

**CLD**  
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include/ <a href="#">chunk_msg.h</a> . . . . .	33
include/ <a href="#">chunkc.h</a> . . . . .	36
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## Chapter 3

# Data Structure Documentation

### 3.1 `chunk_check_status` Struct Reference

```
#include <chunk_msg.h>
```

#### Data Fields

- `uint8_t` [state](#)
- `uint8_t` [pad](#) [3]
- `uint32_t` [count](#)
- `uint64_t` [lastdone](#)

#### 3.1.1 Field Documentation

3.1.1.1 `uint32_t chunk_check_status::count`

3.1.1.2 `uint64_t chunk_check_status::lastdone`

3.1.1.3 `uint8_t chunk_check_status::pad`[3]

3.1.1.4 `uint8_t chunk_check_status::state`

The documentation for this struct was generated from the following file:

- `include/`[chunk\\_msg.h](#)

### 3.2 `chunksrv_req` Struct Reference

```
#include <chunk_msg.h>
```

### Data Fields

- uint8\_t [magic](#) [CHD\_MAGIC\_SZ]
- uint8\_t [op](#)
- uint8\_t [flags](#)
- uint16\_t [key\\_len](#)
- uint32\_t [nonce](#)
- uint64\_t [data\\_len](#)
- char [sig](#) [CHD\_SIG\_SZ]

### 3.2.1 Field Documentation

3.2.1.1 uint64\_t [chunksrv\\_req::data\\_len](#)

3.2.1.2 uint8\_t [chunksrv\\_req::flags](#)

3.2.1.3 uint16\_t [chunksrv\\_req::key\\_len](#)

3.2.1.4 uint8\_t [chunksrv\\_req::magic](#)[CHD\_MAGIC\_SZ]

3.2.1.5 uint32\_t [chunksrv\\_req::nonce](#)

3.2.1.6 uint8\_t [chunksrv\\_req::op](#)

3.2.1.7 char [chunksrv\\_req::sig](#)[CHD\_SIG\_SZ]

The documentation for this struct was generated from the following file:

- include/[chunk\\_msg.h](#)

## 3.3 chunksrv\_resp Struct Reference

```
#include <chunk_msg.h>
```

### Data Fields

- uint8\_t [magic](#) [CHD\_MAGIC\_SZ]
- uint8\_t [resp\\_code](#)
- uint8\_t [rsv1](#) [3]
- uint32\_t [nonce](#)
- uint64\_t [data\\_len](#)
- unsigned char [hash](#) [CHD\_CSUM\_SZ]

### 3.3.1 Field Documentation

3.3.1.1 `uint64_t chunksrv_resp::data_len`

3.3.1.2 `unsigned char chunksrv_resp::hash[CHD_CSUM_SZ]`

3.3.1.3 `uint8_t chunksrv_resp::magic[CHD_MAGIC_SZ]`

3.3.1.4 `uint32_t chunksrv_resp::nonce`

3.3.1.5 `uint8_t chunksrv_resp::resp_code`

3.3.1.6 `uint8_t chunksrv_resp::rsv1[3]`

The documentation for this struct was generated from the following file:

- `include/chunk_msg.h`

## 3.4 chunksrv\_resp\_chkstat Struct Reference

```
#include <chunk_msg.h>
```

### Data Fields

- struct `chunksrv_resp` `resp`
- struct `chunk_check_status` `chkstat`

### 3.4.1 Field Documentation

3.4.1.1 `struct chunk_check_status chunksrv_resp_chkstat::chkstat`

3.4.1.2 `struct chunksrv_resp chunksrv_resp_chkstat::resp`

The documentation for this struct was generated from the following file:

- `include/chunk_msg.h`

## 3.5 chunksrv\_resp\_get Struct Reference

```
#include <chunk_msg.h>
```

### Data Fields

- struct `chunksrv_resp` `resp`

- [uint64\\_t mtime](#)

### 3.5.1 Field Documentation

#### 3.5.1.1 [uint64\\_t chunksrv\\_resp\\_get::mtime](#)

#### 3.5.1.2 [struct chunksrv\\_resp chunksrv\\_resp\\_get::resp](#)

The documentation for this struct was generated from the following file:

- [include/chunk\\_msg.h](#)

## 3.6 [cld\\_dirent\\_cur](#) Struct Reference

```
#include <cldc.h>
```

### Data Fields

- [const void \\* p](#)
- [size\\_t tmp\\_len](#)

### 3.6.1 Field Documentation

#### 3.6.1.1 [const void\\* cld\\_dirent\\_cur::p](#)

#### 3.6.1.2 [size\\_t cld\\_dirent\\_cur::tmp\\_len](#)

The documentation for this struct was generated from the following file:

- [include/cldc.h](#)

## 3.7 [cld\\_timer](#) Struct Reference

```
#include <cld_common.h>
```

### Data Fields

- [bool fired](#)
- [bool on\\_list](#)
- [void\(\\* cb\)\(struct cld\\_timer \\*\)](#)
- [void \\* userdata](#)
- [time\\_t expires](#)
- [char name \[32\]](#)

### 3.7.1 Field Documentation

3.7.1.1 void(\* cld\_timer::cb)(struct cld\_timer \*)

3.7.1.2 time\_t cld\_timer::expires

3.7.1.3 bool cld\_timer::fired

3.7.1.4 char cld\_timer::name[32]

3.7.1.5 bool cld\_timer::on\_list

3.7.1.6 void\* cld\_timer::userdata

The documentation for this struct was generated from the following file:

- include/[cld\\_common.h](#)

## 3.8 cld\_timer\_list Struct Reference

```
#include <cld_common.h>
```

### Data Fields

- GList \* [list](#)
- time\_t [runmark](#)

### 3.8.1 Field Documentation

3.8.1.1 GList\* cld\_timer\_list::list

3.8.1.2 time\_t cld\_timer\_list::runmark

The documentation for this struct was generated from the following file:

- include/[cld\\_common.h](#)

## 3.9 cldc\_call\_opts Struct Reference

per-operation application options

```
#include <cldc.h>
```

## Data Fields

- int(\* [cb](#))(struct [cldc\\_call\\_opts](#) \*, enum [cle\\_err\\_codes](#))
- void \* [private](#)
- struct [cld\\_msg\\_get\\_resp](#) [resp](#)

### 3.9.1 Detailed Description

per-operation application options

### 3.9.2 Field Documentation

**3.9.2.1** int(\* [cldc\\_call\\_opts::cb](#))(struct [cldc\\_call\\_opts](#) \*, enum [cle\\_err\\_codes](#))

**3.9.2.2** void\* [cldc\\_call\\_opts::private](#)

**3.9.2.3** struct [cld\\_msg\\_get\\_resp](#) [cldc\\_call\\_opts::resp](#)

The documentation for this struct was generated from the following file:

- include/[cldc.h](#)

## 3.10 cldc\_fh Struct Reference

an open file handle associated with a session

```
#include <cldc.h>
```

## Data Fields

- uint64\_t [fh](#)
- struct [cldc\\_session](#) \* [sess](#)
- bool [valid](#)

### 3.10.1 Detailed Description

an open file handle associated with a session

### 3.10.2 Field Documentation

3.10.2.1 `uint64_t cldc_fh::fh`

3.10.2.2 `struct cldc_session* cldc_fh::sess`

3.10.2.3 `bool cldc_fh::valid`

The documentation for this struct was generated from the following file:

- `include/cldc.h`

## 3.11 cldc\_host Struct Reference

Information for a single CLD server host.

```
#include <cldc.h>
```

### Data Fields

- unsigned int `prio`
- unsigned int `weight`
- `char *` `host`
- unsigned short `port`

### 3.11.1 Detailed Description

Information for a single CLD server host.

### 3.11.2 Field Documentation

3.11.2.1 `char* cldc_host::host`

3.11.2.2 `unsigned short cldc_host::port`

3.11.2.3 `unsigned int cldc_host::prio`

3.11.2.4 `unsigned int cldc_host::weight`

The documentation for this struct was generated from the following file:

- `include/cldc.h`

## 3.12 cldc\_msg Struct Reference

an outgoing message, from client to server

```
#include <cldc.h>
```

### Data Fields

- uint64\_t [xid](#)
- enum [cld\\_msg\\_op](#) [op](#)
- struct [cldc\\_session](#) \* [sess](#)
- ssize\_t(\* [cb](#))(struct [cldc\\_msg](#) \*, const void \*, size\_t, enum [cle\\_err\\_codes](#))
- void \* [cb\\_private](#)
- struct [cldc\\_call\\_opts](#) [copts](#)
- bool [done](#)
- time\_t [expire\\_time](#)
- int [n\\_pkts](#)
- struct [cldc\\_pkt\\_info](#) \* [pkt\\_info](#) [0]

### 3.12.1 Detailed Description

an outgoing message, from client to server

### 3.12.2 Field Documentation

**3.12.2.1** `ssize_t(* cldc_msg::cb)(struct cldc_msg *, const void *, size_t, enum cle_err_codes)`

**3.12.2.2** `void* cldc_msg::cb_private`

**3.12.2.3** `struct cldc_call_opts cldc_msg::copts`

**3.12.2.4** `bool cldc_msg::done`

**3.12.2.5** `time_t cldc_msg::expire_time`

**3.12.2.6** `int cldc_msg::n_pkts`

**3.12.2.7** `enum cld_msg_op cldc_msg::op`

**3.12.2.8** `struct cldc_pkt_info* cldc_msg::pkt_info[0]`

**3.12.2.9** `struct cldc_session* cldc_msg::sess`

**3.12.2.10** `uint64_t cldc_msg::xid`

The documentation for this struct was generated from the following file:



- [include/cldc.h](#)

## 3.13 cldc\_node\_metadata Struct Reference

```
#include <cldc.h>
```

### Data Fields

- [quad\\_t inum](#)
- [quad\\_t vers](#)
- [quad\\_t time\\_create](#)
- [quad\\_t time\\_modify](#)
- [int flags](#)
- [const char \\* inode\\_name](#)

#### 3.13.1 Field Documentation

3.13.1.1 [int cldc\\_node\\_metadata::flags](#)

3.13.1.2 [const char\\* cldc\\_node\\_metadata::inode\\_name](#)

3.13.1.3 [quad\\_t cldc\\_node\\_metadata::inum](#)

3.13.1.4 [quad\\_t cldc\\_node\\_metadata::time\\_create](#)

3.13.1.5 [quad\\_t cldc\\_node\\_metadata::time\\_modify](#)

3.13.1.6 [quad\\_t cldc\\_node\\_metadata::vers](#)

The documentation for this struct was generated from the following file:

- [include/cldc.h](#)

## 3.14 cldc\_ops Struct Reference

application-supplied facilities

```
#include <cldc.h>
```

### Data Fields

- [bool\(\\* timer\\_ctl \)\(void \\*private, bool add, int\(\\*cb\)\(struct \[cldc\\\_session\]\(#\) \\*, void \\*\), void \\*cb\\_private, time\\_t secs\)](#)

- `int(* pkt\_send )(void *private, const void *addr, size_t addrlen, const void *buf, size_t buflen)`
- `void(* event )(void *private, struct cldc\_session *, struct cldc\_fh *, uint32_t)`

### 3.14.1 Detailed Description

application-supplied facilities

### 3.14.2 Field Documentation

- 3.14.2.1 `void(* cldc\_ops::event )(void *private, struct cldc\_session *, struct cldc\_fh *, uint32_t)`
- 3.14.2.2 `int(* cldc\_ops::pkt\_send )(void *private, const void *addr, size_t addrlen, const void *buf, size_t buflen)`
- 3.14.2.3 `bool(* cldc\_ops::timer\_ctl )(void *private, bool add, int(*cb )(struct cldc\_session *, void *), void *cb\_private, time_t secs)`

The documentation for this struct was generated from the following file:

- `include/cldc.h`

## 3.15 [cldc\\_pkt\\_info](#) Struct Reference

```
#include <cldc.h>
```

### Data Fields

- `int pkt\_len`
- `int hdr\_len`
- `int retries`
- `char user [CLD_MAX_USERNAME]`
- `char data [0]`

### 3.15.1 Field Documentation

3.15.1.1 char cldc\_pkt\_info::data[0]

3.15.1.2 int cldc\_pkt\_info::hdr\_len

3.15.1.3 int cldc\_pkt\_info::pkt\_len

3.15.1.4 int cldc\_pkt\_info::retries

3.15.1.5 char cldc\_pkt\_info::user[CLD\_MAX\_USERNAME]

The documentation for this struct was generated from the following file:

- include/[cldc.h](#)

## 3.16 cldc\_session Struct Reference

a single CLD client session

```
#include <cldc.h>
```

### Data Fields

- uint8\_t [sid](#) [CLD\_SID\_SZ]
- struct [cldc\\_ops](#) \* [ops](#)
- struct [hail\\_log](#) [log](#)
- void \* [private](#)
- uint8\_t [addr](#) [64]
- size\_t [addr\\_len](#)
- GList \* [cfh](#)
- GList \* [out\\_msg](#)
- time\_t [msg\\_scan\\_time](#)
- time\_t [expire\\_time](#)
- bool [expired](#)
- uint64\_t [next\\_seqid\\_in](#)
- uint64\_t [next\\_seqid\\_in\\_tr](#)
- uint64\_t [next\\_seqid\\_out](#)
- char [user](#) [CLD\_MAX\_USERNAME]
- char [secret\\_key](#) [CLD\_MAX\_SECRET\_KEY]
- bool [confirmed](#)
- enum cld\_msg\_op [msg\\_buf\\_op](#)
- unsigned int [msg\\_buf\\_len](#)
- char [msg\\_buf](#) [CLD\_MAX\_MSG\_SZ]
- char [payload](#) [CLD\_MAX\_PAYLOAD\_SZ]
- char [inode\\_name\\_temp](#) [CLD\_INODE\_NAME\_MAX]

### 3.16.1 Detailed Description

a single CLD client session

### 3.16.2 Field Documentation

- 3.16.2.1 `uint8_t cldc_session::addr[64]`
- 3.16.2.2 `size_t cldc_session::addr_len`
- 3.16.2.3 `GList* cldc_session::cfh`
- 3.16.2.4 `bool cldc_session::confirmed`
- 3.16.2.5 `time_t cldc_session::expire_time`
- 3.16.2.6 `bool cldc_session::expired`
- 3.16.2.7 `char cldc_session::inode_name_temp[CLD_INODE_NAME_MAX]`
- 3.16.2.8 `struct hail_log cldc_session::log`
- 3.16.2.9 `char cldc_session::msg_buf[CLD_MAX_MSG_SZ]`
- 3.16.2.10 `unsigned int cldc_session::msg_buf_len`
- 3.16.2.11 `enum cld_msg_op cldc_session::msg_buf_op`
- 3.16.2.12 `time_t cldc_session::msg_scan_time`
- 3.16.2.13 `uint64_t cldc_session::next_seqid_in`
- 3.16.2.14 `uint64_t cldc_session::next_seqid_in_tr`
- 3.16.2.15 `uint64_t cldc_session::next_seqid_out`
- 3.16.2.16 `struct cldc_ops* cldc_session::ops`
- 3.16.2.17 `GList* cldc_session::out_msg`
- 3.16.2.18 `char cldc_session::payload[CLD_MAX_PAYLOAD_SZ]`
- 3.16.2.19 `void* cldc_session::private`
- 3.16.2.20 `char cldc_session::secret_key[CLD_MAX_SECRET_KEY]`
- 3.16.2.21 `uint8_t cldc_session::sid[CLD_SID_SZ]`
- 3.16.2.22 `char cldc_session::user[CLD_MAX_USERNAME]`

The documentation for this struct was generated from the following file:

- [include/cldc.h](#)

### 3.17 cldc\_udp Struct Reference

A UDP implementation of the CLD client protocol.

```
#include <cldc.h>
```

#### Data Fields

- `uint8_t addr` [64]
- `size_t addr_len`
- `int fd`
- `struct cldc_session * sess`
- `int(* cb)(struct cldc_session *, void *)`
- `void * cb_private`

#### 3.17.1 Detailed Description

A UDP implementation of the CLD client protocol.

#### 3.17.2 Field Documentation

**3.17.2.1** `uint8_t cldc_udp::addr[64]`

**3.17.2.2** `size_t cldc_udp::addr_len`

**3.17.2.3** `int(* cldc_udp::cb)(struct cldc_session *, void *)`

**3.17.2.4** `void* cldc_udp::cb_private`

**3.17.2.5** `int cldc_udp::fd`

**3.17.2.6** `struct cldc_session* cldc_udp::sess`

The documentation for this struct was generated from the following file:

- `include/cldc.h`

### 3.18 hail\_log Struct Reference

```
#include <hail_log.h>
```

#### Data Fields

- `void(* func)(int prio, const char *fmt,...) ATTR_PRINTF(2`

- void(\*) boo [debug](#) )
- bool [verbose](#)

### 3.18.1 Field Documentation

3.18.1.1 void(\*) boo `hail_log::debug`)

3.18.1.2 void(\* `hail_log::func`)(int prio, const char \*fmt,...) ATTR\_PRINTF(2

3.18.1.3 bool `hail_log::verbose`

The documentation for this struct was generated from the following file:

- include/[hail\\_log.h](#)

## 3.19 hstor\_blist Struct Reference

```
#include <hstor.h>
```

### Data Fields

- char \* [own\\_id](#)
- char \* [own\\_name](#)
- GList \* [list](#)

### 3.19.1 Field Documentation

3.19.1.1 GList\* `hstor_blist::list`

3.19.1.2 char\* `hstor_blist::own_id`

3.19.1.3 char\* `hstor_blist::own_name`

The documentation for this struct was generated from the following file:

- include/[hstor.h](#)

## 3.20 hstor\_bucket Struct Reference

```
#include <hstor.h>
```

## Data Fields

- char \* [name](#)
- char \* [time\\_create](#)

### 3.20.1 Field Documentation

3.20.1.1 char\* hstor\_bucket::name

3.20.1.2 char\* hstor\_bucket::time\_create

The documentation for this struct was generated from the following file:

- include/[hstor.h](#)

## 3.21 hstor\_client Struct Reference

```
#include <hstor.h>
```

## Data Fields

- CURL \* [curl](#)
- char \* [acc](#)
- char \* [host](#)
- char \* [user](#)
- char \* [key](#)
- bool [verbose](#)

### 3.21.1 Field Documentation

3.21.1.1 char\* hstor\_client::acc

3.21.1.2 CURL\* hstor\_client::curl

3.21.1.3 char\* hstor\_client::host

3.21.1.4 char\* hstor\_client::key

3.21.1.5 char\* hstor\_client::user

3.21.1.6 bool hstor\_client::verbose

The documentation for this struct was generated from the following file:

- include/[hstor.h](#)



## 3.22 hstor\_keylist Struct Reference

```
#include <hstor.h>
```

### Data Fields

- char \* [name](#)
- char \* [prefix](#)
- char \* [marker](#)
- char \* [delim](#)
- unsigned int [max\\_keys](#)
- bool [trunc](#)
- GList \* [contents](#)
- GList \* [common\\_pfx](#)

### 3.22.1 Field Documentation

3.22.1.1 GList\* hstor\_keylist::common\_pfx

3.22.1.2 GList\* hstor\_keylist::contents

3.22.1.3 char\* hstor\_keylist::delim

3.22.1.4 char\* hstor\_keylist::marker

3.22.1.5 unsigned int hstor\_keylist::max\_keys

3.22.1.6 char\* hstor\_keylist::name

3.22.1.7 char\* hstor\_keylist::prefix

3.22.1.8 bool hstor\_keylist::trunc

The documentation for this struct was generated from the following file:

- include/[hstor.h](#)

## 3.23 hstor\_object Struct Reference

```
#include <hstor.h>
```

### Data Fields

- char \* [key](#)

- char \* [time\\_mod](#)
- char \* [etag](#)
- uint64\_t [size](#)
- char \* [storage](#)
- char \* [own\\_id](#)
- char \* [own\\_name](#)

### 3.23.1 Field Documentation

3.23.1.1 char\* hstor\_object::etag

3.23.1.2 char\* hstor\_object::key

3.23.1.3 char\* hstor\_object::own\_id

3.23.1.4 char\* hstor\_object::own\_name

3.23.1.5 uint64\_t hstor\_object::size

3.23.1.6 char\* hstor\_object::storage

3.23.1.7 char\* hstor\_object::time\_mod

The documentation for this struct was generated from the following file:

- include/[hstor.h](#)

## 3.24 http\_hdr Struct Reference

```
#include <hstor.h>
```

### Data Fields

- char \* [key](#)
- char \* [val](#)

### 3.24.1 Field Documentation

3.24.1.1 char\* http\_hdr::key

3.24.1.2 char\* http\_hdr::val

The documentation for this struct was generated from the following file:

- include/[hstor.h](#)

## 3.25 http\_req Struct Reference

```
#include <hstor.h>
```

### Data Fields

- char \* [method](#)
- struct [http\\_uri](#) uri
- int [major](#)
- int [minor](#)
- char \* [orig\\_path](#)
- unsigned int [n\\_hdr](#)
- struct [http\\_hdr](#) [hdr](#) [HREQ\_MAX\_HDR]

### 3.25.1 Field Documentation

3.25.1.1 struct [http\\_hdr](#) [http\\_req::hdr](#)[HREQ\_MAX\_HDR]

3.25.1.2 int [http\\_req::major](#)

3.25.1.3 char\* [http\\_req::method](#)

3.25.1.4 int [http\\_req::minor](#)

3.25.1.5 unsigned int [http\\_req::n\\_hdr](#)

3.25.1.6 char\* [http\\_req::orig\\_path](#)

3.25.1.7 struct [http\\_uri](#) [http\\_req::uri](#)

The documentation for this struct was generated from the following file:

- include/[hstor.h](#)

## 3.26 http\_uri Struct Reference

```
#include <hstor.h>
```

### Data Fields

- char \* [scheme](#)
- unsigned int [scheme\\_len](#)
- char \* [userinfo](#)
- unsigned int [userinfo\\_len](#)

- char \* [hostname](#)
- unsigned int [hostname\\_len](#)
- unsigned int [port](#)
- char \* [path](#)
- unsigned int [path\\_len](#)
- char \* [query](#)
- unsigned int [query\\_len](#)
- char \* [fragment](#)
- unsigned int [fragment\\_len](#)

### 3.26.1 Field Documentation

3.26.1.1 char\* [http\\_uri::fragment](#)

3.26.1.2 unsigned int [http\\_uri::fragment\\_len](#)

3.26.1.3 char\* [http\\_uri::hostname](#)

3.26.1.4 unsigned int [http\\_uri::hostname\\_len](#)

3.26.1.5 char\* [http\\_uri::path](#)

3.26.1.6 unsigned int [http\\_uri::path\\_len](#)

3.26.1.7 unsigned int [http\\_uri::port](#)

3.26.1.8 char\* [http\\_uri::query](#)

3.26.1.9 unsigned int [http\\_uri::query\\_len](#)

3.26.1.10 char\* [http\\_uri::scheme](#)

3.26.1.11 unsigned int [http\\_uri::scheme\\_len](#)

3.26.1.12 char\* [http\\_uri::userinfo](#)

3.26.1.13 unsigned int [http\\_uri::userinfo\\_len](#)

The documentation for this struct was generated from the following file:

- include/[hstor.h](#)

## 3.27 list\_head Struct Reference

```
#include <elist.h>
```

## Data Fields

- struct [list\\_head](#) \* [next](#)
- struct [list\\_head](#) \* [prev](#)

### 3.27.1 Field Documentation

#### 3.27.1.1 struct [list\\_head](#)\* [list\\_head::next](#)

#### 3.27.1.2 struct [list\\_head](#) \* [list\\_head::prev](#)

The documentation for this struct was generated from the following file:

- include/[elist.h](#)

## 3.28 ncld\_fh Struct Reference

```
#include <ncld.h>
```

## Data Fields

- struct [ncld\\_sess](#) \* [sess](#)
- struct [cldc\\_fh](#) \* [fh](#)
- bool [is\\_open](#)
- int [errc](#)
- int [nios](#)
- unsigned int [event\\_mask](#)
- void(\* [event\\_func](#) )(void \*, unsigned int)
- void \* [event\\_arg](#)

### 3.28.1 Field Documentation

3.28.1.1 `int ncld_fh::errc`

3.28.1.2 `void* ncld_fh::event_arg`

3.28.1.3 `void(* ncld_fh::event_func)(void *, unsigned int)`

3.28.1.4 `unsigned int ncld_fh::event_mask`

3.28.1.5 `struct cldc_fh* ncld_fh::fh`

3.28.1.6 `bool ncld_fh::is_open`

3.28.1.7 `int ncld_fh::nios`

3.28.1.8 `struct ncld_sess* ncld_fh::sess`

The documentation for this struct was generated from the following file:

- `include/ncld.h`

## 3.29 ncld\_read Struct Reference

```
#include <ncld.h>
```

### Data Fields

- `const void * ptr`
- `long length`
- `struct cldc_node_metadata meta`
- `struct ncld_fh * fh`
- `bool is_done`
- `int errc`

### 3.29.1 Field Documentation

3.29.1.1 `int ncld_read::errc`

3.29.1.2 `struct ncld_fh* ncld_read::fh`

3.29.1.3 `bool ncld_read::is_done`

3.29.1.4 `long ncld_read::length`

3.29.1.5 `struct cldc_node_metadata ncld_read::meta`

3.29.1.6 `const void* ncld_read::ptr`

The documentation for this struct was generated from the following file:

- `include/ncld.h`

## 3.30 ncld\_sess Struct Reference

```
#include <ncld.h>
```

### Data Fields

- `char * host`
- `unsigned short port`
- `GMutex * mutex`
- `GCond * cond`
- `GThread * thread`
- `bool is_up`
- `bool open_done`
- `int errc`
- `GList * handles`
- `int to_thread [2]`
- `struct cldc_udp * udp`
- `struct cld_timer udp_timer`
- `struct cld_timer_list tlist`
- `void(* event)(void *, unsigned int)`
- `void * event_arg`

### 3.30.1 Field Documentation

3.30.1.1 `GCond* nclد_sess::cond`

3.30.1.2 `int nclد_sess::errc`

3.30.1.3 `void(* nclد_sess::event)(void *, unsigned int)`

3.30.1.4 `void* nclد_sess::event_arg`

3.30.1.5 `GList* nclد_sess::handles`

3.30.1.6 `char* nclد_sess::host`

3.30.1.7 `bool nclد_sess::is_up`

3.30.1.8 `GMutex* nclد_sess::mutex`

3.30.1.9 `bool nclد_sess::open_done`

3.30.1.10 `unsigned short nclد_sess::port`

3.30.1.11 `GThread* nclد_sess::thread`

3.30.1.12 `struct cld_timer_list nclد_sess::tlist`

3.30.1.13 `int nclد_sess::to_thread[2]`

3.30.1.14 `struct clدc_udp* nclد_sess::udp`

3.30.1.15 `struct cld_timer nclد_sess::udp_timer`

The documentation for this struct was generated from the following file:

- `include/nclد.h`

### 3.31 objcache Struct Reference

```
#include <objcache.h>
```

#### Data Fields

- `GMutex *` [lock](#)
- `GHashTable *` [table](#)



### 3.31.1 Field Documentation

#### 3.31.1.1 GMutex\* objcache::lock

#### 3.31.1.2 GHashTable\* objcache::table

The documentation for this struct was generated from the following file:

- [include/objcache.h](#)

## 3.32 objcache\_entry Struct Reference

```
#include <objcache.h>
```

### Data Fields

- unsigned int [hash](#)
- unsigned int [flags](#)
- int [ref](#)

### 3.32.1 Field Documentation

#### 3.32.1.1 unsigned int objcache\_entry::flags

#### 3.32.1.2 unsigned int objcache\_entry::hash

#### 3.32.1.3 int objcache\_entry::ref

The documentation for this struct was generated from the following file:

- [include/objcache.h](#)

## 3.33 st\_client Struct Reference

```
#include <chunkc.h>
```

### Data Fields

- char \* [host](#)
- char \* [user](#)
- char \* [key](#)
- bool [verbose](#)
- int [fd](#)

- `SSL_CTX * ssl_ctx`
- `SSL * ssl`
- `char req_buf [sizeof(struct chunksrv_req)+CHD_KEY_SZ]`

### 3.33.1 Field Documentation

3.33.1.1 `int st_client::fd`

3.33.1.2 `char* st_client::host`

3.33.1.3 `char* st_client::key`

3.33.1.4 `char st_client::req_buf[sizeof(struct chunksrv_req)+CHD_KEY_SZ]`

3.33.1.5 `SSL* st_client::ssl`

3.33.1.6 `SSL_CTX* st_client::ssl_ctx`

3.33.1.7 `char* st_client::user`

3.33.1.8 `bool st_client::verbose`

The documentation for this struct was generated from the following file:

- `include/chunkc.h`

## 3.34 st\_keylist Struct Reference

```
#include <chunkc.h>
```

### Data Fields

- `char * name`
- `GList * contents`

### 3.34.1 Field Documentation

3.34.1.1 `GList* st_keylist::contents`

3.34.1.2 `char* st_keylist::name`

The documentation for this struct was generated from the following file:

- `include/chunkc.h`

## 3.35 st\_object Struct Reference

```
#include <chunkc.h>
```

### Data Fields

- char \* [name](#)
- char \* [time\\_mod](#)
- char \* [etag](#)
- uint64\_t [size](#)
- char \* [owner](#)

### 3.35.1 Field Documentation

3.35.1.1 char\* st\_object::etag

3.35.1.2 char\* st\_object::name

3.35.1.3 char\* st\_object::owner

3.35.1.4 uint64\_t st\_object::size

3.35.1.5 char\* st\_object::time\_mod

The documentation for this struct was generated from the following file:

- include/[chunkc.h](#)



## Chapter 4

# File Documentation

### 4.1 include/chunk-private.h File Reference

```
#include <stdint.h>
#include <glib.h>
```

#### Defines

- #define [MDB\\_TPATH\\_FMT](#) "%s/%X"
- #define [BAD\\_TPATH\\_FMT](#) "%s/bad"
- #define [PREFIX\\_LEN](#) 3

#### 4.1.1 Define Documentation

4.1.1.1 #define [BAD\\_TPATH\\_FMT](#) "%s/bad"

4.1.1.2 #define [MDB\\_TPATH\\_FMT](#) "%s/%X"

4.1.1.3 #define [PREFIX\\_LEN](#) 3

### 4.2 include/chunk\_msg.h File Reference

```
#include <stdint.h>
```

#### Data Structures

- struct [chunksrv\\_req](#)
- struct [chunksrv\\_resp](#)
- struct [chunksrv\\_resp\\_get](#)
- struct [chunk\\_check\\_status](#)

- struct `chunksrv_resp_chkstat`

## Defines

- #define `CHUNKD_MAGIC` "CHUNKDv1"

## Enumerations

- enum {  
`CHD_MAGIC_SZ` = 8, `CHD_USER_SZ` = 64, `CHD_KEY_SZ` = 1024, `CHD_CSUM_SZ` = 20,  
`CHD_SIG_SZ` = 64 }
- enum `chunksrv_ops` {  
`CHO_NOP` = 0, `CHO_GET` = 1, `CHO_GET_META` = 2, `CHO_PUT` = 3,  
`CHO_DEL` = 4, `CHO_LIST` = 5, `CHO_LOGIN` = 6, `CHO_TABLE_OPEN` = 7,  
`CHO_CHECK_START` = 8, `CHO_CHECK_STATUS` = 9, `CHO_START_TLS` = 10, `CHO_CP` = 11 }
- enum `chunk_errcode` {  
`che_Success` = 0, `che_AccessDenied` = 1, `che_InternalError` = 2, `che_InvalidArgument` = 3,  
`che_InvalidURI` = 4, `che_NoSuchKey` = 5, `che_SignatureDoesNotMatch` = 6,  
`che_InvalidKey` = 7,  
`che_InvalidTable` = 8, `che_Busy` = 9, `che_KeyExists` = 10 }
- enum `chunk_flags` { `CHF_SYNC` = (1 << 0), `CHF_TBL_CREAT` = (1 << 1),  
`CHF_TBL_EXCL` = (1 << 2) }
- enum `chunk_check_state` { `chk_Off`, `chk_Idle`, `chk_Active` }

### 4.2.1 Define Documentation

- 4.2.1.1 #define `CHUNKD_MAGIC` "CHUNKDv1"

### 4.2.2 Enumeration Type Documentation

- 4.2.2.1 anonymous enum

#### Enumerator:

*`CHD_MAGIC_SZ`*

*`CHD_USER_SZ`*

*`CHD_KEY_SZ`*

*`CHD_CSUM_SZ`*

*`CHD_SIG_SZ`*

## 4.2.2.2 enum chunk\_check\_state

Enumerator:

*chk\_Off*  
*chk\_Idle*  
*chk\_Active*

## 4.2.2.3 enum chunk\_errcode

Enumerator:

*che\_Success*  
*che\_AccessDenied*  
*che\_InternalError*  
*che\_InvalidArgument*  
*che\_InvalidURI*  
*che\_NoSuchKey*  
*che\_SignatureDoesNotMatch*  
*che\_InvalidKey*  
*che\_InvalidTable*  
*che\_Busy*  
*che\_KeyExists*

## 4.2.2.4 enum chunk\_flags

Enumerator:

*CHF\_SYNC*  
*CHF\_TBL\_CREAT*  
*CHF\_TBL\_EXCL*

## 4.2.2.5 enum chunksrv\_ops

Enumerator:

*CHO\_NOP*  
*CHO\_GET*  
*CHO\_GET\_META*  
*CHO\_PUT*  
*CHO\_DEL*  
*CHO\_LIST*

*CHO\_LOGIN*  
*CHO\_TABLE\_OPEN*  
*CHO\_CHECK\_START*  
*CHO\_CHECK\_STATUS*  
*CHO\_START\_TLS*  
*CHO\_CP*

### 4.3 include/chunkc.h File Reference

```
#include <sys/types.h>
#include <openssl/ssl.h>
#include <stdbool.h>
#include <stdint.h>
#include <string.h>
#include <glib.h>
#include <chunk_msg.h>
```

#### Data Structures

- struct [st\\_object](#)
- struct [st\\_keylist](#)
- struct [st\\_client](#)

#### Functions

- void [stc\\_free](#) (struct [st\\_client](#) \*stc)
- void [stc\\_free\\_keylist](#) (struct [st\\_keylist](#) \*keylist)
- void [stc\\_free\\_object](#) (struct [st\\_object](#) \*obj)
- void [stc\\_init](#) (void)
- struct [st\\_client](#) \* [stc\\_new](#) (const char \*service\_host, int port, const char \*user, const char \*secret\_key, bool encrypt)
- bool [stc\\_table\\_open](#) (struct [st\\_client](#) \*stc, const void \*key, size\_t key\_len, uint32\_t flags)
- bool [stc\\_get](#) (struct [st\\_client](#) \*stc, const void \*key, size\_t key\_len, size\_t(\*write\_cb)(void \*, size\_t, size\_t, void \*), void \*user\_data)
- void \* [stc\\_get\\_inline](#) (struct [st\\_client](#) \*stc, const void \*key, size\_t key\_len, size\_t \*len)
- bool [stc\\_get\\_start](#) (struct [st\\_client](#) \*stc, const void \*key, size\_t key\_len, int \*pfd, uint64\_t \*len)
- size\_t [stc\\_get\\_recv](#) (struct [st\\_client](#) \*stc, void \*data, size\_t len)
- bool [stc\\_put](#) (struct [st\\_client](#) \*stc, const void \*key, size\_t key\_len, size\_t(\*read\_cb)(void \*, size\_t, size\_t, void \*), uint64\_t len, void \*user\_data, uint32\_t flags)



- bool [stc\\_put\\_start](#) (struct [st\\_client](#) \*stc, const void \*key, size\_t key\_len, uint64\_t cont\_len, int \*pfd, uint32\_t flags)
- size\_t [stc\\_put\\_send](#) (struct [st\\_client](#) \*stc, void \*data, size\_t len)
- bool [stc\\_put\\_sync](#) (struct [st\\_client](#) \*stc)
- bool [stc\\_put\\_inline](#) (struct [st\\_client](#) \*stc, const void \*key, size\_t key\_len, void \*data, uint64\_t len, uint32\_t flags)
- bool [stc\\_cp](#) (struct [st\\_client](#) \*stc, const void \*dest\_key, size\_t dest\_key\_len, const void \*src\_key, size\_t src\_key\_len)
- bool [stc\\_del](#) (struct [st\\_client](#) \*stc, const void \*key, size\_t key\_len)
- bool [stc\\_ping](#) (struct [st\\_client](#) \*stc)
- bool [stc\\_check\\_start](#) (struct [st\\_client](#) \*stc)
- bool [stc\\_check\\_status](#) (struct [st\\_client](#) \*stc, struct [chunk\\_check\\_status](#) \*out)
- struct [st\\_keylist](#) \* [stc\\_keys](#) (struct [st\\_client](#) \*stc)
- int [stc\\_readport](#) (const char \*fname)



### 4.3.1 Function Documentation

- 4.3.1.1 `bool stc_check_start ( struct st_client * stc )`
- 4.3.1.2 `bool stc_check_status ( struct st_client * stc, struct chunk_check_status * out )`
- 4.3.1.3 `bool stc_cp ( struct st_client * stc, const void * dest_key, size_t dest_key_len, const void * src_key, size_t src_key_len )`
- 4.3.1.4 `bool stc_del ( struct st_client * stc, const void * key, size_t key_len )`
- 4.3.1.5 `void stc_free ( struct st_client * stc )`
- 4.3.1.6 `void stc_free_keylist ( struct st_keylist * keylist )`
- 4.3.1.7 `void stc_free_object ( struct st_object * obj )`
- 4.3.1.8 `bool stc_get ( struct st_client * stc, const void * key, size_t key_len, size_t(*) (void *, size_t, size_t, void *) write_cb, void * user_data )`
- 4.3.1.9 `void* stc_get_inline ( struct st_client * stc, const void * key, size_t key_len, size_t * len )`
- 4.3.1.10 `size_t stc_get_recv ( struct st_client * stc, void * data, size_t len )`
- 4.3.1.11 `bool stc_get_start ( struct st_client * stc, const void * key, size_t key_len, int * pfd, uint64_t * len )`
- 4.3.1.12 `void stc_init ( void )`
- 4.3.1.13 `struct st_keylist* stc_keys ( struct st_client * stc )` [read]
- 4.3.1.14 `struct st_client* stc_new ( const char * service_host, int port, const char * user, const char * secret_key, bool encrypt )` [read]
- 4.3.1.15 `bool stc_ping ( struct st_client * stc )`
- 4.3.1.16 `bool stc_put ( struct st_client * stc, const void * key, size_t key_len, size_t(*) (void *, size_t, size_t, void *) read_cb, uint64_t len, void * user_data, uint32_t flags )`
- 4.3.1.17 `bool stc_put_inline ( struct st_client * stc, const void * key, size_t key_len, void * data, uint64_t len, uint32_t flags )`
- 4.3.1.18 `size_t stc_put_send ( struct st_client * stc, void * data, size_t len )`
- 4.3.1.19 `bool stc_put_start ( struct st_client * stc, const void * key, size_t key_len, uint64_t cont_len, int * pfd, uint32_t flags )`
- 4.3.1.20 `bool stc_put_sync ( struct st_client * stc )`
- 4.3.1.21 `int stc_readport ( const char * fname )`
- 4.3.1.22 `bool stc_table_open ( struct st_client * stc, const void * key, size_t key_len, uint32_t flags )`

---

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## 4.4 include/chunksrv.h File Reference

```
#include <chunk_msg.h>
```

## Functions

- `size_t req_len` (const struct `chunksrv_req` \*req)
- `void chreq_sign` (struct `chunksrv_req` \*req, const char \*key, char \*b64hmac\_out)

### 4.4.1 Function Documentation

4.4.1.1 `void chreq_sign ( struct chunksrv_req * req, const char * key, char * b64hmac_out )`

4.4.1.2 `size_t req_len ( const struct chunksrv_req * req )`

## 4.5 include/cld-private.h File Reference

```
#include <stdint.h>
```

```
#include <glib.h>
```

## 4.6 include/cld\_common.h File Reference

```
#include <stdint.h>
```

```
#include <stdbool.h>
```

```
#include <string.h>
```

```
#include <time.h>
```

```
#include <glib.h>
```

```
#include <openssl/sha.h>
```

```
#include <cld_msg_rpc.h>
```

## Data Structures

- struct `cld_timer`
- struct `cld_timer_list`

## Defines

- `#define CLD_ALIGN8(n) ((8 - ((n) & 7)) & 7)`
- `#define SIDFMT "%016lX"`
- `#define SIDARG(sid) cld_sid2llu(sid)`
- `#define CLD_PKT_FTR_LEN sizeof(struct cld_pkt_ftr)`  
*Length of the packet footer.*
- `#define PKT_HDR_TO_STR_SCRATCH_LEN 128`

## Functions

- void `cld_timer_add` (struct `cld_timer_list` \*tlist, struct `cld_timer` \*timer, time\_t expires)
- void `cld_timer_del` (struct `cld_timer_list` \*tlist, struct `cld_timer` \*timer)
- time\_t `cld_timers_run` (struct `cld_timer_list` \*tlist)
- unsigned long long `cld_sid2llu` (const uint8\_t \*sid)
- void `cld_rand64` (void \*p)
- const char \* `cld_errstr` (enum `cle_err_codes` ecode)
- int `cld_readport` (const char \*fname)
- int `cld_authcheck` (struct `hail_log` \*log, const char \*key, const void \*buf, size\_t buf\_len, const void \*sha)
- int `cld_authsign` (struct `hail_log` \*log, const char \*key, const void \*buf, size\_t buf\_len, void \*sha)
- const char \* `cld_opstr` (enum `cld_msg_op`)
- const char \* `cld_pkt_hdr_to_str` (char \*scratch, const char \*pkt\_hdr, size\_t pkt\_len)
- void `__cld_dump_buf` (const void \*buf, size\_t len)
- struct `__attribute__` ((packed)) `cld_pkt_ftr`

*Footer that appears at the end of each packet.*

### 4.6.1 Define Documentation

4.6.1.1 `#define CLD_ALIGN8( n ) ((8 - ((n) & 7)) & 7)`

4.6.1.2 `#define CLD_PKT_FTR_LEN sizeof(struct cld_pkt_ftr)`

Length of the packet footer.

This size is fixed

4.6.1.3 `#define PKT_HDR_TO_STR_SCRATCH_LEN 128`

4.6.1.4 `#define SIDARG( sid ) cld_sid2llu(sid)`

4.6.1.5 `#define SIDFMT "%016llx"`

### 4.6.2 Function Documentation

4.6.2.1 struct `__attribute__` ((packed)) [read]

Footer that appears at the end of each packet.

< packet sequence ID

< packet signature

- 4.6.2.2 void `_cld_dump_buf` ( const void \* *buf*, size\_t *len* )
- 4.6.2.3 int `cld_authcheck` ( struct hail\_log \* *log*, const char \* *key*, const void \* *buf*, size\_t *buf\_len*, const void \* *sha* )
- 4.6.2.4 int `cld_authsign` ( struct hail\_log \* *log*, const char \* *key*, const void \* *buf*, size\_t *buf\_len*, void \* *sha* )
- 4.6.2.5 const char\* `cld_errstr` ( enum cle\_err\_codes *ecode* )
- 4.6.2.6 const char\* `cld_opstr` ( enum *cld\_msg\_op* )
- 4.6.2.7 const char\* `cld_pkt_hdr_to_str` ( char \* *scratch*, const char \* *pkt\_hdr*, size\_t *pkt\_len* )
- 4.6.2.8 void `cld_rand64` ( void \* *p* )
- 4.6.2.9 int `cld_readport` ( const char \* *fname* )
- 4.6.2.10 unsigned long long `cld_sid2llu` ( const uint8\_t \* *sid* )
- 4.6.2.11 void `cld_timer_add` ( struct cld\_timer\_list \* *tlist*, struct cld\_timer \* *timer*, time\_t *expires* )
- 4.6.2.12 void `cld_timer_del` ( struct cld\_timer\_list \* *tlist*, struct cld\_timer \* *timer* )
- 4.6.2.13 time\_t `cld_timers_run` ( struct cld\_timer\_list \* *tlist* )

## 4.7 include/cldc.h File Reference

```
#include <sys/types.h>
#include <stdbool.h>
#include <glib.h>
#include <cld_msg_rpc.h>
#include <cld_common.h>
#include <hail_log.h>
```

### Data Structures

- struct [cldc\\_call\\_opts](#)  
*per-operation application options*
- struct [cldc\\_node\\_metadata](#)
- struct [cldc\\_pkt\\_info](#)
- struct [cldc\\_msg](#)  
*an outgoing message, from client to server*

- struct [cldc\\_fh](#)  
*an open file handle associated with a session*
- struct [cldc\\_ops](#)  
*application-supplied facilities*
- struct [cldc\\_session](#)  
*a single CLD client session*
- struct [cldc\\_host](#)  
*Information for a single CLD server host.*
- struct [cldc\\_udp](#)  
*A UDP implementation of the CLD client protocol.*
- struct [cld\\_dirent\\_cur](#)

## Functions

- int [cldc\\_receive\\_pkt](#) (struct [cldc\\_session](#) \*sess, const void \*net\_addr, size\_t net\_addrlen, const void \*buf, size\_t buflen)  
*Packet received from remote host.*
- void [cldc\\_init](#) (void)
- int [cldc\\_new\\_sess](#) (const struct [cldc\\_ops](#) \*ops, const struct [cldc\\_call\\_opts](#) \*copts, const void \*addr, size\_t addr\_len, const char \*user, const char \*secret\_key, void \*private, struct [cldc\\_session](#) \*\*sess\_out)
- void [cldc\\_kill\\_sess](#) (struct [cldc\\_session](#) \*sess)
- int [cldc\\_end\\_sess](#) (struct [cldc\\_session](#) \*sess, const struct [cldc\\_call\\_opts](#) \*copts)
- int [cldc\\_nop](#) (struct [cldc\\_session](#) \*sess, const struct [cldc\\_call\\_opts](#) \*copts)
- int [cldc\\_del](#) (struct [cldc\\_session](#) \*sess, const struct [cldc\\_call\\_opts](#) \*copts, const char \*pathname)
- int [cldc\\_open](#) (struct [cldc\\_session](#) \*sess, const struct [cldc\\_call\\_opts](#) \*copts, const char \*pathname, uint32\_t open\_mode, uint32\_t events, struct [cldc\\_fh](#) \*\*fh\_out)
- int [cldc\\_close](#) (struct [cldc\\_fh](#) \*fh, const struct [cldc\\_call\\_opts](#) \*copts)
- int [cldc\\_unlock](#) (struct [cldc\\_fh](#) \*fh, const struct [cldc\\_call\\_opts](#) \*copts)
- int [cldc\\_lock](#) (struct [cldc\\_fh](#) \*fh, const struct [cldc\\_call\\_opts](#) \*copts, uint32\_t lock\_flags, bool wait\_for\_lock)
- int [cldc\\_put](#) (struct [cldc\\_fh](#) \*fh, const struct [cldc\\_call\\_opts](#) \*copts, const void \*data, size\_t data\_len)
- int [cldc\\_get](#) (struct [cldc\\_fh](#) \*fh, const struct [cldc\\_call\\_opts](#) \*copts, bool metadata\_only)
- int [cldc\\_dirent\\_count](#) (const void \*data, size\_t data\_len)
- int [cldc\\_dirent\\_first](#) (struct [cld\\_dirent\\_cur](#) \*dc)
- int [cldc\\_dirent\\_next](#) (struct [cld\\_dirent\\_cur](#) \*dc)

- void `cldc_dirent_cur_init` (struct `cld_dirent_cur` \*dc, const void \*buf, size\_t buflen)
- void `cldc_dirent_cur_fini` (struct `cld_dirent_cur` \*dc)
- char \* `cldc_dirent_name` (struct `cld_dirent_cur` \*dc)
- void `cldc_copts_get_data` (const struct `cldc_call_opts` \*copts, char \*\*data, size\_t \*data\_len)
- void `cldc_copts_get_metadata` (const struct `cldc_call_opts` \*copts, struct `cldc_node_metadata` \*md)
- void `cldc_udp_free` (struct `cldc_udp` \*udp)
- int `cldc_udp_new` (const char \*hostname, int port, struct `cldc_udp` \*\*udp\_out)
- int `cldc_udp_receive_pkt` (struct `cldc_udp` \*udp)
- int `cldc_udp_pkt_send` (void \*private, const void \*addr, size\_t addrlen, const void \*buf, size\_t buflen)
- int `cldc_getaddr` (GList \*\*host\_list, const char \*thishost, struct `hail_log` \*log)
- int `cldc_saveaddr` (struct `cldc_host` \*hp, unsigned int priority, unsigned int weight, unsigned int port, unsigned int nlen, const char \*name, struct `hail_log` \*log)





### 4.7.1 Function Documentation

- 4.7.1.1 `int cldc_close ( struct cldc_fh * fh, const struct cldc_call_opts * copts )`
- 4.7.1.2 `void cldc_copts_get_data ( const struct cldc_call_opts * copts, char ** data, size_t * data_len )`
- 4.7.1.3 `void cldc_copts_get_metadata ( const struct cldc_call_opts * copts, struct cldc_node_metadata * md )`
- 4.7.1.4 `int cldc_del ( struct cldc_session * sess, const struct cldc_call_opts * copts, const char * pathname )`
- 4.7.1.5 `int cldc_dirent_count ( const void * data, size_t data_len )`
- 4.7.1.6 `void cldc_dirent_cur_fini ( struct cld_dirent_cur * dc )`
- 4.7.1.7 `void cldc_dirent_cur_init ( struct cld_dirent_cur * dc, const void * buf, size_t buflen )`
- 4.7.1.8 `int cldc_dirent_first ( struct cld_dirent_cur * dc )`
- 4.7.1.9 `char* cldc_dirent_name ( struct cld_dirent_cur * dc )`
- 4.7.1.10 `int cldc_dirent_next ( struct cld_dirent_cur * dc )`
- 4.7.1.11 `int cldc_end_sess ( struct cldc_session * sess, const struct cldc_call_opts * copts )`
- 4.7.1.12 `int cldc_get ( struct cldc_fh * fh, const struct cldc_call_opts * copts, bool metadata_only )`
- 4.7.1.13 `int cldc_getaddr ( GList ** host_list, const char * thishost, struct hail_log * log )`
- 4.7.1.14 `void cldc_init ( void )`
- 4.7.1.15 `void cldc_kill_sess ( struct cldc_session * sess )`
- 4.7.1.16 `int cldc_lock ( struct cldc_fh * fh, const struct cldc_call_opts * copts, uint32_t lock_flags, bool wait_for_lock )`
- 4.7.1.17 `int cldc_new_sess ( const struct cldc_ops * ops, const struct cldc_call_opts * copts, const void * addr, size_t addr_len, const char * user, const char * secret_key, void * private, struct cldc_session ** sess_out )`
- 4.7.1.18 `int cldc_nop ( struct cldc_session * sess, const struct cldc_call_opts * copts )`
- 4.7.1.19 `int cldc_open ( struct cldc_session * sess, const struct cldc_call_opts * copts, const char * pathname, uint32_t open_mode, uint32_t events, struct cldc_fh ** fh_out )`
- 4.7.1.20 `int cldc_put ( struct cldc_fh * fh, const struct cldc_call_opts * copts, const void * data, size_t data_len )`
- 4.7.1.21 `int cldc_receive_pkt ( struct cldc_session * sess, const void * net_addr, size_t net_addrlen, const void * buf, size_t buflen )`

Packet received from remote host.

Called by app when a packet is received from a remote host over the network.

#### Parameters

<i>sess</i>	Session associated with received packet
<i>net_addr</i>	Opaque network address
<i>net_addrlen</i>	Size of opaque network address
<i>buf</i>	Pointer to data buffer containing packet
<i>buflen</i>	Length of received packet

#### Returns

Zero for success, non-zero on error

4.7.1.22 `int cldc_saveaddr ( struct cldc_host * hp, unsigned int priority, unsigned int weight, unsigned int port, unsigned int nlen, const char * name, struct hail_log * log )`

4.7.1.23 `void cldc_udp_free ( struct cldc_udp * udp )`

4.7.1.24 `int cldc_udp_new ( const char * hostname, int port, struct cldc_udp ** udp_out )`

4.7.1.25 `int cldc_udp_pkt_send ( void * private, const void * addr, size_t addrlen, const void * buf, size_t buflen )`

4.7.1.26 `int cldc_udp_receive_pkt ( struct cldc_udp * udp )`

4.7.1.27 `int cldc_unlock ( struct cldc_fh * fh, const struct cldc_call_opts * copts )`

## 4.8 include/elist.h File Reference

### Data Structures

- struct [list\\_head](#)

### Defines

- #define [LIST\\_HEAD\\_INIT](#)(name) { &(name), &(name) }
- #define [LIST\\_HEAD](#)(name) struct [list\\_head](#) name = LIST\_HEAD\_INIT(name)
- #define [INIT\\_LIST\\_HEAD](#)(ptr)
- #define [list\\_entry](#)(ptr, type, member) (((type \*))((char \*) (ptr) - (unsigned long) (&((type \*)0)->member)))

*list\_entry* - get the struct for this entry : the &struct [list\\_head](#) pointer.

- #define [list\\_for\\_each](#)(pos, head)  
*list\_for\_each* - iterate over a list : the &struct [list\\_head](#) to use as a loop counter.
- #define [list\\_for\\_each\\_prev](#)(pos, head)

*list\_for\_each\_prev* - iterate over a list backwards : the &struct [list\\_head](#) to use as a loop counter.

- #define [list\\_for\\_each\\_safe](#)(pos, n, head)

*list\_for\_each\_safe* - iterate over a list safe against removal of list entry : the &struct [list\\_head](#) to use as a loop counter.

- #define [list\\_for\\_each\\_entry](#)(pos, head, member)

*list\_for\_each\_entry* - iterate over list of given type : the type \* to use as a loop counter.

- #define [list\\_for\\_each\\_entry\\_safe](#)(pos, n, head, member)

*list\_for\_each\_entry\_safe* - iterate over list of given type safe against removal of list entry : the type \* to use as a loop counter.

- #define [list\\_for\\_each\\_entry\\_continue](#)(pos, head, member)

*list\_for\_each\_entry\_continue* - iterate over list of given type continuing after existing point : the type \* to use as a loop counter.

## 4.8.1 Define Documentation

### 4.8.1.1 #define INIT\_LIST\_HEAD( ptr )

**Value:**

```
do { \
    (ptr)->next = (ptr); (ptr)->prev = (ptr); \
} while (0)
```

### 4.8.1.2 #define list\_entry( ptr, type, member ) ((type \*)((char \*)(ptr)-(unsigned long)(&((type \*)0)->member)))

*list\_entry* - get the struct for this entry : the &struct [list\\_head](#) pointer.

: the type of the struct this is embedded in. : the name of the list\_struct within the struct.

### 4.8.1.3 #define list\_for\_each( pos, head )

**Value:**

```
for (pos = (head)->next; pos != (head); \
     pos = pos->next)
```

*list\_for\_each* - iterate over a list : the &struct [list\\_head](#) to use as a loop counter.

: the head for your list.

**4.8.1.4 #define list\_for\_each\_entry( pos, head, member )****Value:**

```
for (pos = list_entry((head)->next, typeof(*pos), member);    \
    &pos->member != (head);                                     \
    pos = list_entry(pos->member.next, typeof(*pos), member))
```

list\_for\_each\_entry - iterate over list of given type : the type \* to use as a loop counter.

: the head for your list. : the name of the list\_struct within the struct.

**4.8.1.5 #define list\_for\_each\_entry\_continue( pos, head, member )****Value:**

```
for (pos = list_entry(pos->member.next, typeof(*pos), member), \
    prefetch(pos->member.next);                                \
    &pos->member != (head);                                       \
    pos = list_entry(pos->member.next, typeof(*pos), member), \
    prefetch(pos->member.next))
```

list\_for\_each\_entry\_continue - iterate over list of given type continuing after existing point : the type \* to use as a loop counter.

: the head for your list. : the name of the list\_struct within the struct.

**4.8.1.6 #define list\_for\_each\_entry\_safe( pos, n, head, member )****Value:**

```
for (pos = list_entry((head)->next, typeof(*pos), member),    \
    n = list_entry(pos->member.next, typeof(*pos), member); \
    &pos->member != (head);                                       \
    pos = n, n = list_entry(n->member.next, typeof(*n), member))
```

list\_for\_each\_entry\_safe - iterate over list of given type safe against removal of list entry : the type \* to use as a loop counter.

: another type \* to use as temporary storage : the head for your list. : the name of the list\_struct within the struct.

**4.8.1.7 #define list\_for\_each\_prev( pos, head )****Value:**

```
for (pos = (head)->prev; pos != (head); \
    pos = pos->prev)
```

list\_for\_each\_prev - iterate over a list backwards : the &struct [list\\_head](#) to use as a loop counter.

: the head for your list.

#### 4.8.1.8 #define list\_for\_each\_safe( pos, n, head )

##### Value:

```
for (pos = (head)->next, n = pos->next; pos != (head); \
     pos = n, n = pos->next)
```

list\_for\_each\_safe - iterate over a list safe against removal of list entry : the &struct [list\\_head](#) to use as a loop counter.

: another &struct [list\\_head](#) to use as temporary storage : the head for your list.

#### 4.8.1.9 #define LIST\_HEAD( name ) struct list\_head name = LIST\_HEAD\_INIT(name)

#### 4.8.1.10 #define LIST\_HEAD\_INIT( name ) { &(amp;name), &(name) }

## 4.9 include/hail\_log.h File Reference

```
#include <stdbool.h>
```

### Data Structures

- struct [hail\\_log](#)

### Defines

- #define [ATTR\\_PRINTF](#)(x, y)
- #define [HAIL\\_VERBOSE](#)(log,...)  
*Print out a CLD session debug message if enabled.*
- #define [HAIL\\_DEBUG](#)(log,...)  
*Print out an application debug message if enabled.*
- #define [HAIL\\_INFO](#)(log,...) (log)->func(LOG\_INFO, \_\_VA\_ARGS\_\_)  
*Print out an informational log message.*
- #define [HAIL\\_WARN](#)(log,...) (log)->func(LOG\_WARNING, \_\_VA\_ARGS\_\_-  
)  
*Print out a warning message.*
- #define [HAIL\\_ERR](#)(log,...) (log)->func(LOG\_ERR, \_\_VA\_ARGS\_\_)  
*Print out an error message.*
- #define [HAIL\\_CRIT](#)(log,...) (log)->func(LOG\_CRIT, \_\_VA\_ARGS\_\_)  
*Print out a critical warning message.*

### 4.9.1 Define Documentation

4.9.1.1 **#define ATTR\_PRINTF( *x*, *y* )**

4.9.1.2 **#define HAIL\_CRIT( *log*, ... )** (log)->func(LOG\_CRIT, \_\_VA\_ARGS\_\_)

Print out a critical warning message.

4.9.1.3 **#define HAIL\_DEBUG( *log*, ... )**

**Value:**

```
if ((log)->debug) { \
    (log)->func(LOG_DEBUG, __VA_ARGS__); \
}
```

Print out an application debug message if enabled.

4.9.1.4 **#define HAIL\_ERR( *log*, ... )** (log)->func(LOG\_ERR, \_\_VA\_ARGS\_\_)

Print out an error message.

4.9.1.5 **#define HAIL\_INFO( *log*, ... )** (log)->func(LOG\_INFO, \_\_VA\_ARGS\_\_)

Print out an informational log message.

4.9.1.6 **#define HAIL\_VERBOSE( *log*, ... )**

**Value:**

```
if ((log)->verbose) { \
    (log)->func(LOG_DEBUG, __VA_ARGS__); \
}
```

Print out a CLD session debug message if enabled.

4.9.1.7 **#define HAIL\_WARN( *log*, ... )** (log)->func(LOG\_WARNING, \_\_VA\_ARGS\_\_)

Print out a warning message.

## 4.10 include/hail\_private.h File Reference

```
#include "hail-config.h"
```

```
#include <rpc/xdr.h>
```

## Functions

- u\_long [xdr\\_sizeof](#) (xdrproc\_t, void \*)

### 4.10.1 Function Documentation

#### 4.10.1.1 u\_long xdr\_sizeof ( xdrproc\_t , void \* )

## 4.11 include/hstor.h File Reference

```
#include <stdbool.h>
#include <stdint.h>
#include <curl/curl.h>
#include <glib.h>
```

## Data Structures

- struct [hstor\\_client](#)
- struct [hstor\\_bucket](#)
- struct [hstor\\_blist](#)
- struct [hstor\\_object](#)
- struct [hstor\\_keylist](#)
- struct [http\\_uri](#)
- struct [http\\_hdr](#)
- struct [http\\_req](#)

## Defines

- #define [ARRAY\\_SIZE](#)(arr) (sizeof(arr) / sizeof((arr)[0]))
- #define [PATH\\_ESCAPE\\_MASK](#) 0x02
- #define [QUERY\\_ESCAPE\\_MASK](#) 0x04

## Enumerations

- enum { [HREQ\\_MAX\\_HDR](#) = 128 }
- enum [ReqQ](#) {  
    [URIQ\\_ACL](#), [URIQ\\_LOCATION](#), [URIQ\\_LOGGING](#), [URIQ\\_TORRENT](#),  
    [URIQNUM](#) }
- enum [ReqACLC](#) {  
    [ACLC\\_PRIV](#), [ACLC\\_PUB\\_R](#), [ACLC\\_PUB\\_RW](#), [ACLC\\_AUTH\\_R](#),  
    [ACLCNUM](#) }



## Functions

- char \* [hutil\\_time2str](#) (char \*buf, int len, time\_t time)
- time\_t [hutil\\_str2time](#) (const char \*timestr)
- int [hreq\\_hdr\\_push](#) (struct [http\\_req](#) \*req, char \*key, char \*val)
- char \* [hreq\\_hdr](#) (struct [http\\_req](#) \*req, const char \*key)
- void [hreq\\_sign](#) (struct [http\\_req](#) \*req, const char \*bucket, const char \*key, char \*b64hmac\_out)
- GHashTable \* [hreq\\_query](#) (struct [http\\_req](#) \*req)
- int [hreq\\_is\\_query](#) (struct [http\\_req](#) \*req)
- void [hreq\\_free](#) (struct [http\\_req](#) \*req)
- int [hreq\\_acl\\_canned](#) (struct [http\\_req](#) \*req)
- struct [http\\_uri](#) \* [huri\\_parse](#) (struct [http\\_uri](#) \*uri\_dest, char \*uri\_src\_text)
- int [huri\\_field\\_unescape](#) (char \*s, int s\_len)
- char \* [huri\\_field\\_escape](#) (char \*signed\_str, unsigned char mask)
- void [hstor\\_free](#) (struct [hstor\\_client](#) \*hstor)
- void [hstor\\_free\\_blist](#) (struct [hstor\\_blist](#) \*blist)
- void [hstor\\_free\\_bucket](#) (struct [hstor\\_bucket](#) \*buck)
- void [hstor\\_free\\_object](#) (struct [hstor\\_object](#) \*obj)
- void [hstor\\_free\\_keylist](#) (struct [hstor\\_keylist](#) \*keylist)
- struct [hstor\\_client](#) \* [hstor\\_new](#) (const char \*service\_acc, const char \*service\_host, const char \*user, const char \*secret\_key)
- bool [hstor\\_add\\_bucket](#) (struct [hstor\\_client](#) \*hstor, const char \*name)
- bool [hstor\\_del\\_bucket](#) (struct [hstor\\_client](#) \*hstor, const char \*name)
- struct [hstor\\_blist](#) \* [hstor\\_list\\_buckets](#) (struct [hstor\\_client](#) \*hstor)
- bool [hstor\\_get](#) (struct [hstor\\_client](#) \*hstor, const char \*bucket, const char \*key, size\_t(\*write\_cb)(void \*, size\_t, size\_t, void \*), void \*user\_data, bool want\_headers)
- void \* [hstor\\_get\\_inline](#) (struct [hstor\\_client](#) \*hstor, const char \*bucket, const char \*key, bool want\_headers, size\_t \*len)
- bool [hstor\\_put](#) (struct [hstor\\_client](#) \*hstor, const char \*bucket, const char \*key, size\_t(\*read\_cb)(void \*, size\_t, size\_t, void \*), uint64\_t len, void \*user\_data, char \*\*user\_hdrs)
- bool [hstor\\_put\\_inline](#) (struct [hstor\\_client](#) \*hstor, const char \*bucket, const char \*key, void \*data, uint64\_t len, char \*\*user\_hdrs)
- bool [hstor\\_del](#) (struct [hstor\\_client](#) \*hstor, const char \*bucket, const char \*key)
- struct [hstor\\_keylist](#) \* [hstor\\_keys](#) (struct [hstor\\_client](#) \*hstor, const char \*bucket, const char \*prefix, const char \*marker, const char \*delim, unsigned int max\_keys)

#### 4.11.1 Define Documentation

4.11.1.1 `#define ARRAY_SIZE( arr ) (sizeof(arr) / sizeof((arr)[0]))`

4.11.1.2 `#define PATH_ESCAPE_MASK 0x02`

4.11.1.3 `#define QUERY_ESCAPE_MASK 0x04`

#### 4.11.2 Enumeration Type Documentation

4.11.2.1 anonymous enum

Enumerator:

*HREQ\_MAX\_HDR*

4.11.2.2 enum ReqACLC

Enumerator:

*ACLC\_PRIV*

*ACLC\_PUB\_R*

*ACLC\_PUB\_RW*

*ACLC\_AUTH\_R*

*ACLCNUM*

4.11.2.3 enum ReqQ

Enumerator:

*URIQ\_ACL*

*URIQ\_LOCATION*

*URIQ\_LOGGING*

*URIQ\_TORRENT*

*URIQNUM*



### 4.11.3 Function Documentation

- 4.11.3.1 `int hreq_acl_canned ( struct http_req * req )`
- 4.11.3.2 `void hreq_free ( struct http_req * req )`
- 4.11.3.3 `char* hreq_hdr ( struct http_req * req, const char * key )`
- 4.11.3.4 `int hreq_hdr_push ( struct http_req * req, char * key, char * val )`
- 4.11.3.5 `int hreq_is_query ( struct http_req * req )`
- 4.11.3.6 `GHashTable* hreq_query ( struct http_req * req )`
- 4.11.3.7 `void hreq_sign ( struct http_req * req, const char * bucket, const char * key, char * b64hmac_out )`
- 4.11.3.8 `bool hstor_add_bucket ( struct hstor_client * hstor, const char * name )`
- 4.11.3.9 `bool hstor_del ( struct hstor_client * hstor, const char * bucket, const char * key )`
- 4.11.3.10 `bool hstor_del_bucket ( struct hstor_client * hstor, const char * name )`
- 4.11.3.11 `void hstor_free ( struct hstor_client * hstor )`
- 4.11.3.12 `void hstor_free_blist ( struct hstor_blist * blist )`
- 4.11.3.13 `void hstor_free_bucket ( struct hstor_bucket * buck )`
- 4.11.3.14 `void hstor_free_keylist ( struct hstor_keylist * keylist )`
- 4.11.3.15 `void hstor_free_object ( struct hstor_object * obj )`
- 4.11.3.16 `bool hstor_get ( struct hstor_client * hstor, const char * bucket, const char * key, size_t*(void *, size_t, size_t, void *) write_cb, void * user_data, bool want_headers )`
- 4.11.3.17 `void* hstor_get_inline ( struct hstor_client * hstor, const char * bucket, const char * key, bool want_headers, size_t * len )`
- 4.11.3.18 `struct hstor_keylist* hstor_keys ( struct hstor_client * hstor, const char * bucket, const char * prefix, const char * marker, const char * delim, unsigned int max_keys ) [read]`
- 4.11.3.19 `struct hstor_blist* hstor_list_buckets ( struct hstor_client * hstor ) [read]`
- 4.11.3.20 `struct hstor_client* hstor_new ( const char * service_acc, const char * service_host, const char * user, const char * secret_key ) [read]`
- 4.11.3.21 `bool hstor_put ( struct hstor_client * hstor, const char * bucket, const char * key, size_t*(void *, size_t, size_t, void *) read_cb, uint64_t len, void * user_data, char ** user_hdrs )`
- 
- 4.11.3.22 `bool hstor_put_inline ( struct hstor_client * hstor, const char * bucket, const char * key, void * data, uint64_t len, char ** user_hdrs )`
- 4.11.3.23 `char* huri_field_escape ( char * signed_str, unsigned char mask )`
- 4.11.3.24 `int huri_field_unescape ( char * s, int s_len )`

```
#include <glib.h>
#include <cldc.h>
```

## Data Structures

- struct [ncld\\_sess](#)
- struct [ncld\\_fh](#)
- struct [ncld\\_read](#)

## Functions

- struct [ncld\\_sess](#) \* [ncld\\_sess\\_open](#) (const char \*host, int port, int \*error, void(\*event)(void \*, unsigned int), void \*ev\_arg, const char \*cld\_user, const char \*cld\_key, struct [hail\\_log](#) \*log)
- struct [ncld\\_fh](#) \* [ncld\\_open](#) (struct [ncld\\_sess](#) \*s, const char \*fname, unsigned int mode, int \*error, unsigned int events, void(\*event)(void \*, unsigned int), void \*ev\_arg)
- int [ncld\\_del](#) (struct [ncld\\_sess](#) \*nsess, const char \*fname)
- struct [ncld\\_read](#) \* [ncld\\_get](#) (struct [ncld\\_fh](#) \*fh, int \*error)
- struct [ncld\\_read](#) \* [ncld\\_get\\_meta](#) (struct [ncld\\_fh](#) \*fh, int \*error)
- void [ncld\\_read\\_free](#) (struct [ncld\\_read](#) \*rp)
- int [ncld\\_write](#) (struct [ncld\\_fh](#) \*, const void \*data, long len)
- int [ncld\\_trylock](#) (struct [ncld\\_fh](#) \*)
- int [ncld\\_qlock](#) (struct [ncld\\_fh](#) \*)
- int [ncld\\_unlock](#) (struct [ncld\\_fh](#) \*)
- void [ncld\\_close](#) (struct [ncld\\_fh](#) \*)
- void [ncld\\_sess\\_close](#) (struct [ncld\\_sess](#) \*s)
- void [ncld\\_init](#) (void)

### 4.12.1 Function Documentation

4.12.1.1 void `nclد_close` ( struct `nclد_fh` \* )

4.12.1.2 int `nclد_del` ( struct `nclد_sess` \* *nsess*, const char \* *fname* )

4.12.1.3 struct `nclد_read`\* `nclد_get` ( struct `nclد_fh` \* *fh*, int \* *error* ) [read]

4.12.1.4 struct `nclد_read`\* `nclد_get_meta` ( struct `nclد_fh` \* *fh*, int \* *error* ) [read]

4.12.1.5 void `nclد_init` ( void )

4.12.1.6 struct `nclد_fh`\* `nclد_open` ( struct `nclد_sess` \* *s*, const char \* *fname*, unsigned int *mode*, int \* *error*, unsigned int *events*, void(\*) (void \*, unsigned int) *event*, void \* *ev\_arg* ) [read]

4.12.1.7 int `nclد_qlock` ( struct `nclد_fh` \* )

4.12.1.8 void `nclد_read.free` ( struct `nclد_read` \* *rp* )

4.12.1.9 void `nclد_sess.close` ( struct `nclد_sess` \* *s* )

4.12.1.10 struct `nclد_sess`\* `nclد_sess.open` ( const char \* *host*, int *port*, int \* *error*, void(\*) (void \*, unsigned int) *event*, void \* *ev\_arg*, const char \* *clد\_user*, const char \* *clد\_key*, struct `hail_log` \* *log* ) [read]

4.12.1.11 int `nclد_trylock` ( struct `nclد_fh` \* )

4.12.1.12 int `nclد_unlock` ( struct `nclد_fh` \* )

4.12.1.13 int `nclد_write` ( struct `nclد_fh` \* , const void \* *data*, long *len* )

## 4.13 include/objcache.h File Reference

```
#include <glib.h>
#include <stdbool.h>
```

### Data Structures

- struct [objcache](#)
- struct [objcache\\_entry](#)

### Defines

- #define [OC\\_F\\_DIRTY](#) 0x1
- #define [objcache\\_get](#)(c, k, l) \_\_objcache\_get(c, k, l, 0)

- #define `objcache_get_dirty`(c, k, l) `__objcache_get`(c, k, l, OC\_F\_DIRTY)

## Functions

- struct `objcache_entry` \* `__objcache_get` (struct `objcache` \*cache, const char \*key, int klen, unsigned int flag)
- bool `objcache_test_dirty` (struct `objcache` \*cache, struct `objcache_entry` \*entry)
- void `objcache_put` (struct `objcache` \*cache, struct `objcache_entry` \*entry)
- int `objcache_count` (struct `objcache` \*cache)
- int `objcache_init` (struct `objcache` \*cache)
- void `objcache_fini` (struct `objcache` \*cache)

### 4.13.1 Define Documentation

4.13.1.1 #define `objcache_get`( c, k, l ) `__objcache_get`(c, k, l, 0)

4.13.1.2 #define `objcache_get_dirty`( c, k, l ) `__objcache_get`(c, k, l, OC\_F\_DIRTY)

4.13.1.3 #define `OC_F_DIRTY` 0x1

### 4.13.2 Function Documentation

4.13.2.1 struct `objcache_entry`\* `__objcache_get` ( struct `objcache` \* *cache*, const char \* *key*, int *klen*, unsigned int *flag* ) [read]

4.13.2.2 int `objcache_count` ( struct `objcache` \* *cache* )

4.13.2.3 void `objcache_fini` ( struct `objcache` \* *cache* )

4.13.2.4 int `objcache_init` ( struct `objcache` \* *cache* )

4.13.2.5 void `objcache_put` ( struct `objcache` \* *cache*, struct `objcache_entry` \* *entry* )

4.13.2.6 bool `objcache_test_dirty` ( struct `objcache` \* *cache*, struct `objcache_entry` \* *entry* )

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