ChewieFS

a JFFS2 like flash filesystem for NetBSD

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www.nfu.hu

JFFS2

- log-structured flash filesystem
- GNU Linux
- license: GPL
- NOR and NAND flashes
- using flash directly

JFFS2 on flash

```
struct jffs2_raw_inode
{
  jint16_t magic;
  jint16_t nodetype;
  jint32_t totlen;
  jint32_t hdr_crc;
  jint32_t ino;
  jint32_t version;
  jmode_t mode;
  jint16_t uid;
  jint16_t gid;
  jint32_t isize;
  jint32_t atime;
  ...
  jint16_t flags;
  jint32_t data_crc;
  jint32_t node_crc;
  __u8 data[0];
};
```

```
struct jffs2_raw_dirent
{
  jint16_t magic;
  jint16_t nodetype;
  jint32_t totlen;
  jint32_t hdr_crc;
  jint32_t pino;
  jint32_t version;
  jint32_t ino;
  ...
  __u8 name[0];
};
```

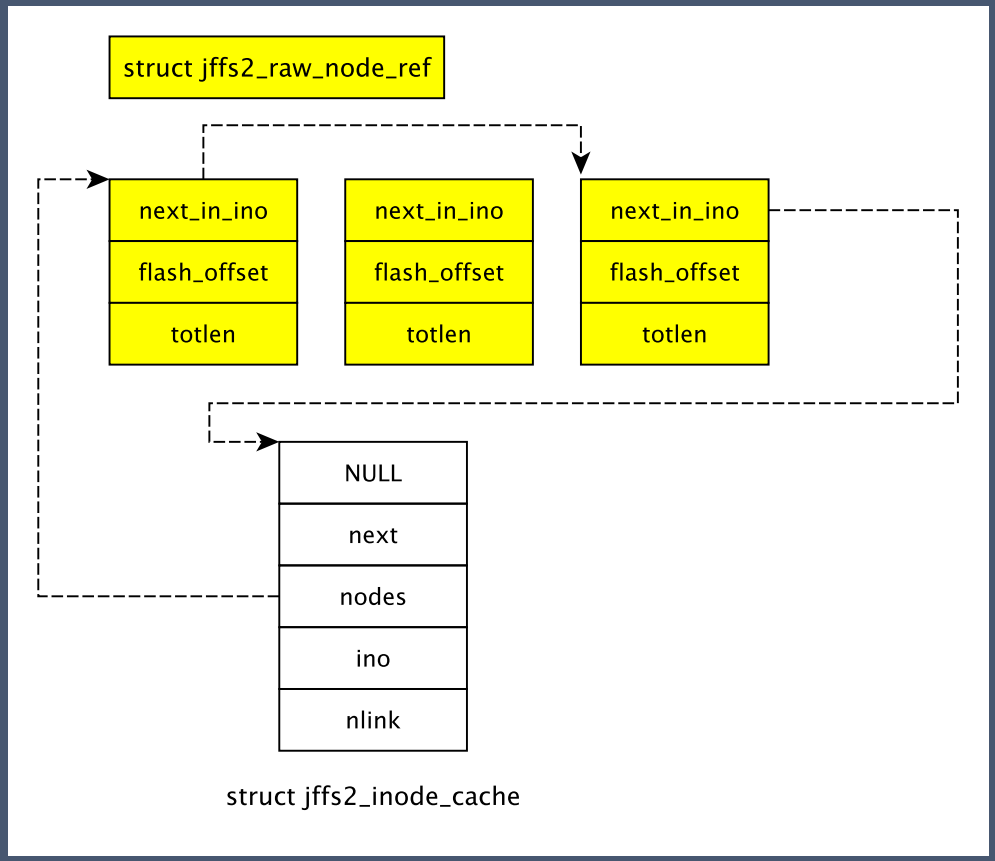
JFFS2 in memory

```
struct jffs2_raw_node_ref
{
  struct jffs2_raw_node_ref
           *next_in_ino;
  uint32_t flash_offset;
  uint32_t __totlen;
};
```

```
struct jffs2_inode_cache
{
  struct jffs2_full_dirent
           *scan_dents;
  struct jffs2_raw_node_ref *nodes;
  uint8_t class;

  uint8_t flags;
  uint16_t state;
  uint32_t ino;
  struct jffs2_inode_cache *next;
  uint32_t pino_nlink;
};
```

JFFS2 in memory /2



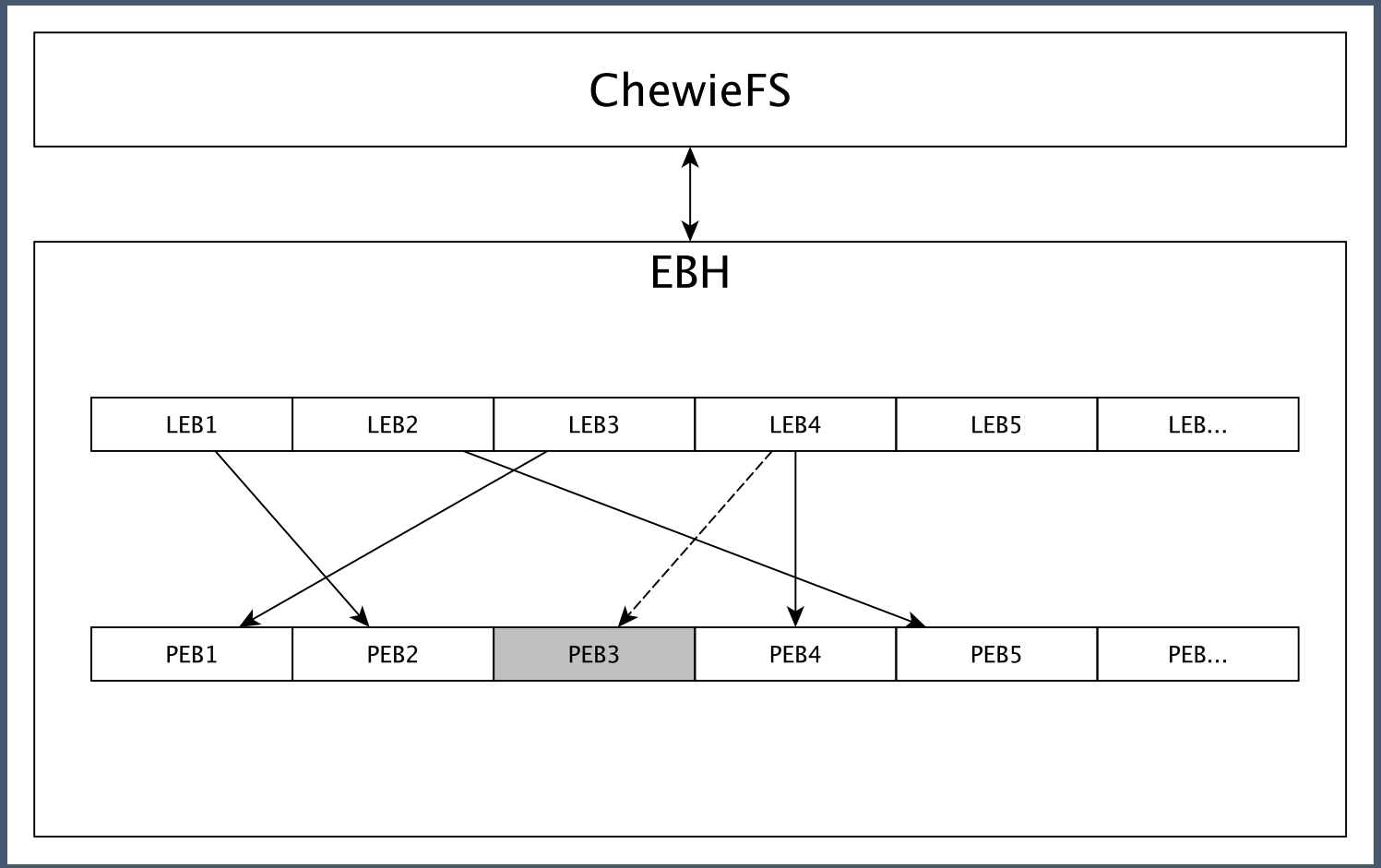
ChewieFS

- log-structured flash filesystem
- NetBSD
- license: BSD
- NAND flash only (at this moment)
- using flash over EBH

EBH

- EraseBlock Handler
- UBI like interface between the flash and the filesystem
- PEB - physical eraseblock
- LEB - logical eraseblock

EBH at work


ChewieFS
EBH
LEB1
LEB2
LEB3
LEB4
LEB5
LEB...
PEB1
PEB2
PEB3
PEB4
PEB5
PEB...

ChewieFS on flash

```
struct chewiefs_flash_vnode
{
  le16 magic;
  le16 type;
  le32 length;
  le32 hdr_crc;
  le64 vno;
  le64 version;
  le32 uid;
  le32 gid;
  ...
};
```

```
struct chewiefs_flash_dirent_node {
  le16 magic;
  le16 type;
  le32 length;
  le32 hdr_crc;
  le64 vno;
  le64 pvno;
  ...
  uint8_t  name[0];
};

struct chewiefs_flash_data_node {
  le16 magic;
  le16 type;
  le32 length;
  le32 hdr_crc;
  le64 vno;
  ...
  uint8_t  data[0];
};
```

ChewieFS in memory

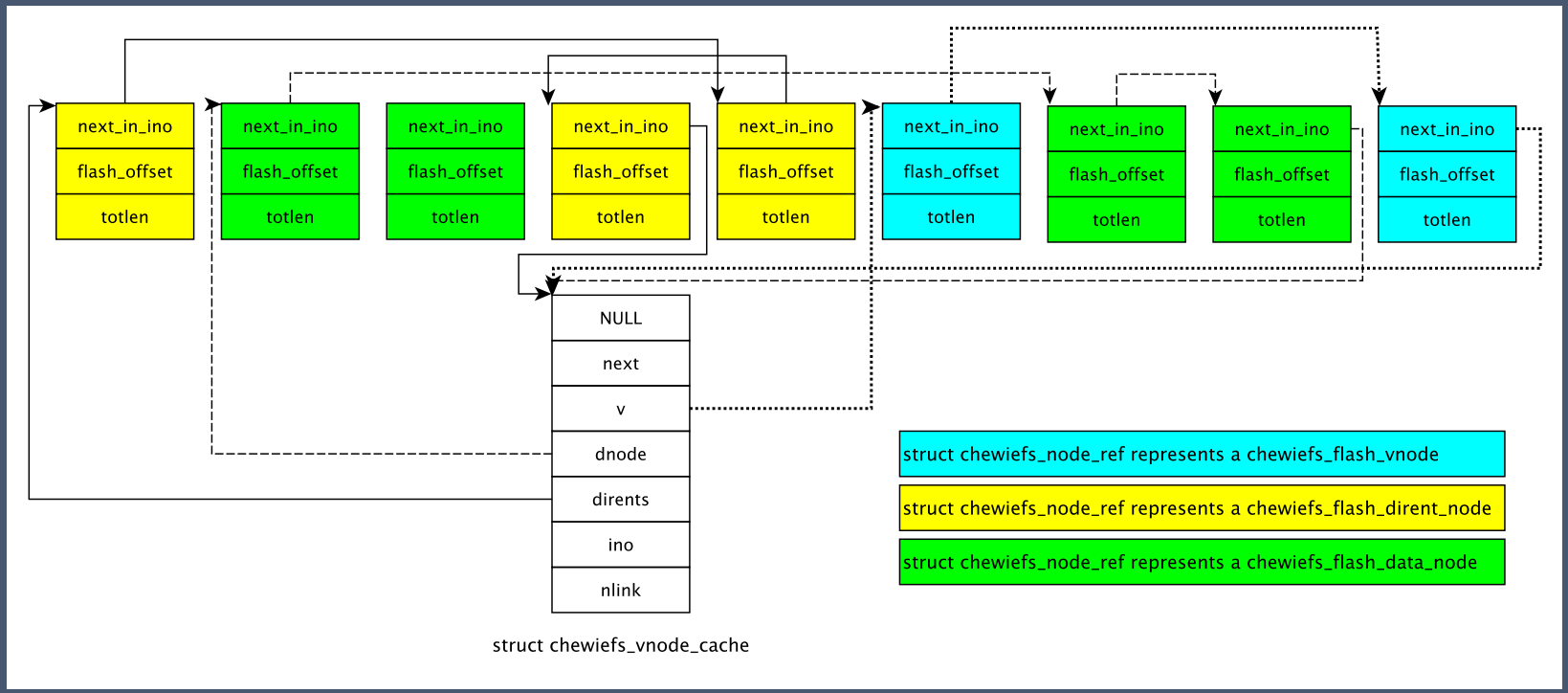
```
struct chewiefs_node_ref
{
  struct chewiefs_node_ref *next;
  uint32_t lnr;
  uint32_t offset;
};
```

```
struct chewiefs_vnode_cache {
  struct chewiefs_full_dirent
          *scan_dirents;
  struct chewiefs_node_ref *v;
  struct chewiefs_node_ref *dnode;
  struct chewiefs_node_ref *dirents;

  uint64_t *vno_version;
  uint64_t highest_version;

  uint8_t flags;
  uint16_t state;
  ino_t vno;
  ino_t pvno;
  struct chewiefs_vnode_cache* next;
  uint32_t nlink;
};
```

ChewieFS in memory /2



Future of ChewieFS

- fixing bugs
- commiting to NetBSD
- waiting for reactions
- optimizing speed and memory usage

Comparing JFFS2 and ChewieFS

	JFFS2	ChewieFS
OS	GNU Linux	NetBSD
license	GPL	BSD
flash	NOR and NAND	only NAND (at this moment)
using flash	directly	over EBH
on flash	jffs2_raw_inode jffs2_raw_dirent	chewiefs_flash_inode chewiefs_flash_dirent_node chewiefs_flash_data_node
in memory	jffs2_raw_node_ref jffs2_inode_cache	chewiefs_node_ref chewiefs_vnode_cache

Links

- http://chewiefs.sed.hu/
- http://www.linux-mtd.infradead.org/faq/jffs2.html
- http://www.linux-mtd.infradead.org/faq/ubi.html

Any questions?

Thank you for your attention!