue head.

The macro STAILQ_CONCAT() concatenates the tail queue headed by head2 onto the end of the one headed by head1 removing all entries from the former.

The macro STAILQ_EMPTY() evaluates to true if there are no items on the tail queue.

The macro STAILQ_ENTRY() declares a structure that connects the elements in the tail queue.

The macro STAILQ_FIRST() returns the first item on the tail queue or NULL if the tail queue is empty.

The macro STAILQ_FOREACH() traverses the tail queue referenced by head in the forward di? rection, assigning each element in turn to var.

The macro STAILQ_INIT() initializes the tail queue referenced by head.

The macro STAILQ_INSERT_HEAD() inserts the new element elm at the head of the tail queue.

The macro STAILQ_INSERT_TAIL() inserts the new element elm at the end of the tail queue.

The macro STAILQ_INSERT_AFTER() inserts the new element elm after the element listelm.

The macro STAILQ_NEXT() returns the next item on the tail queue, or NULL this item is the last.

The macro STAILQ_REMOVE_HEAD() removes the element at the head of the tail queue. For optimum efficiency, elements being removed from the head of the tail queue should use this macro explicitly rather than the generic STAILQ_REMOVE() macro.

The macro STAILQ_REMOVE() removes the element elm from the tail queue.

RETURN VALUE

STAILQ_EMPTY() returns nonzero if the queue is empty, and zero if the queue contains at least one entry.

STAILQ_FIRST(), and STAILQ_NEXT() return a pointer to the first or next TYPE structure, respectively.

STAILQ_HEAD_INITIALIZER() returns an initializer that can be assigned to the queue head.

CONFORMING TO

Not in POSIX.1, POSIX.1-2001 or POSIX.1-2008. Present on the BSDs (STAILQ macros first appeared in 4.4BSD).

BUGS

The macro STAILQ_FOREACH() doesn't allow var to be removed or freed within the loop, as it would interfere with the traversal. The macro STAILQ_FOREACH_SAFE(), which is present on the BSDs but is not present in glibc, fixes this limitation by allowing var to safely be removed from the list and freed from within the loop without interfering with the traversal.

EXAMPLES

```
#include <stddef.h>
#include <stdio.h>
#include <stdlib.h>
#include <sys/queue.h>
struct entry {
    int data;
    STAILQ_ENTRY(entry) entries;        /* Singly linked tail queue. */
};
STAILQ_HEAD(stailhead, entry);
```

```
int
main(void)
{
    struct entry *n1, *n2, *n3, *np;
    struct stailhead head;              /* Singly linked tail queue
                                        head. */
    STAILQ_INIT(&head);                 /* Initialize the queue. */
    n1 = malloc(sizeof(struct entry));  /* Insert at the head. */
    STAILQ_INSERT_HEAD(&head, n1, entries);
    n1 = malloc(sizeof(struct entry));  /* Insert at the tail. */
    STAILQ_INSERT_TAIL(&head, n1, entries);
    n2 = malloc(sizeof(struct entry));  /* Insert after. */
    STAILQ_INSERT_AFTER(&head, n1, n2, entries);
    STAILQ_REMOVE(&head, n2, entry, entries);/* Deletion. */
    free(n2);
    n3 = STAILQ_FIRST(&head);
    STAILQ_REMOVE_HEAD(&head, entries); /* Deletion from the head. */
    free(n3);
    n1 = STAILQ_FIRST(&head);
    n1->data = 0;
    for (int i = 1; i < 5; i++) {
        n1 = malloc(sizeof(struct entry));
        STAILQ_INSERT_HEAD(&head, n1, entries);
        n1->data = i;
    }
                                    /* Forward traversal. */
    STAILQ_FOREACH(np, &head, entries)
        printf("%i\n", np->data);
                                    /* TailQ Deletion. */
    n1 = STAILQ_FIRST(&head);
    while (n1 != NULL) {
        n2 = STAILQ_NEXT(n1, entries);
        free(n1);
```

```
            n1 = n2;
        }
        STAILQ_INIT(&head);
        exit(EXIT_SUCCESS);
    }
```

SEE ALSO

insque(3), queue(7)

COLOPHON

This page is part of release 5.10 of the Linux man-pages project. A description of the project, information about reporting bugs, and the latest version of this page, can be found at https://www.kernel.org/doc/man-pages/.