LCOV - code coverage report

			Found	Hit	C
Current view:	directory - fs/ext4 - mballoc.h (source / functions)				
Test:	kernel_2_6_31_ext4_round_3.info	**Lines:**	2	2	1
Date:	2009-10-24	**Functions:**	0	0	

```
                :  /*
                :   *  fs/ext4/mballoc.h
                :   *
                :   *  Written by: Alex Tomas <alex@clusterfs.com>
                :   *
                :   */
                : #ifndef _EXT4_MBALLOC_H
                : #define _EXT4_MBALLOC_H
                :
                : #include <linux/time.h>
                : #include <linux/fs.h>
                : #include <linux/namei.h>
                : #include <linux/quotaops.h>
                : #include <linux/buffer_head.h>
                : #include <linux/module.h>
                : #include <linux/swap.h>
                : #include <linux/proc_fs.h>
                : #include <linux/pagemap.h>
                : #include <linux/seq_file.h>
                : #include <linux/version.h>
                : #include <linux/blkdev.h>
                : #include <linux/mutex.h>
                : #include "ext4_jbd2.h"
                : #include "ext4.h"
                :
                : /*
                :  * with AGGRESSIVE_CHECK allocator runs consistency checks over
                :  * structures. these checks slow things down a lot
                :  */
                : #define AGGRESSIVE_CHECK__
                :
                : /*
                :  * with DOUBLE_CHECK defined mballoc creates persistent in-core
                :  * bitmaps, maintains and uses them to check for double allocations
                :  */
                : #define DOUBLE_CHECK__
                :
                : /*
                :  */
                : #define MB_DEBUG__
                : #ifdef MB_DEBUG
                : #define mb_debug(fmt, a...)     printk(fmt, ##a)
                : #else
                : #define mb_debug(fmt, a...)
                : #endif
                :
                : /*
                :  * with EXT4_MB_HISTORY mballoc stores last N allocations in memory
                :  * and you can monitor it in /proc/fs/ext4/<dev>/mb_history
                :  */
                : #define EXT4_MB_HISTORY
                : #define EXT4_MB_HISTORY_ALLOC           1       /* allocation */
```

```
53                : #define EXT4_MB_HISTORY_PREALLOC        2       /* preallocated blocks used */
54                : #define EXT4_MB_HISTORY_DISCARD         4       /* preallocation discarded */
55                : #define EXT4_MB_HISTORY_FREE            8       /* free */
56                :
57                : #define EXT4_MB_HISTORY_DEFAULT         (EXT4_MB_HISTORY_ALLOC | \
58                :                                         EXT4_MB_HISTORY_PREALLOC)
59                :
60                : /*
61                :  * How long mballoc can look for a best extent (in found extents)
62                :  */
63                : #define MB_DEFAULT_MAX_TO_SCAN          200
64                :
65                : /*
66                :  * How long mballoc must look for a best extent
67                :  */
68                : #define MB_DEFAULT_MIN_TO_SCAN          10
69                :
70                : /*
71                :  * How many groups mballoc will scan looking for the best chunk
72                :  */
73                : #define MB_DEFAULT_MAX_GROUPS_TO_SCAN   5
74                :
75                : /*
76                :  * with 'ext4_mb_stats' allocator will collect stats that will be
77                :  * shown at umount. The collecting costs though!
78                :  */
79                : #define MB_DEFAULT_STATS                1
80                :
81                : /*
82                :  * files smaller than MB_DEFAULT_STREAM_THRESHOLD are served
83                :  * by the stream allocator, which purpose is to pack requests
84                :  * as close each to other as possible to produce smooth I/O traffic
85                :  * We use locality group prealloc space for stream request.
86                :  * We can tune the same via /proc/fs/ext4/<parition>/stream_req
87                :  */
88                : #define MB_DEFAULT_STREAM_THRESHOLD     16      /* 64K */
89                :
90                : /*
91                :  * for which requests use 2^N search using buddies
92                :  */
93                : #define MB_DEFAULT_ORDER2_REQS          2
94                :
95                : /*
96                :  * default group prealloc size 512 blocks
97                :  */
98                : #define MB_DEFAULT_GROUP_PREALLOC       512
99                :
100               :
101               : struct ext4_free_data {
102               :         /* this links the free block information from group_info */
103               :         struct rb_node node;
104               :
105               :         /* this links the free block information from ext4_sb_info */
106               :         struct list_head list;
107               :
108               :         /* group which free block extent belongs */
109               :         ext4_group_t group;
110               :
111               :         /* free block extent */
112               :         ext4_grpblk_t start_blk;
113               :         ext4_grpblk_t count;
114               :
115               :         /* transaction which freed this extent */
116               :         tid_t   t_tid;
117               : };
```

```
:
: struct ext4_prealloc_space {
:         struct list_head        pa_inode_list;
:         struct list_head        pa_group_list;
:         union {
:                 struct list_head pa_tmp_list;
:                 struct rcu_head pa_rcu;
:         } u;
:         spinlock_t              pa_lock;
:         atomic_t                pa_count;
:         unsigned                pa_deleted;
:         ext4_fsblk_t            pa_pstart;      /* phys. block */
:         ext4_lblk_t             pa_lstart;      /* log. block */
:         unsigned short          pa_len;         /* len of preallocated chunk */
:         unsigned short          pa_free;        /* how many blocks are free */
:         unsigned short          pa_type;        /* pa type. inode or group */
:         spinlock_t              *pa_obj_lock;
:         struct inode            *pa_inode;      /* hack, for history only */
: };
:
: enum {
:         MB_INODE_PA = 0,
:         MB_GROUP_PA = 1
: };
:
: struct ext4_free_extent {
:         ext4_lblk_t fe_logical;
:         ext4_grpblk_t fe_start;
:         ext4_group_t fe_group;
:         int fe_len;
: };
:
: /*
:  * Locality group:
:  *   we try to group all related changes together
:  *   so that writeback can flush/allocate them together as well
:  *   Size of lg_prealloc_list hash is determined by MB_DEFAULT_GROUP_PREALLOC
:  *   (512). We store prealloc space into the hash based on the pa_free blocks
:  *   order value.ie, fls(pa_free)-1;
:  */
: #define PREALLOC_TB_SIZE 10
: struct ext4_locality_group {
:         /* for allocator */
:         /* to serialize allocates */
:         struct mutex            lg_mutex;
:         /* list of preallocations */
:         struct list_head        lg_prealloc_list[PREALLOC_TB_SIZE];
:         spinlock_t              lg_prealloc_lock;
: };
:
: struct ext4_allocation_context {
:         struct inode *ac_inode;
:         struct super_block *ac_sb;
:
:         /* original request */
:         struct ext4_free_extent ac_o_ex;
:
:         /* goal request (after normalization) */
:         struct ext4_free_extent ac_g_ex;
:
:         /* the best found extent */
:         struct ext4_free_extent ac_b_ex;
:
:         /* copy of the bext found extent taken before preallocation efforts */
:         struct ext4_free_extent ac_f_ex;
```

```
183                :
184                :         /* number of iterations done. we have to track to limit searching */
185                :         unsigned long ac_ex_scanned;
186                :         __u16 ac_groups_scanned;
187                :         __u16 ac_found;
188                :         __u16 ac_tail;
189                :         __u16 ac_buddy;
190                :         __u16 ac_flags;         /* allocation hints */
191                :         __u8 ac_status;
192                :         __u8 ac_criteria;
193                :         __u8 ac_repeats;
194                :         __u8 ac_2order;         /* if request is to allocate 2^N blocks and
195                :                                  * N > 0, the field stores N, otherwise 0 */
196                :         __u8 ac_op;             /* operation, for history only */
197                :         struct page *ac_bitmap_page;
198                :         struct page *ac_buddy_page;
199                :         /*
200                :          * pointer to the held semaphore upon successful
201                :          * block allocation
202                :          */
203                :         struct rw_semaphore *alloc_semp;
204                :         struct ext4_prealloc_space *ac_pa;
205                :         struct ext4_locality_group *ac_lg;
206                : };
207                :
208                : #define AC_STATUS_CONTINUE      1
209                : #define AC_STATUS_FOUND         2
210                : #define AC_STATUS_BREAK         3
211                :
212                : struct ext4_mb_history {
213                :         struct ext4_free_extent orig;   /* orig allocation */
214                :         struct ext4_free_extent goal;   /* goal allocation */
215                :         struct ext4_free_extent result; /* result allocation */
216                :         unsigned pid;
217                :         unsigned ino;
218                :         __u16 found;    /* how many extents have been found */
219                :         __u16 groups;   /* how many groups have been scanned */
220                :         __u16 tail;     /* what tail broke some buddy */
221                :         __u16 buddy;    /* buddy the tail ^^^ broke */
222                :         __u16 flags;
223                :         __u8 cr:3;      /* which phase the result extent was found at */
224                :         __u8 op:4;
225                :         __u8 merged:1;
226                : };
227                :
228                : struct ext4_buddy {
229                :         struct page *bd_buddy_page;
230                :         void *bd_buddy;
231                :         struct page *bd_bitmap_page;
232                :         void *bd_bitmap;
233                :         struct ext4_group_info *bd_info;
234                :         struct super_block *bd_sb;
235                :         __u16 bd_blkbits;
236                :         ext4_group_t bd_group;
237                :         struct rw_semaphore *alloc_semp;
238                : };
239                : #define EXT4_MB_BITMAP(e4b)     ((e4b)->bd_bitmap)
240                : #define EXT4_MB_BUDDY(e4b)      ((e4b)->bd_buddy)
241                :
242                : #ifndef EXT4_MB_HISTORY
243                : static inline void ext4_mb_store_history(struct ext4_allocation_context *ac)
244                : {
245                :         return;
246                : }
247                : #endif
```

```
   248                :
   249                : #define in_range(b, first, len) ((b) >= (first) && (b) <= (first) + (len) - 1)
   250                :
   251                : static inline ext4_fsblk_t ext4_grp_offs_to_block(struct super_block *sb,
   252                :                                                  struct ext4_free_extent *fex)
   253                : {
   254                :         ext4_fsblk_t block;
   255                :
   256        690609042 :         block = (ext4_fsblk_t) fex->fe_group * EXT4_BLOCKS_PER_GROUP(sb)
   257                :                               + fex->fe_start
   258                :                               + le32_to_cpu(EXT4_SB(sb)->s_es->s_first_data_block);
   259        230203014 :         return block;
   260                : }
   261                : #endif
```