gfp_allowed_mask

in mm/page_alloc.c

```
gfp_t gfp_allowed_mask __read_mostly = GFP_BOOT_MASK;

/* Control slab gfp mask during early boot */
#define GFP_BOOT_MASK (__GFP_BITS_MASK & ~(__GFP_WAIT|__GFP_IO|__GFP_FS))


#define __GFP_BITS_SHIFT 25    /* Room for N __GFP_FOO bits */
#define __GFP_BITS_MASK ((__force gfp_t)((1 << __GFP_BITS_SHIFT) - 1))
```

所有的GFP_XXXX(分配内存相关的flag)共有25种flags

```
/* Plain integer GFP bitmasks. Do not use this directly. */
#define ___GFP_DMA              0x01u
#define ___GFP_HIGHMEM          0x02u
#define ___GFP_DMA32            0x04u
#define ___GFP_MOVABLE          0x08u
#define ___GFP_WAIT             0x10u
#define ___GFP_HIGH             0x20u
#define ___GFP_IO               0x40u
#define ___GFP_FS               0x80u
#define ___GFP_COLD             0x100u
#define ___GFP_NOWARN           0x200u
#define ___GFP_REPEAT           0x400u
#define ___GFP_NOFAIL           0x800u
#define ___GFP_NORETRY          0x1000u
#define ___GFP_MEMALLOC         0x2000u
#define ___GFP_COMP             0x4000u
#define ___GFP_ZERO             0x8000u
#define ___GFP_NOMEMALLOC       0x10000u
#define ___GFP_HARDWALL         0x20000u
#define ___GFP_THISNODE         0x40000u
#define ___GFP_RECLAIMABLE      0x80000u
#define ___GFP_NOTRACK          0x200000u
#define ___GFP_NO_KSWAPD        0x400000u
#define ___GFP_OTHER_NODE       0x800000u
#define ___GFP_WRITE            0x1000000u
```

__GFP_BITS_MASK代表这25种flag的总和。

而GFP_BOOT_MASK是去除了如下3种

__GFP_WAIT

__GFP_IO

__GFP_FS

即在boot阶段不能指定这3种flag.

而当kernel初始化完成后，则没有这个限制。

in init/main.c

kernel_init_freeable()

```
	/* Now the scheduler is fully set up and can do blocking allocations */
	gfp_allowed_mask = __GFP_BITS_MASK;
```

从注释看，就是scheduler已经工作了，分配memory时可以阻塞（blocking）了。

__GFP_WAIT

__GFP_IO

__GFP_FS

这3种flag可能造成blocking.

gfp_allowed_mask的使用

```
static __always_inline void *
slab_alloc(struct kmem_cache *cachep, gfp_t flags, unsigned long caller)
{
	unsigned long save_flags;
	void *objp;

	flags &= gfp_allowed_mask;

	lockdep_trace_alloc(flags);
```

.....

}

即传入的flags参数都要先与gfp_allowed_mask做And运算。