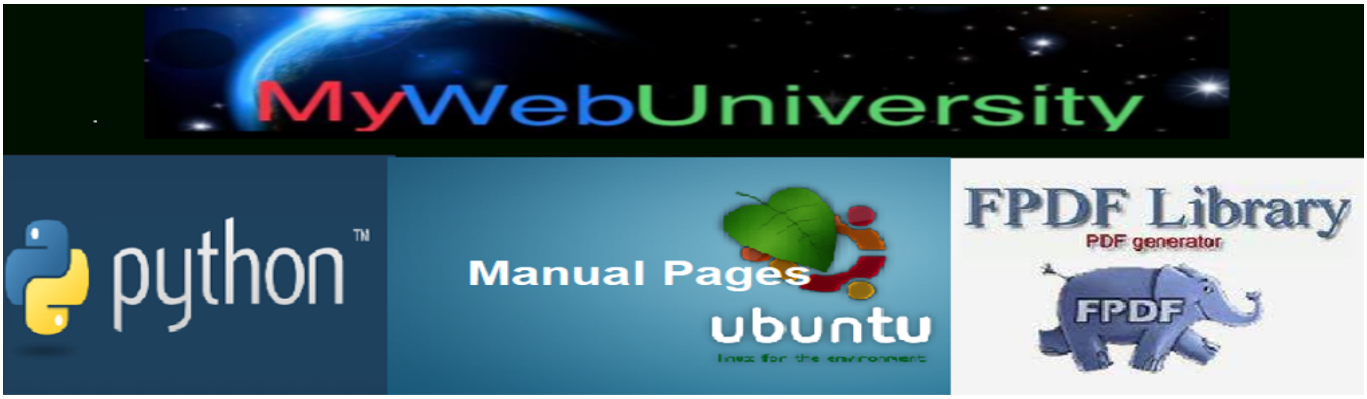

Rocky Enterprise Linux 9.2 Manual Pages on command 'quotactl.2'

$ man quotactl.2

QUOTACTL(2) Linux Programmer's Manual QUOTACTL(2)

NAME

quotactl - manipulate disk quotas

SYNOPSIS

#include <sys/quota.h>

#include <xfs/xqm.h> /* for XFS quotas */

int quotactl(int cmd, const char *special, int id, caddr_t addr);

DESCRIPTION

The quota system can be used to set per-user, per-group, and per-project limits on the amount of disk space used on a filesystem. For each user and/or group, a soft limit and a hard limit can be set for each filesystem. The hard limit can't be exceeded. The soft limit can be exceeded, but warnings will ensue. Moreover, the user can't exceed the soft limit for more than grace period duration (one week by default) at a time; after this, the soft limit counts as a hard limit.

The quotactl() call manipulates disk quotas. The cmd argument indicates a command to be applied to the user or group ID specified in id. To initialize the cmd argument, use the QCMD(subcmd, type) macro. The type value is either USRQUOTA, for user quotas, GRPQUOTA, for group quotas, or (since Linux 4.1) PRJQUOTA, for project quotas. The subcmd value is described below.

The special argument is a pointer to a null-terminated string containing the pathname of the (mounted) block special device for the filesystem being manipulated.

The addr argument is the address of an optional, command-specific, data structure that is copied in or out of the system. The interpretation of addr is given with each operation

below.

The subcmd value is one of the following operations:

Q_QUOTAON

Turn on quotas for a filesystem. The id argument is the identification number of the quota format to be used. Currently, there are three supported quota formats:

QFMT_VFS_OLD The original quota format.

QFMT_VFS_V0 The standard VFS v0 quota format, which can handle 32-bit UIDs and GIDs and quota limits up to 2^42 bytes and 2^32 inodes.

QFMT_VFS_V1 A quota format that can handle 32-bit UIDs and GIDs and quota limits of 2^64 bytes and 2^64 inodes.

The addr argument points to the pathname of a file containing the quotas for the filesystem. The quota file must exist; it is normally created with the quo? tacheck(8) program

Quota information can be also stored in hidden system inodes for ext4, XFS, and other filesystems if the filesystem is configured so. In this case, there are no visible quota files and there is no need to use quotacheck(8). Quota information is always kept consistent by the filesystem and the Q_QUOTAON operation serves only to enable enforcement of quota limits. The presence of hidden system inodes with quota information is indicated by the DQF_SYS_FILE flag in the dqi_flags field re? turned by the Q_GETINFO operation.

This operation requires privilege (CAP_SYS_ADMIN).

Q_QUOTAOFF

Turn off quotas for a filesystem. The addr and id arguments are ignored. This op? eration requires privilege (CAP_SYS_ADMIN).

Q_GETQUOTA

Get disk quota limits and current usage for user or group id. The addr argument is a pointer to a dqblk structure defined in <sys/quota.h> as follows:

```
/* uint64_t is an unsigned 64-bit integer;
   uint32_t is an unsigned 32-bit integer */
struct dqblk {      /* Definition since Linux 2.4.22 */
    uint64_t dqb_bhardlimit;  /* Absolute limit on disk
                                 quota blocks alloc */
    uint64_t dqb_bsoftlimit;  /* Preferred limit on
```

```
                        disk quota blocks */
    uint64_t dqb_curspace;    /* Current occupied space
                        (in bytes) */
    uint64_t dqb_ihardlimit;  /* Maximum number of
                        allocated inodes */
    uint64_t dqb_isoftlimit;  /* Preferred inode limit */
    uint64_t dqb_curinodes;   /* Current number of
                        allocated inodes */
    uint64_t dqb_btime;       /* Time limit for excessive
                        disk use */
    uint64_t dqb_itime;       /* Time limit for excessive
                        files */
    uint32_t dqb_valid;       /* Bit mask of QIF_*
                        constants */
};
/* Flags in dqb_valid that indicate which fields in
   dqblk structure are valid. */
#define QIF_BLIMITS   1
#define QIF_SPACE     2
#define QIF_ILIMITS   4
#define QIF_INODES    8
#define QIF_BTIME     16
#define QIF_ITIME     32
#define QIF_LIMITS    (QIF_BLIMITS | QIF_ILIMITS)
#define QIF_USAGE     (QIF_SPACE | QIF_INODES)
#define QIF_TIMES     (QIF_BTIME | QIF_ITIME)
#define QIF_ALL       (QIF_LIMITS | QIF_USAGE | QIF_TIMES)
```

The dqb_valid field is a bit mask that is set to indicate the entries in the dqblk structure that are valid. Currently, the kernel fills in all entries of the dqblk structure and marks them as valid in the dqb_valid field. Unprivileged users may retrieve only their own quotas; a privileged user (CAP_SYS_ADMIN) can retrieve the quotas of any user.

Q_GETNEXTQUOTA (since Linux 4.6)

This operation is the same as Q_GETQUOTA, but it returns quota information for the next ID greater than or equal to id that has a quota set.

The addr argument is a pointer to a nextdqblk structure whose fields are as for the dqblk, except for the addition of a dqb_id field that is used to return the ID for which quota information is being returned:

```
struct nextdqblk {
    uint64_t dqb_bhardlimit;
    uint64_t dqb_bsoftlimit;
    uint64_t dqb_curspace;
    uint64_t dqb_ihardlimit;
    uint64_t dqb_isoftlimit;
    uint64_t dqb_curinodes;
    uint64_t dqb_btime;
    uint64_t dqb_itime;
    uint32_t dqb_valid;
    uint32_t dqb_id;
};
```

Q_SETQUOTA

Set quota information for user or group id, using the information supplied in the dqblk structure pointed to by addr. The dqb_valid field of the dqblk structure in? dicates which entries in the structure have been set by the caller. This operation supersedes the Q_SETQLIM and Q_SETUSE operations in the previous quota interfaces. This operation requires privilege (CAP_SYS_ADMIN).

Q_GETINFO (since Linux 2.4.22)

Get information (like grace times) about quotafile. The addr argument should be a pointer to a dqinfo structure. This structure is defined in <sys/quota.h> as fol? lows:

```
/* uint64_t is an unsigned 64-bit integer;
   uint32_t is an unsigned 32-bit integer */
struct dqinfo {         /* Defined since kernel 2.4.22 */
    uint64_t dqi_bgrace;  /* Time before block soft limit
                             becomes hard limit */
    uint64_t dqi_igrace;  /* Time before inode soft limit
```

```
                        becomes hard limit */
    uint32_t dqi_flags;   /* Flags for quotafile
                        (DQF_*) */
    uint32_t dqi_valid;
};
/* Bits for dqi_flags */
/* Quota format QFMT_VFS_OLD */
#define DQF_ROOT_SQUASH (1 << 0) /* Root squash enabled */
        /* Before Linux v4.0, this had been defined
           privately as V1_DQF_RSQUASH */
/* Quota format QFMT_VFS_V0 / QFMT_VFS_V1 */
#define DQF_SYS_FILE    (1 << 16)   /* Quota stored in
                                    a system file */
/* Flags in dqi_valid that indicate which fields in
   dqinfo structure are valid. */
#define IIF_BGRACE  1
#define IIF_IGRACE  2
#define IIF_FLAGS   4
#define IIF_ALL     (IIF_BGRACE | IIF_IGRACE | IIF_FLAGS)
```

The dqi_valid field in the dqinfo structure indicates the entries in the structure that are valid. Currently, the kernel fills in all entries of the dqinfo structure and marks them all as valid in the dqi_valid field. The id argument is ignored.

Q_SETINFO (since Linux 2.4.22)

Set information about quotafile. The addr argument should be a pointer to a dqinfo structure. The dqi_valid field of the dqinfo structure indicates the entries in the structure that have been set by the caller. This operation supersedes the Q_SETGRACE and Q_SETFLAGS operations in the previous quota interfaces. The id ar? gument is ignored. This operation requires privilege (CAP_SYS_ADMIN).

Q_GETFMT (since Linux 2.4.22)

Get quota format used on the specified filesystem. The addr argument should be a pointer to a 4-byte buffer where the format number will be stored.

Q_SYNC Update the on-disk copy of quota usages for a filesystem. If special is NULL, then all filesystems with active quotas are sync'ed. The addr and id arguments are ig?

nored.

Q_GETSTATS (supported up to Linux 2.4.21)

Get statistics and other generic information about the quota subsystem. The addr argument should be a pointer to a dqstats structure in which data should be stored. This structure is defined in <sys/quota.h>. The special and id arguments are ig? nored.

This operation is obsolete and was removed in Linux 2.4.22. Files in /proc/sys/fs/quota/ carry the information instead.

For XFS filesystems making use of the XFS Quota Manager (XQM), the above operations are bypassed and the following operations are used:

Q_XQUOTAON

Turn on quotas for an XFS filesystem. XFS provides the ability to turn on/off quota limit enforcement with quota accounting. Therefore, XFS expects addr to be a pointer to an unsigned int that contains a bitwise combination of the following flags (defined in <xfs/xqm.h>):

```
XFS_QUOTA_UDQ_ACCT  /* User quota accounting */
XFS_QUOTA_UDQ_ENFD  /* User quota limits enforcement */
XFS_QUOTA_GDQ_ACCT  /* Group quota accounting */
XFS_QUOTA_GDQ_ENFD  /* Group quota limits enforcement */
XFS_QUOTA_PDQ_ACCT  /* Project quota accounting */
XFS_QUOTA_PDQ_ENFD  /* Project quota limits enforcement */
```

This operation requires privilege (CAP_SYS_ADMIN). The id argument is ignored.

Q_XQUOTAOFF

Turn off quotas for an XFS filesystem. As with Q_QUOTAON, XFS filesystems expect a pointer to an unsigned int that specifies whether quota accounting and/or limit en? forcement need to be turned off (using the same flags as for Q_XQUOTAON operation).

This operation requires privilege (CAP_SYS_ADMIN). The id argument is ignored.

Q_XGETQUOTA

Get disk quota limits and current usage for user id. The addr argument is a pointer to an fs_disk_quota structure, which is defined in <xfs/xqm.h> as follows:

```
/* All the blk units are in BBs (Basic Blocks) of
   512 bytes. */
#define FS_DQUOT_VERSION  1  /* fs_disk_quota.d_version */
```

```
#define XFS_USER_QUOTA    (1<<0)  /* User quota type */
#define XFS_PROJ_QUOTA    (1<<1)  /* Project quota type */
#define XFS_GROUP_QUOTA   (1<<2)  /* Group quota type */
struct fs_disk_quota {
    int8_t   d_version;   /* Version of this structure */
    int8_t   d_flags;     /* XFS_{USER,PROJ,GROUP}_QUOTA */
    uint16_t d_fieldmask; /* Field specifier */
    uint32_t d_id;        /* User, project, or group ID */
    uint64_t d_blk_hardlimit; /* Absolute limit on
                                 disk blocks */
    uint64_t d_blk_softlimit; /* Preferred limit on
                                 disk blocks */
    uint64_t d_ino_hardlimit; /* Maximum # allocated
                                 inodes */
    uint64_t d_ino_softlimit; /* Preferred inode limit */
    uint64_t d_bcount;    /* # disk blocks owned by
                             the user */
    uint64_t d_icount;    /* # inodes owned by the user */
    int32_t  d_itimer;    /* Zero if within inode limits */
                          /* If not, we refuse service */
    int32_t  d_btimer;    /* Similar to above; for
                             disk blocks */
    uint16_t d_iwarns;    /* # warnings issued with
                             respect to # of inodes */
    uint16_t d_bwarns;    /* # warnings issued with
                             respect to disk blocks */
    int32_t  d_padding2;  /* Padding - for future use */
    uint64_t d_rtb_hardlimit; /* Absolute limit on realtime
                                 (RT) disk blocks */
    uint64_t d_rtb_softlimit; /* Preferred limit on RT
                                 disk blocks */
    uint64_t d_rtbcount;  /* # realtime blocks owned */
    int32_t  d_rtbtimer;  /* Similar to above; for RT
```

```
                    disk blocks */
    uint16_t d_rtbwarns;  /* # warnings issued with
                    respect to RT disk blocks */
    int16_t  d_padding3;  /* Padding - for future use */
    char     d_padding4[8];   /* Yet more padding */
};
```

Unprivileged users may retrieve only their own quotas; a privileged user (CAP_SYS_ADMIN) may retrieve the quotas of any user.

Q_XGETNEXTQUOTA (since Linux 4.6)

This operation is the same as Q_XGETQUOTA, but it returns (in the fs_disk_quota structure pointed by addr) quota information for the next ID greater than or equal to id that has a quota set. Note that since fs_disk_quota already has q_id field, no separate structure type is needed (in contrast with Q_GETQUOTA and Q_GETNEX? TQUOTA operations)

Q_XSETQLIM

Set disk quota limits for user id. The addr argument is a pointer to an fs_disk_quota structure. This operation requires privilege (CAP_SYS_ADMIN).

Q_XGETQSTAT

Returns XFS filesystem-specific quota information in the fs_quota_stat structure pointed by addr. This is useful for finding out how much space is used to store quota information, and also to get the quota on/off status of a given local XFS filesystem. The fs_quota_stat structure itself is defined as follows:

```
#define FS_QSTAT_VERSION 1  /* fs_quota_stat.qs_version */
struct fs_qfilestat {
    uint64_t qfs_ino;       /* Inode number */
    uint64_t qfs_nblks;     /* Number of BBs
                    512-byte-blocks */
    uint32_t qfs_nextents;  /* Number of extents */
};
struct fs_quota_stat {
    int8_t   qs_version; /* Version number for
                    future changes */
    uint16_t qs_flags; /* XFS_QUOTA_{U,P,G}DQ_{ACCT,ENFD} */
```

```
    int8_t   qs_pad;   /* Unused */
    struct fs_qfilestat qs_uquota;  /* User quota storage
                                       information */
    struct fs_qfilestat qs_gquota;  /* Group quota storage
                                       information */
    uint32_t qs_incoredqs;   /* Number of dquots in core */
    int32_t  qs_btimelimit;  /* Limit for blocks timer */
    int32_t  qs_itimelimit;  /* Limit for inodes timer */
    int32_t  qs_rtbtimelimit;/* Limit for RT
                                blocks timer */
    uint16_t qs_bwarnlimit;  /* Limit for # of warnings */
    uint16_t qs_iwarnlimit;  /* Limit for # of warnings */
};
```

The id argument is ignored.

Q_XGETQSTATV

Returns XFS filesystem-specific quota information in the fs_quota_statv pointed to by addr. This version of the operation uses a structure with proper versioning support, along with appropriate layout (all fields are naturally aligned) and padding to avoiding special compat handling; it also provides the ability to get statistics regarding the project quota file. The fs_quota_statv structure itself is defined as follows:

```
#define FS_QSTATV_VERSION1 1 /* fs_quota_statv.qs_version */
struct fs_qfilestatv {
    uint64_t qfs_ino;       /* Inode number */
    uint64_t qfs_nblks;     /* Number of BBs
                               512-byte-blocks */
    uint32_t qfs_nextents;  /* Number of extents */
    uint32_t qfs_pad;       /* Pad for 8-byte alignment */
};
struct fs_quota_statv {
    int8_t   qs_version;    /* Version for future
                               changes */
    uint8_t  qs_pad1;       /* Pad for 16-bit alignment */
```

```
        uint16_t qs_flags;      /* XFS_QUOTA_.* flags */
        uint32_t qs_incoredqs;  /* Number of dquots incore */
        struct fs_qfilestatv qs_uquota;  /* User quota
                                            information */
        struct fs_qfilestatv qs_gquota;  /* Group quota
                                            information */
        struct fs_qfilestatv qs_pquota;  /* Project quota
                                            information */
        int32_t  qs_btimelimit;   /* Limit for blocks timer */
        int32_t  qs_itimelimit;   /* Limit for inodes timer */
        int32_t  qs_rtbtimelimit; /* Limit for RT blocks
                                     timer */
        uint16_t qs_bwarnlimit;   /* Limit for # of warnings */
        uint16_t qs_iwarnlimit;   /* Limit for # of warnings */
        uint64_t qs_pad2[8];      /* For future proofing */
    };
```

The qs_version field of the structure should be filled with the version of the structure supported by the callee (for now, only FS_QSTAT_VERSION1 is supported). The kernel will fill the structure in accordance with version provided. The id argument is ignored.

Q_XQUOTARM (since Linux 3.16)

Free the disk space taken by disk quotas. The addr argument should be a pointer to an unsigned int value containing flags (the same as in d_flags field of fs_disk_quota structure) which identify what types of quota should be removed. (Note that the quota type passed in the cmd argument is ignored, but should remain valid in order to pass preliminary quotactl syscall handler checks.)

Quotas must have already been turned off. The id argument is ignored.

Q_XQUOTASYNC (since Linux 2.6.15; no-op since Linux 3.4)

This operation was an XFS quota equivalent to Q_SYNC, but it is no-op since Linux 3.4, as sync(1) writes quota information to disk now (in addition to the other filesystem metadata that it writes out). The special, id and addr arguments are ignored.

RETURN VALUE

On success, quotactl() returns 0; on error -1 is returned, and errno is set to indicate the error.

ERRORS

EACCES cmd is Q_QUOTAON, and the quota file pointed to by addr exists, but is not a regu? lar file or is not on the filesystem pointed to by special.

EBUSY cmd is Q_QUOTAON, but another Q_QUOTAON had already been performed.

EFAULT addr or special is invalid.

EINVAL cmd or type is invalid.

EINVAL cmd is Q_QUOTAON, but the specified quota file is corrupted.

EINVAL (since Linux 5.5)

cmd is Q_XQUOTARM, but addr does not point to valid quota types.

ENOENT The file specified by special or addr does not exist.

ENOSYS The kernel has not been compiled with the CONFIG_QUOTA option.

ENOTBLK

special is not a block device.

EPERM The caller lacked the required privilege (CAP_SYS_ADMIN) for the specified opera? tion.

ERANGE cmd is Q_SETQUOTA, but the specified limits are out of the range allowed by the quota format.

ESRCH No disk quota is found for the indicated user. Quotas have not been turned on for this filesystem.

ESRCH cmd is Q_QUOTAON, but the specified quota format was not found.

ESRCH cmd is Q_GETNEXTQUOTA or Q_XGETNEXTQUOTA, but there is no ID greater than or equal to id that has an active quota.

NOTES

Instead of <xfs/xqm.h> one can use <linux/dqblk_xfs.h>, taking into account that there are several naming discrepancies:

? Quota enabling flags (of format XFS_QUOTA_[UGP]DQ_{ACCT,ENFD}) are defined without a leading "X", as FS_QUOTA_[UGP]DQ_{ACCT,ENFD}.

? The same is true for XFS_{USER,GROUP,PROJ}_QUOTA quota type flags, which are defined as FS_{USER,GROUP,PROJ}_QUOTA.

? The dqblk_xfs.h header file defines its own XQM_USRQUOTA, XQM_GRPQUOTA, and XQM_PR? JQUOTA constants for the available quota types, but their values are the same as for

constants without the XQM_ prefix.

SEE ALSO

quota(1), getrlimit(2), quotacheck(8), quotaon(8)

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/.