FreeCoAP

Generated by Doxygen 1.8.11

Contents

Chapter 1

Class Index

1.1 Class List

Here are the classes, structs, unions and interfaces with brief descriptions:

Chapter 2

File Index

2.1 File List

Here is a list of all documented files with brief descriptions:

Chapter 3

Class Documentation

3.1 coap_client_t Struct Reference

Client structure.

```
#include <coap_client.h>
```

Public Attributes

- int sd
- int timer_fd
- struct timespec timeout
- unsigned num_retrans
- coap_ipv_sockaddr_in_t server_sin
- socklen_t server_sin_len
- char server_host [COAP_CLIENT_HOST_BUF_LEN]
- char server_port [COAP_CLIENT_PORT_BUF_LEN]
- gnutls_session_t session
- gnutls_certificate_credentials_t cred
- gnutls_priority_t priority

3.1.1 Detailed Description

Client structure.

3.1.2 Member Data Documentation

3.1.2.1 gnutls_certificate_credentials_t coap_client_t::cred

DTLS credentials

3.1.2.2 unsigned coap_client_t::num_retrans

Current number of retransmissions

3.1.2.3 gnutls_priority_t coap_client_t::priority

DTLS priorities

3.1.2.4 int coap_client_t::sd

Socket descriptor

3.1.2.5 char coap_client_t::server_host[COAP_CLIENT_HOST_BUF_LEN]

String to hold the server host address

3.1.2.6 char coap_client_t::server_port[COAP_CLIENT_PORT_BUF_LEN]

String to hold the server port number

3.1.2.7 coap_ipv_sockaddr_in_t coap_client_t::server_sin

Socket structture

3.1.2.8 socklen_t coap_client_t::server_sin_len

Socket structure length

3.1.2.9 gnutls_session_t coap_client_t::session

DTLS session

3.1.2.10 struct timespec coap_client_t::timeout

Timeout value

3.1.2.11 int coap_client_t::timer_fd

Timer file descriptor

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

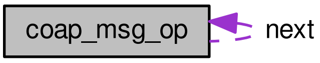
- lib/include/coap_client.h

3.2 coap_msg_op Struct Reference

Option structure.

```
#include <coap_msg.h>
```

Collaboration diagram for coap_msg_op:



Public Attributes

- unsigned num
- unsigned len
- char ∗ val
- struct coap_msg_op ∗ next

3.2.1 Detailed Description

Option structure.

3.2.2 Member Data Documentation

3.2.2.1 unsigned coap_msg_op::len

Option length

3.2.2.2 struct coap_msg_op∗ coap_msg_op::next

Pointer to the next option structure in the list

3.2.2.3 unsigned coap_msg_op::num

Option number

3.2.2.4 char∗ coap_msg_op::val

Pointer to a buffer containing the option value

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

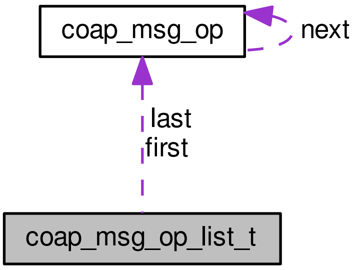
- lib/include/coap_msg.h

3.3 coap_msg_op_list_t Struct Reference

Option linked-list structure.

```
#include <coap_msg.h>
```

Collaboration diagram for coap_msg_op_list_t:



Public Attributes

- coap_msg_op_t ∗ first
- coap_msg_op_t ∗ last

3.3.1 Detailed Description

Option linked-list structure.

3.3.2 Member Data Documentation

3.3.2.1 coap_msg_op_t∗ coap_msg_op_list_t::first

Pointer to the first option structure in the list

3.3.2.2 coap_msg_op_t∗ coap_msg_op_list_t::last

Pointer to the last option structure in the list

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

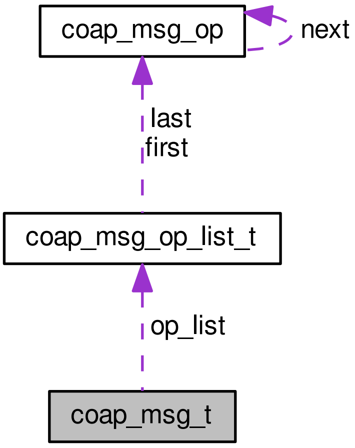
- lib/include/coap_msg.h

3.4 coap_msg_t Struct Reference

Message structure.

```
#include <coap_msg.h>
```

Collaboration diagram for coap_msg_t:



Public Attributes

- unsigned ver
- coap_msg_type_t type
- unsigned token_len
- unsigned code_class
- unsigned code_detail
- unsigned msg_id
- char token [COAP_MSG_MAX_TOKEN_LEN]
- coap_msg_op_list_t op_list
- char ∗ payload
- size_t payload_len

3.4.1 Detailed Description

Message structure.

3.4.2 Member Data Documentation

3.4.2.1 unsigned coap_msg_t::code_class

Code class

3.4.2.2 unsigned coap_msg_t::code_detail

Code detail

3.4.2.3 unsigned coap_msg_t::msg_id

Message ID

3.4.2.4 coap_msg_op_list_t coap_msg_t::op_list

Option list

3.4.2.5 char* coap_msg_t::payload

Pointer to a buffer containing the payload

3.4.2.6 size_t coap_msg_t::payload_len

Length of the payload

3.4.2.7 char coap_msg_t::token[COAP_MSG_MAX_TOKEN_LEN]

Token value

3.4.2.8 unsigned coap_msg_t::token_len

Token length

3.4.2.9 coap_msg_type_t coap_msg_t::type

Message type

3.4.2.10 unsigned coap_msg_t::ver

CoAP version

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

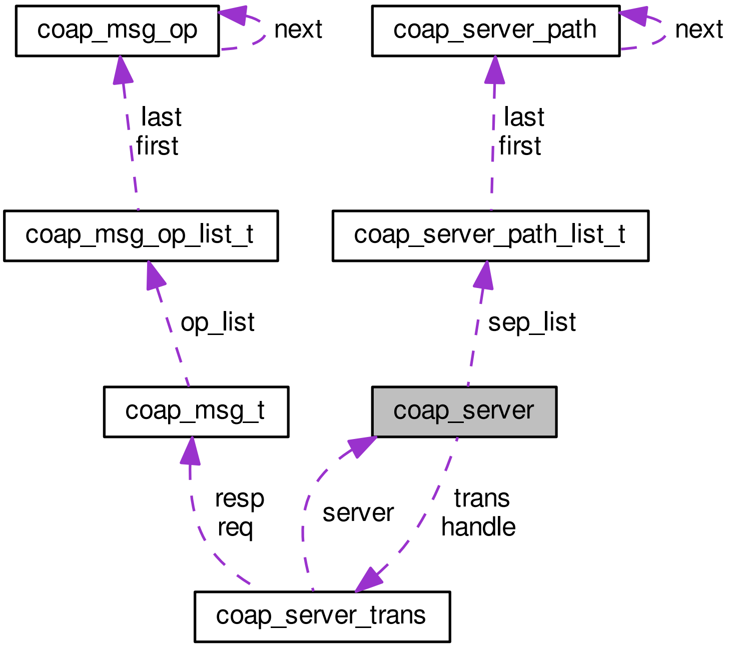
- lib/include/coap_msg.h

3.5 coap_server Struct Reference

Server structure.

```
#include <coap_server.h>
```

Collaboration diagram for coap_server:



Public Attributes

- int sd
- unsigned msg_id
- coap_server_path_list_t sep_list
- coap_server_trans_t trans [COAP_SERVER_NUM_TRANS]
- coap_server_handler_t handle
- gnutls_certificate_credentials_t cred
- gnutls_priority_t priority
- gnutls_dh_params_t dh_params

3.5.1 Detailed Description

Server structure.

3.5.2 Member Data Documentation

3.5.2.1 gnutls_certificate_credentials_t coap_server::cred

DTLS credentials

3.5.2.2 gnutls_dh_params_t coap_server::dh_params

Diffie-Hellman parameters

3.5.2.3 coap_server_handler_t coap_server::handle

Call-back function to handle requests and generate responses

3.5.2.4 unsigned coap_server::msg_id

Last message ID value used in a response message

3.5.2.5 gnutls_priority_t coap_server::priority

DTLS priorities

3.5.2.6 int coap_server::sd

Socket descriptor

3.5.2.7 coap_server_path_list_t coap_server::sep_list

List of URI paths that require separate responses

3.5.2.8 coap_server_trans_t coap_server::trans[COAP_SERVER_NUM_TRANS]

Array of transaction structures

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

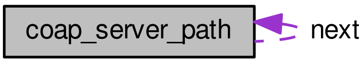
- lib/include/coap_server.h

3.6 coap_server_path Struct Reference

URI path structure.

```
#include <coap_server.h>
```

Collaboration diagram for coap_server_path:



Public Attributes

- char ∗ str
- struct coap_server_path ∗ next

3.6.1 Detailed Description

URI path structure.

3.6.2 Member Data Documentation

3.6.2.1 struct coap_server_path∗ coap_server_path::next

Pointer to the next URI path structure in the list

3.6.2.2 char∗ coap_server_path::str

String containing a path

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

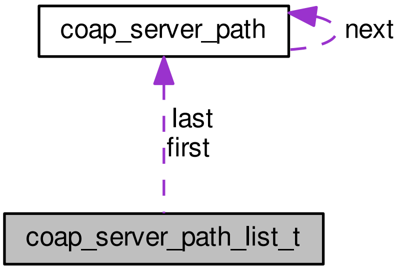
- lib/include/coap_server.h

3.7 coap_server_path_list_t Struct Reference

URI path list structure.

```
#include <coap_server.h>
```

Collaboration diagram for coap_server_path_list_t:



Public Attributes

- coap_server_path_t ∗ first
- coap_server_path_t ∗ last

3.7.1 Detailed Description

URI path list structure.

3.7.2 Member Data Documentation

3.7.2.1 coap_server_path_t∗ coap_server_path_list_t::first

Pointer to the first URI path structure in the list

3.7.2.2 coap_server_path_t∗ coap_server_path_list_t::last

Pointer to the last URI path structure in the list

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

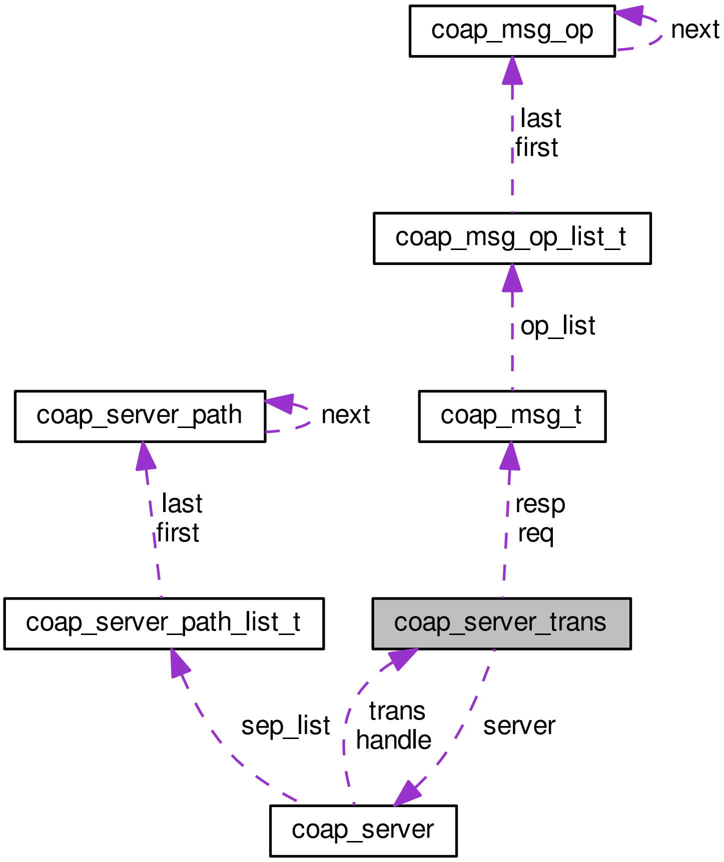
- lib/include/coap_server.h

3.8 coap_server_trans Struct Reference

Transaction structure.

`#include <coap_server.h>`

Collaboration diagram for coap_server_trans:



Public Attributes

- int active
- time_t last_use
- int timer_fd
- struct timespec timeout
- unsigned num_retrans
- coap_ipv_sockaddr_in_t client_sin
- socklen_t client_sin_len
- char client_addr [COAP_SERVER_ADDR_BUF_LEN]
- coap_msg_t req
- coap_msg_t resp
- struct coap_server ∗ server
- gnutls_session_t session

3.8.1 Detailed Description

Transaction structure.

3.8.2 Member Data Documentation

3.8.2.1 int coap_server_trans::active

Flag to indicate if this transaction structure contains valid data

3.8.2.2 char coap_server_trans::client_addr[COAP_SERVER_ADDR_BUF_LEN]

String to hold the client address

3.8.2.3 coap_ipv_sockaddr_in_t coap_server_trans::client_sin

Socket structure

3.8.2.4 socklen_t coap_server_trans::client_sin_len

Socket structure length

3.8.2.5 time_t coap_server_trans::last_use

The time that this transaction structure was last used

3.8.2.6 unsigned coap_server_trans::num_retrans

Current number of retransmissions

3.8.2.7 coap_msg_t coap_server_trans::req

Last request message received for this transaction

3.8.2.8 coap_msg_t coap_server_trans::resp

Last response message sent for this transaction

3.8.2.9 struct coap_server∗ coap_server_trans::server

Pointer to the containing server structure

3.8.2.10 gnutls_session_t coap_server_trans::session

DTLS session

3.8.2.11 struct timespec coap_server_trans::timeout

Timeout value

3.8.2.12 int coap_server_trans::timer_fd

Timer file descriptor

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

- lib/include/coap_server.h

Chapter 4

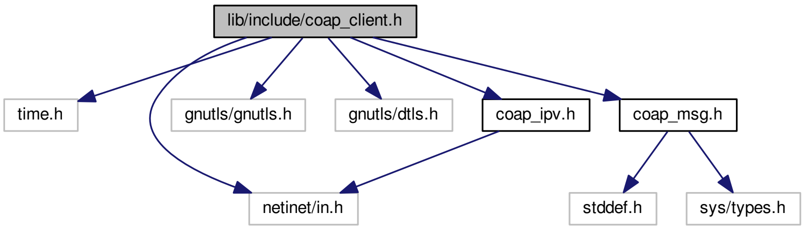
File Documentation

4.1 lib/include/coap_client.h File Reference

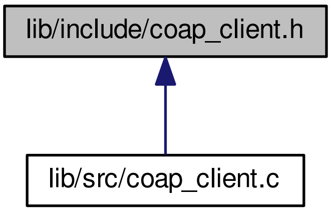
Include file for the FreeCoAP client library.

```
#include <time.h>
#include <netinet/in.h>
#include <gnutls/gnutls.h>
#include <gnutls/dtls.h>
#include "coap_msg.h"
#include "coap_ipv.h"
```

Include dependency graph for coap_client.h:



This graph shows which files directly or indirectly include this file:



Classes

- struct coap_client_t

  Client structure.

Macros

- #define COAP_CLIENT_HOST_BUF_LEN 128
- #define COAP_CLIENT_PORT_BUF_LEN 8

Functions

- int coap_client_create (coap_client_t ∗client, const char ∗host, const char ∗port, const char ∗key_file_name, const char ∗cert_file_name, const char ∗trust_file_name, const char ∗crl_file_name, const char ∗common←↩_name)

  Initialise a client structure.
- void coap_client_destroy (coap_client_t ∗client)

  Deinitialise a client structure.
- int coap_client_exchange (coap_client_t ∗client, coap_msg_t ∗req, coap_msg_t ∗resp)

  Send a request to the server and receive the response.

4.1.1 Detailed Description

Include file for the FreeCoAP client library.

4.1.2 Macro Definition Documentation

4.1.2.1 #define COAP_CLIENT_HOST_BUF_LEN 128

Buffer length for host addresses

4.1.2.2 #define COAP_CLIENT_PORT_BUF_LEN 8

Buffer length for port numbers

4.1.3 Function Documentation

4.1.3.1 int coap_client_create (coap_client_t ∗ *client,* const char ∗ *host,* const char ∗ *port,* const char ∗ *key_file_name,* const char ∗ *cert_file_name,* const char ∗ *trust_file_name,* const char ∗ *crl_file_name,* const char ∗ *common_name*)

Initialise a client structure.

Parameters

out	*client*	Pointer to a client structure
in	*host*	Pointer to a string containing the host address of the server
in	*port*	Port number of the server
in	*key_file_name*	String containing the DTLS key file name
in	*cert_file_name*	String containing the DTLS certificate file name
in	*trust_file_name*	String containing the DTLS trust file name

Returns

Operation status

Return values

0	Success
<*0*	Error

4.1.3.2 void coap_client_destroy (coap_client_t ∗ *client*)

Deinitialise a client structure.

Parameters

`in,out`	*client*	Pointer to a client structure

4.1.3.3 int coap_client_exchange (coap_client_t ∗ *client,* coap_msg_t ∗ *req,* coap_msg_t ∗ *resp*)

Send a request to the server and receive the response.

This function sets the message ID and token fields of the request message overriding any values set by the calling function.

Parameters

`in,out`	*client*	Pointer to a client structure
`in`	*req*	Pointer to the request message
`out`	*resp*	Pointer to the response message

Returns

Operation status

Return values

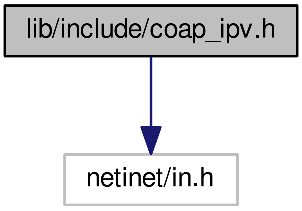
0	Success
<*0*	Error

4.2 lib/include/coap_ipv.h File Reference

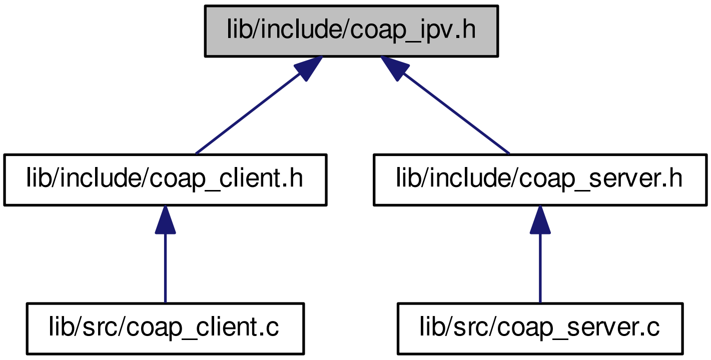
Include file for the FreeCoAP IP Version (IPv4/IPv6) abstraction layer.

```
#include <netinet/in.h>
```

Include dependency graph for coap_ipv.h:



This graph shows which files directly or indirectly include this file:



Macros

- #define **COAP_IPV_AF_INET** AF_INET
- #define **COAP_IPV_INET_ADDRSTRLEN** INET_ADDRSTRLEN
- #define **COAP_IPV_SIN_ADDR** sin_addr
- #define **COAP_IPV_SIN_PORT** sin_port

Typedefs

- typedef struct sockaddr_in **coap_ipv_sockaddr_in_t**

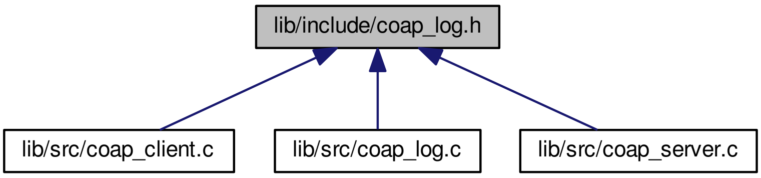
4.2.1 Detailed Description

Include file for the FreeCoAP IP Version (IPv4/IPv6) abstraction layer.

4.3 lib/include/coap_log.h File Reference

Include file for the FreeCoAP logging module.

This graph shows which files directly or indirectly include this file:



Macros

- #define COAP_LOG_DEF_LEVEL COAP_LOG_ERROR

Enumerations

- enum coap_log_level_t {
  COAP_LOG_ERROR = 0, COAP_LOG_WARN = 1, COAP_LOG_NOTICE = 2, COAP_LOG_INFO = 3,
  COAP_LOG_DEBUG = 4 }

  Log level.

Functions

- void coap_log_set_level (coap_log_level_t level)

  Set the log level.
- coap_log_level_t coap_log_get_level (void)

  Get the log level.
- void coap_log_error (const char ∗msg,...)

  Log an error message.
- void coap_log_warn (const char ∗msg,...)

  Log a warning message.
- void coap_log_notice (const char ∗msg,...)

  Log an notice message.
- void coap_log_info (const char ∗msg,...)

  Log an info message.
- void coap_log_debug (const char ∗msg,...)

  Log a debug message.

4.3.1 Detailed Description

Include file for the FreeCoAP logging module.

4.3.2 Macro Definition Documentation

4.3.2.1 #define COAP_LOG_DEF_LEVEL COAP_LOG_ERROR

Default log level

4.3.3 Enumeration Type Documentation

4.3.3.1 enum coap_log_level_t

Log level.

Enumerator

- ***COAP_LOG_ERROR*** Error log level
- ***COAP_LOG_WARN*** Warning log level
- ***COAP_LOG_NOTICE*** Notice log level
- ***COAP_LOG_INFO*** Informational log level
- ***COAP_LOG_DEBUG*** Debug log level

4.3.4 Function Documentation

4.3.4.1 void coap_log_debug (const char ∗ *msg,* ...)

Log a debug message.

Parameters

`in`	*msg*	String containing format specifiers
`in`	...	arguments for the format specifiers

4.3.4.2 void coap_log_error (const char ∗ *msg,* ...)

Log an error message.

Parameters

`in`	*msg*	String containing format specifiers
`in`	...	arguments for the format specifiers

4.3.4.3 coap_log_level_t coap_log_get_level (void)

Get the log level.

Returns

The current log level

4.3.4.4 void coap_log_info (const char ∗ *msg,* ...)

Log an info message.

Parameters

in	*msg*	String containing format specifiers
in	...	arguments for the format specifiers

4.3.4.5 void coap_log_notice (const char ∗ *msg,* ...)

Log an notice message.

Parameters

in	*msg*	String containing format specifiers
in	...	arguments for the format specifiers

4.3.4.6 void coap_log_set_level (coap_log_level_t *level*)

Set the log level.

Messages with a severity below this level will be filtered. Error messages cannot be filtered.

Parameters

in	*level*	The new log level

< Warning log level

< Notice warning level

< Informational warning level

< Debug warning level

4.3.4.7 void coap_log_warn (const char ∗ *msg,* ...)

Log a warning message.

Parameters

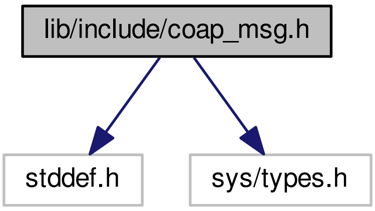
`in`	*msg*	String containing format specifiers
`in`	...	arguments for the format specifiers

4.4 lib/include/coap_msg.h File Reference

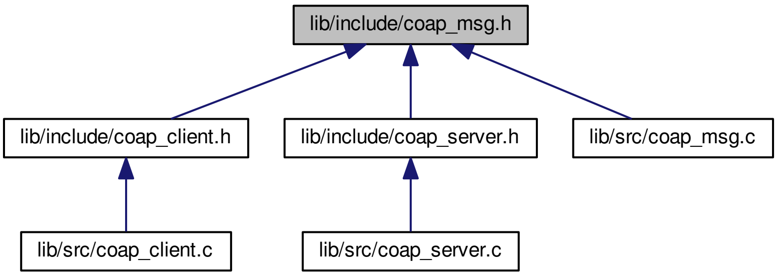
Include file for the FreeCoAP message parser/formatter library.

```
#include <stddef.h>
#include <sys/types.h>
```

Include dependency graph for coap_msg.h:



This graph shows which files directly or indirectly include this file:



Classes

- struct coap_msg_op

  Option structure.
- struct coap_msg_op_list_t

  Option linked-list structure.
- struct coap_msg_t

  Message structure.

Macros

- #define COAP_MSG_VER 0x01
- #define COAP_MSG_MAX_TOKEN_LEN 8
- #define COAP_MSG_MAX_CODE_CLASS 7
- #define COAP_MSG_MAX_CODE_DETAIL 31
- #define COAP_MSG_MAX_MSG_ID ((1 << 16) - 1)
- #define COAP_MSG_OP_URI_PATH_MAX_LEN 256
- #define COAP_MSG_OP_MAX_BLOCK_VAL_LEN 3
- #define COAP_MSG_OP_MAX_BLOCK_SIZE (1 << 10)
- #define COAP_MSG_MAX_BUF_LEN 1152
- #define coap_msg_op_num_is_critical(num) ((num) & 1)
- #define coap_msg_op_num_is_unsafe(num) ((num) & 2)
- #define coap_msg_op_num_no_cache_key(num) ((num & 0x1e) == 0x1c)
- #define coap_msg_op_get_num(op) ((op)->num)
- #define coap_msg_op_set_num(op, num) ((op)->num = (num))
- #define coap_msg_op_get_len(op) ((op)->len)
- #define coap_msg_op_set_len(op, len) ((op)->len = (len))
- #define coap_msg_op_get_val(op) ((op)->val)
- #define coap_msg_op_set_val(op, val) ((op)->val = (val))
- #define coap_msg_op_get_next(op) ((op)->next)
- #define coap_msg_op_set_next(op, next_op) ((op)->next = (next_op))
- #define coap_msg_get_ver(msg) ((msg)->ver)
- #define coap_msg_get_type(msg) ((msg)->type)
- #define coap_msg_get_token_len(msg) ((msg)->token_len)
- #define coap_msg_get_code_class(msg) ((msg)->code_class)
- #define coap_msg_get_code_detail(msg) ((msg)->code_detail)
- #define coap_msg_get_msg_id(msg) ((msg)->msg_id)
- #define coap_msg_get_token(msg) ((msg)->token)
- #define coap_msg_get_first_op(msg) ((msg)->op_list.first)
- #define coap_msg_get_payload(msg) ((msg)->payload)
- #define coap_msg_get_payload_len(msg) ((msg)->payload_len)
- #define coap_msg_is_empty(msg) (((msg)->code_class == 0) && ((msg)->code_detail == 0))

Typedefs

- typedef struct coap_msg_op coap_msg_op_t

  Option structure.

Enumerations

- enum coap_msg_type_t { COAP_MSG_CON = 0x0, COAP_MSG_NON = 0x1, COAP_MSG_ACK = 0x2, COAP_MSG_RST = 0x3 }

  Message type enumeration.
- enum coap_msg_class_t { COAP_MSG_REQ = 0, COAP_MSG_SUCCESS = 2, COAP_MSG_CLIENT_E↩RR = 4, COAP_MSG_SERVER_ERR = 5 }

  Code class enumeration.
- enum coap_msg_method_t { COAP_MSG_GET = 1, COAP_MSG_POST = 2, COAP_MSG_PUT = 3, CO↩AP_MSG_DELETE =4 }

  Request code detail enumeration.

- enum coap_msg_success_t {
  COAP_MSG_CREATED = 1, COAP_MSG_DELETED = 2, COAP_MSG_VALID = 3, COAP_MSG_CHANGED = 4,
  COAP_MSG_CONTENT = 5, COAP_MSG_CONTINUE = 31 }

  Success response code detail enumeration.
- enum coap_msg_client_err_t {
  COAP_MSG_BAD_REQ = 0, COAP_MSG_UNAUTHORIZED = 1, COAP_MSG_BAD_OPTION = 2, COAP_MSG_FORBIDDEN = 3,
  COAP_MSG_NOT_FOUND = 4, COAP_MSG_METHOD_NOT_ALLOWED = 5, COAP_MSG_NOT_ACCEPTABLE = 6, COAP_MSG_INCOMPLETE = 8,
  COAP_MSG_PRECOND_FAILED = 12, COAP_MSG_REQ_ENT_TOO_LARGE = 13, COAP_MSG_UNSUP_CONT_FMT = 15 }

  Client error response code detail enumeration.
- enum coap_msg_server_err_t {
  COAP_MSG_INT_SERVER_ERR = 0, COAP_MSG_NOT_IMPL = 1, COAP_MSG_BAD_GATEWAY = 2, COAP_MSG_SERV_UNAVAIL = 3,
  COAP_MSG_GATEWAY_TIMEOUT = 4, COAP_MSG_PROXY_NOT_SUP = 5 }

  Server error response code detail enumeration.
- enum coap_msg_op_num_t {
  COAP_MSG_IF_MATCH = 1, COAP_MSG_URI_HOST = 3, COAP_MSG_ETAG = 4, COAP_MSG_IF_NONE_MATCH = 5,
  COAP_MSG_URI_PORT = 7, COAP_MSG_LOCATION_PATH = 8, COAP_MSG_URI_PATH = 11, COAP_MSG_CONTENT_FORMAT = 12,
  COAP_MSG_MAX_AGE = 14, COAP_MSG_URI_QUERY = 15, COAP_MSG_ACCEPT = 17, COAP_MSG_LOCATION_QUERY = 20,
  COAP_MSG_BLOCK2 = 23, COAP_MSG_BLOCK1 = 27, COAP_MSG_SIZE2 = 28, COAP_MSG_PROXY_URI = 35,
  COAP_MSG_PROXY_SCHEME = 39, COAP_MSG_SIZE1 = 60 }

  Option number enumeration.

Functions

- int coap_msg_op_num_is_recognized (unsigned num)

  Check if option is recognized.
- int coap_msg_op_parse_block_val (unsigned ∗num, unsigned ∗more, unsigned ∗size, const char ∗val, unsigned len)

  Parse Block1 or Block2 option value.
- int coap_msg_op_format_block_val (char ∗val, unsigned len, unsigned num, unsigned more, unsigned size)

  Format Block1 or Block2 option value.
- void coap_msg_gen_rand_str (char ∗buf, size_t len)

  Generate a random string of bytes.
- void coap_msg_create (coap_msg_t ∗msg)

  Initialise a message structure.
- void coap_msg_destroy (coap_msg_t ∗msg)

  Deinitialise a message structure.
- void coap_msg_reset (coap_msg_t ∗msg)

  Deinitialise and initialise a message structure.
- unsigned coap_msg_check_critical_ops (coap_msg_t ∗msg)

  Check that all of the critical options in a message are recognized.
- unsigned coap_msg_check_unsafe_ops (coap_msg_t ∗msg)

  Check that all of the unsafe options in a message are recognized.
- int coap_msg_parse_type_msg_id (char ∗buf, size_t len, unsigned ∗type, unsigned ∗msg_id)

  Extract the type and message ID values from a message.

- ssize_t coap_msg_parse (coap_msg_t ∗msg, char ∗buf, size_t len)

    Parse a message.
- int coap_msg_set_type (coap_msg_t ∗msg, unsigned type)

    Set the type in a message.
- int coap_msg_set_code (coap_msg_t ∗msg, unsigned code_class, unsigned code_detail)

    Set the code in a message.
- int coap_msg_set_msg_id (coap_msg_t ∗msg, unsigned msg_id)

    Set the message ID in a message.
- int coap_msg_set_token (coap_msg_t ∗msg, char ∗buf, size_t len)

    Set the token in a message.
- int coap_msg_add_op (coap_msg_t ∗msg, unsigned num, unsigned len, const char ∗val)

    Add a token to a message structure.
- int coap_msg_set_payload (coap_msg_t ∗msg, char ∗buf, size_t len)

    Set the payload in a message.
- ssize_t coap_msg_format (coap_msg_t ∗msg, char ∗buf, size_t len)

    Format a message.
- int coap_msg_copy (coap_msg_t ∗dst, coap_msg_t ∗src)

    Copy a message.
- size_t coap_msg_uri_path_to_str (coap_msg_t ∗msg, char ∗buf, size_t len)

    Convert the URI path in a message to a string representation.

4.4.1 Detailed Description

Include file for the FreeCoAP message parser/formatter library.

4.4.2 Macro Definition Documentation

4.4.2.1 #define coap_msg_get_code_class(*msg*) ((msg)->code_class)

Get the code class from a message

4.4.2.2 #define coap_msg_get_code_detail(*msg*) ((msg)->code_detail)

Get the code detail from a message

4.4.2.3 #define coap_msg_get_first_op(*msg*) ((msg)->op_list.first)

Get the first option from a message

4.4.2.4 #define coap_msg_get_msg_id(*msg*) ((msg)->msg_id)

Get the message ID from message

4.4.2.5 #define coap_msg_get_payload(*msg*) ((msg)->payload)

Get the payload from a message

4.4.2.6 #define coap_msg_get_payload_len(*msg*) ((msg)->payload_len)

Get the payload length from a message

4.4.2.7 #define coap_msg_get_token(*msg*) ((msg)->token)

Get the token from a message

4.4.2.8 #define coap_msg_get_token_len(*msg*) ((msg)->token_len)

Get the token length from a message

4.4.2.9 #define coap_msg_get_type(*msg*) ((msg)->type)

Get the type from a message

4.4.2.10 #define coap_msg_get_ver(*msg*) ((msg)->ver)

Get the version from a message

4.4.2.11 #define coap_msg_is_empty(*msg*) (((msg)->code_class == 0) && ((msg)->code_detail == 0))

Indicate if a message is empty

4.4.2.12 #define COAP_MSG_MAX_BUF_LEN 1152

Maximum buffer length for header and payload

4.4.2.13 #define COAP_MSG_MAX_CODE_CLASS 7

Maximum code class

4.4.2.14 #define COAP_MSG_MAX_CODE_DETAIL 31

Maximum code detail

4.4.2.15 #define COAP_MSG_MAX_MSG_ID ((1 << 16) - 1)

Maximum message ID

4.4.2.16 #define COAP_MSG_MAX_TOKEN_LEN 8

Maximum token length

4.4.2.17 #define coap_msg_op_get_len(*op*) ((op)->len)

Get the option length from an option

4.4.2.18 #define coap_msg_op_get_next(*op*) ((op)->next)

Get the next pointer from an option

4.4.2.19 #define coap_msg_op_get_num(*op*) ((op)->num)

Get the option number from an option

4.4.2.20 #define coap_msg_op_get_val(*op*) ((op)->val)

Get the option value from an option

4.4.2.21 #define COAP_MSG_OP_MAX_BLOCK_SIZE (1 << 10)

Maximum block size for a Block1 or Block2 option

4.4.2.22 #define COAP_MSG_OP_MAX_BLOCK_VAL_LEN 3

Maximum buffer length for a Block1 or Block2 option value

4.4.2.23 #define coap_msg_op_num_is_critical(*num*) ((num) & 1)

Indicate if an option is critical

4.4.2.24 #define coap_msg_op_num_is_unsafe(*num*) ((num) & 2)

Indicate if an option is unsafe to forward

4.4.2.25 #define coap_msg_op_num_no_cache_key(*num*) ((num & 0x1e) == 0x1c)

Indicate if an option is not part of the cache key

4.4.2.26 #define coap_msg_op_set_len(*op,* *len*) ((op)->len = (len))

Set the option length in an option

4.4.2.27 #define coap_msg_op_set_next(*op,* *next_op*) ((op)->next = (next_op))

Set the next pointer in an option

4.4.2.28 #define coap_msg_op_set_num(*op,* *num*) ((op)->num = (num))

Set the option number in an option

4.4.2.29 #define coap_msg_op_set_val(*op,* *val*) ((op)->val = (val))

Set the option value in an option

4.4.2.30 #define COAP_MSG_OP_URI_PATH_MAX_LEN 256

Maximum buffer length for a reconstructed URI path

4.4.2.31 #define COAP_MSG_VER 0x01

CoAP version

4.4.3 Enumeration Type Documentation

4.4.3.1 enum coap_msg_class_t

Code class enumeration.

Enumerator

COAP_MSG_REQ Request

COAP_MSG_SUCCESS Success response

COAP_MSG_CLIENT_ERR Client error response

COAP_MSG_SERVER_ERR Server error response

4.4.3.2 enum coap_msg_client_err_t

Client error response code detail enumeration.

Enumerator

COAP_MSG_BAD_REQ Bad request client error

COAP_MSG_UNAUTHORIZED Unauthorized client error

COAP_MSG_BAD_OPTION Bad option client error

COAP_MSG_FORBIDDEN Forbidden client error

COAP_MSG_NOT_FOUND Not found client error

COAP_MSG_METHOD_NOT_ALLOWED Method not allowed client error

COAP_MSG_NOT_ACCEPTABLE Not acceptable client error

COAP_MSG_INCOMPLETE Request entity incomplete client error

COAP_MSG_PRECOND_FAILED Precondition failed client error

COAP_MSG_REQ_ENT_TOO_LARGE Request entity too large client error

COAP_MSG_UNSUP_CONT_FMT Unsupported content-format client error

4.4.3.3 enum coap_msg_method_t

Request code detail enumeration.

Enumerator

COAP_MSG_GET Get request method

COAP_MSG_POST Post request method

COAP_MSG_PUT Put request method

COAP_MSG_DELETE Delete request method

4.4.3.4 enum coap_msg_op_num_t

Option number enumeration.

Enumerator

COAP_MSG_IF_MATCH If-Match option number

COAP_MSG_URI_HOST URI-Host option number

COAP_MSG_ETAG Entity-Tag option number

COAP_MSG_IF_NONE_MATCH If-None-Match option number

COAP_MSG_URI_PORT URI-Port option number

COAP_MSG_LOCATION_PATH Location-Path option number

COAP_MSG_URI_PATH URI-Path option number

COAP_MSG_CONTENT_FORMAT Content-Format option number

COAP_MSG_MAX_AGE Max-Age option number

COAP_MSG_URI_QUERY URI-Query option number

COAP_MSG_ACCEPT Accept option number

COAP_MSG_LOCATION_QUERY Location-Query option number

COAP_MSG_BLOCK2 Block2 option number

COAP_MSG_BLOCK1 Block1 option number

COAP_MSG_SIZE2 Size2 option number

COAP_MSG_PROXY_URI Proxy-URI option number

COAP_MSG_PROXY_SCHEME Proxy-Scheme option number

COAP_MSG_SIZE1 Size1 option number

4.4.3.5 enum coap_msg_server_err_t

Server error response code detail enumeration.

Enumerator

COAP_MSG_INT_SERVER_ERR Internal server error

COAP_MSG_NOT_IMPL Not implemented server error

COAP_MSG_BAD_GATEWAY Bad gateway server error

COAP_MSG_SERV_UNAVAIL Service unavailable server error

COAP_MSG_GATEWAY_TIMEOUT Gateway timeout server error

COAP_MSG_PROXY_NOT_SUP Proxying not supported server error

4.4.3.6 enum coap_msg_success_t

Success response code detail enumeration.

Enumerator

COAP_MSG_CREATED Created success response

COAP_MSG_DELETED Deleted success response

COAP_MSG_VALID Valid success response

COAP_MSG_CHANGED Changed success response

COAP_MSG_CONTENT Content success response

COAP_MSG_CONTINUE Continue success response

4.4.3.7 enum coap_msg_type_t

Message type enumeration.

Enumerator

COAP_MSG_CON Confirmable message

COAP_MSG_NON Non-confirmable message

COAP_MSG_ACK Acknowledgement message

COAP_MSG_RST Reset message

4.4.4 Function Documentation

4.4.4.1 int coap_msg_add_op (coap_msg_t * *msg,* unsigned *num,* unsigned *len,* const char * *val*)

Add a token to a message structure.

Parameters

in,out	*msg*	Pointer to a message structure
in	*num*	Option number
in	*len*	Option length
in	*val*	Pointer to a buffer containing the option value

Returns

Operation status

Return values

0	Success
<*0*	Error

4.4.4.2 unsigned coap_msg_check_critical_ops (coap_msg_t ∗ *msg*)

Check that all of the critical options in a message are recognized.

Parameters

in	*msg*	Pointer to message structure

Returns

Operation status or bad option number

Return values

0	Success
>*0*	Bad option number

4.4.4.3 unsigned coap_msg_check_unsafe_ops (coap_msg_t ∗ *msg*)

Check that all of the unsafe options in a message are recognized.

Parameters

in	*msg*	Pointer to message structure

Returns

Operation status or bad option number

Return values

0	Success
>0	Bad option number

4.4.4.4 int coap_msg_copy (coap_msg_t ∗ *dst,* coap_msg_t ∗ *src*)

Copy a message.

Parameters

`in,out`	*dst*	Pointer to the destination message structure
`in`	*src*	Pointer to the source message structure

Returns

Operation status

Return values

0	Success
<0	Error

4.4.4.5 void coap_msg_create (coap_msg_t ∗ *msg*)

Initialise a message structure.

Parameters

`out`	*msg*	Pointer to a message structure

4.4.4.6 void coap_msg_destroy (coap_msg_t ∗ *msg*)

Deinitialise a message structure.

Parameters

`in,out`	*msg*	Pointer to a message structure

4.4.4.7 ssize_t coap_msg_format (coap_msg_t ∗ *msg,* char ∗ *buf,* size_t *len*)

Format a message.

Parameters

in	*msg*	Pointer to a message structure
out	*buf*	Pointer to a buffer to contain the formatted message
in	*len*	Length of the buffer

Returns

Length of the formatted message or error code

Return values

>*0*	Length of the formatted message
<*0*	Error

4.4.4.8 void coap_msg_gen_rand_str (char * *buf,* size_t *len*)

Generate a random string of bytes.

Parameters

out	*buf*	Pointer to the buffer to store the random string
in	*len*	Length of the buffer

4.4.4.9 int coap_msg_op_format_block_val (char * *val,* unsigned *len,* unsigned *num,* unsigned *more,* unsigned *size*)

Format Block1 or Block2 option value.

Parameters

out	*val*	Pointer to option value
in	*len*	Length of option value
in	*num*	Block number
in	*more*	More value
in	*size*	Block size

Returns

Length of the formatted option value or error code

Return values

>*0*	Length of the formatted option value
<*0*	Error

4.4.4.10 int coap_msg_op_num_is_recognized (unsigned *num*)

Check if option is recognized.

Parameters

in	*num*	Option number

Returns

Operation status

Return values

1	Option is recognized
0	Option is not recognized

4.4.4.11 int coap_msg_op_parse_block_val (unsigned ∗ *num,* unsigned ∗ *more,* unsigned ∗ *size,* const char ∗ *val,* unsigned *len*)

Parse Block1 or Block2 option value.

Parameters

out	*num*	Pointer to Block number
out	*more*	Pointer to More value
out	*size*	Pointer to Block size
in	*val*	Pointer to the option value
in	*len*	Option length

Returns

Operation status

Return values

0	Success
<*0*	Error

4.4.4.12 ssize_t coap_msg_parse (coap_msg_t ∗ *msg,* char ∗ *buf,* size_t *len*)

Parse a message.

Parameters

in,out	*msg*	Pointer to a message structure

Parameters

in	*buf*	Pointer to a buffer containing the message
in	*len*	Length of the buffer

Returns

Operation status

Return values

0	Success
<*0*	Error

4.4.4.13 int coap_msg_parse_type_msg_id (char ∗ *buf,* size_t *len,* unsigned ∗ *type,* unsigned ∗ *msg_id*)

Extract the type and message ID values from a message.

If a message contains a format error, this function will attempt to extract the type and message ID so that a reset message can be returned to the sender.

Parameters

in	*buf*	Pointer to a buffer containing the message
in	*len*	Length of the buffer
out	*type*	Pointer to field to store the type value
out	*msg←_id*	Pointer to a field to store the message ID value

Returns

Operation status

Return values

0	Success
<*0*	Error

4.4.4.14 void coap_msg_reset (coap_msg_t ∗ *msg*)

Deinitialise and initialise a message structure.

Parameters

in,out	*msg*	Pointer to a message structure

4.4.4.15 int coap_msg_set_code (coap_msg_t ∗ *msg,* unsigned *code_class,* unsigned *code_detail*)

Set the code in a message.

Parameters

out	*msg*	Pointer to a message structure
in	*code_class*	Code class
in	*code_detail*	Code detail

Returns

Operation status

Return values

0	Success
<*0*	Error

4.4.4.16 int coap_msg_set_msg_id (coap_msg_t ∗ *msg,* unsigned *msg_id*)

Set the message ID in a message.

Parameters

out	*msg*	Pointer to a message structure
in	*msg_id*	Message ID

Returns

Operation status

Return values

0	Success
<*0*	Error

4.4.4.17 int coap_msg_set_payload (coap_msg_t ∗ *msg,* char ∗ *buf,* size_t *len*)

Set the payload in a message.

Free the buffer in the message structure containing the current payload if there is one, allocate a buffer to contain the new payload and copy the buffer argument into the new payload buffer.

Parameters

in,out	*msg*	Pointer to a message structure
in	*buf*	Pointer to a buffer containing the payload
in	*len*	Length of the buffer

Returns

Operation status

Return values

0	Success
<*0*	Error

4.4.4.18 int coap_msg_set_token (coap_msg_t ∗ *msg,* char ∗ *buf,* size_t *len*)

Set the token in a message.

Parameters

out	*msg*	Pointer to a message structure
in	*buf*	Pointer to a buffer containing the token
in	*len*	Length of the buffer

Returns

Operation status

Return values

0	Success
<*0*	Error

4.4.4.19 int coap_msg_set_type (coap_msg_t ∗ *msg,* unsigned *type*)

Set the type in a message.

Parameters

out	*msg*	Pointer to a message structure
in	*type*	Message type

Returns

Operation status

Return values

0	Success
<*0*	Error

4.4.4.20 size_t coap_msg_uri_path_to_str (coap_msg_t ∗ *msg*, char ∗ *buf*, size_t *len*)

Convert the URI path in a message to a string representation.

Parameters

in	*msg*	Pointer to a message structure
out	*buf*	Pointer to a buffer to hold the string
in	*len*	Length of the buffer

Returns

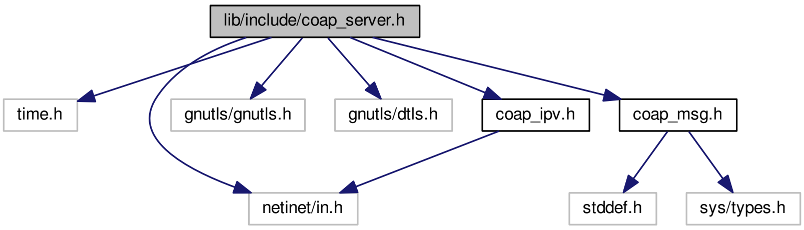
The number of bytes that would be written to the buffer it was large enough

4.5 lib/include/coap_server.h File Reference

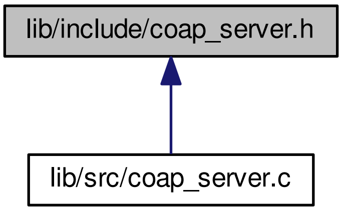
Include file for the FreeCoAP server library.

```
#include <time.h>
#include <netinet/in.h>
#include <gnutls/gnutls.h>
#include <gnutls/dtls.h>
#include "coap_msg.h"
#include "coap_ipv.h"
```

Include dependency graph for coap_server.h:



This graph shows which files directly or indirectly include this file:



Classes

- struct coap_server_path

  URI path structure.
- struct coap_server_path_list_t

  URI path list structure.
- struct coap_server_trans

  Transaction structure.
- struct coap_server

  Server structure.

Macros

- #define COAP_SERVER_NUM_TRANS 8
- #define COAP_SERVER_ADDR_BUF_LEN 128
- #define COAP_SERVER_DIAG_PAYLOAD_LEN 128
- #define coap_server_trans_get_req(tran) (&(trans)->req)
- #define coap_server_trans_get_resp(tran) (&(trans)->resp)

Typedefs

- typedef int(∗ coap_server_handler_t) (struct coap_server_trans ∗, coap_msg_t ∗, coap_msg_t ∗)

  Server handler callback function pointer.
- typedef struct coap_server_path coap_server_path_t

  URI path structure.
- typedef struct coap_server_trans coap_server_trans_t

  Transaction structure.
- typedef struct coap_server coap_server_t

  Server structure.

Enumerations

- enum coap_server_resp_t { COAP_SERVER_PIGGYBACKED = 0, COAP_SERVER_SEPARATE = 1 }

  Response type enumeration.

Functions

- int coap_server_create (coap_server_t ∗server, coap_server_handler_t handle, const char ∗host, const char ∗port, const char ∗key_file_name, const char ∗cert_file_name, const char ∗trust_file_name, const char ∗crl←_file_name)

  Initialise a server structure.
- void coap_server_destroy (coap_server_t ∗server)

  Deinitialise a server structure.
- unsigned coap_server_get_next_msg_id (coap_server_t ∗server)

  Get a new message ID value.
- int coap_server_add_sep_resp_uri_path (coap_server_t ∗server, const char ∗str)

  Register a URI path that requires a separate response.
- int coap_server_run (coap_server_t ∗server)

  Run the server.

4.5.1 Detailed Description

Include file for the FreeCoAP server library.

4.5.2 Macro Definition Documentation

4.5.2.1 #define COAP_SERVER_ADDR_BUF_LEN 128

Buffer length for host addresses

4.5.2.2 #define COAP_SERVER_DIAG_PAYLOAD_LEN 128

Buffer length for diagnostic payloads

4.5.2.3 #define COAP_SERVER_NUM_TRANS 8

Maximum number of active transactions per server

4.5.2.4 #define coap_server_trans_get_req(*tran*) (&(trans)->req)

Get the last request message received for this transaction

4.5.2.5 #define coap_server_trans_get_resp(*tran*) (&(trans)->resp)

Get the last response message sent for this transaction

4.5.3 Enumeration Type Documentation

4.5.3.1 enum coap_server_resp_t

Response type enumeration.

Enumerator

COAP_SERVER_PIGGYBACKED Piggybacked response

COAP_SERVER_SEPARATE Separate response

4.5.4 Function Documentation

4.5.4.1 int coap_server_add_sep_resp_uri_path (coap_server_t * *server,* const char * *str*)

Register a URI path that requires a separate response.

Parameters

`in,out`	*server*	Pointer to a server structure
`in`	*str*	String representation of a URI path

Returns

Operation status

Return values

0	Success
<*0*	Error

4.5.4.2 int coap_server_create (coap_server_t * *server,* coap_server_handler_t *handle,* const char * *host,* const char * *port,* const char * *key_file_name,* const char * *cert_file_name,* const char * *trust_file_name,* const char * *crl_file_name*)

Initialise a server structure.

Parameters

`out`	*server*	Pointer to a server structure
`in`	*handle*	Call-back function to handle client requests
`in`	*host*	Pointer to a string containing the host address of the server
`in`	*port*	Port number of the server
`in`	*key_file_name*	String containing the DTLS key file name
`in`	*cert_file_name*	String containing the DTLS certificate file name
`in`	*trust_file_name*	String containing the DTLS trust file name
`in`	*crl_file_name*	String containing the DTLS certificate revocation list file name

Returns

Operation status

Return values

0	Success
<0	Error

4.5.4.3 void coap_server_destroy (coap_server_t * *server*)

Deinitialise a server structure.

Parameters

`in,out`	*server*	Pointer to a server structure

4.5.4.4 unsigned coap_server_get_next_msg_id (coap_server_t * *server*)

Get a new message ID value.

Parameters

`in,out`	*server*	Pointer to a server structure

Returns

message ID value

4.5.4.5 int coap_server_run (coap_server_t * *server*)

Run the server.

Listen for incoming requests. For each request received, call the handle call-back function in the server structure and send the response to the client.

Parameters

`in,out`	*server*	Pointer to a server structure

Returns

Operation status

Return values

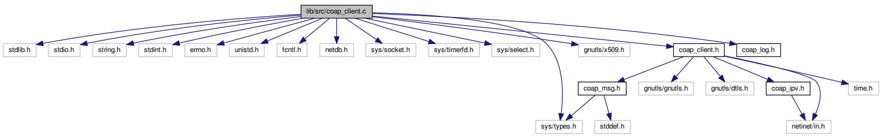
0	Success
<*0*	Error

4.6 lib/src/coap_client.c File Reference

Source file for the FreeCoAP client library.

```
#include <stdlib.h>
#include <stdio.h>
#include <string.h>
#include <stdint.h>
#include <errno.h>
#include <unistd.h>
#include <fcntl.h>
#include <netdb.h>
#include <sys/socket.h>
#include <sys/timerfd.h>
#include <sys/select.h>
#include <sys/types.h>
#include <gnutls/x509.h>
#include "coap_client.h"
#include "coap_log.h"
```

Include dependency graph for coap_client.c:



Macros

- #define COAP_CLIENT_ACK_TIMEOUT_SEC 2
- #define COAP_CLIENT_MAX_RETRANSMIT 4
- #define COAP_CLIENT_RESP_TIMEOUT_SEC 30
- #define COAP_CLIENT_DTLS_MTU COAP_MSG_MAX_BUF_LEN
- #define COAP_CLIENT_DTLS_RETRANS_TIMEOUT 1000
- #define COAP_CLIENT_DTLS_TOTAL_TIMEOUT 60000
- #define COAP_CLIENT_DTLS_HANDSHAKE_ATTEMPTS 60
- #define COAP_CLIENT_DTLS_PRIORITIES "PERFORMANCE:-VERS-TLS-ALL:+VERS-DTLS1.0:%SE↩ RVER_PRECEDENCE"

Functions

- int coap_client_create (coap_client_t ∗client, const char ∗host, const char ∗port, const char ∗key_file_name, const char ∗cert_file_name, const char ∗trust_file_name, const char ∗crl_file_name, const char ∗common↩ _name)

  Initialise a client structure.
- void coap_client_destroy (coap_client_t ∗client)

  Deinitialise a client structure.
- int coap_client_exchange (coap_client_t ∗client, coap_msg_t ∗req, coap_msg_t ∗resp)

  Send a request to the server and receive the response.

4.6.1 Detailed Description

Source file for the FreeCoAP client library.

4.6.2 Macro Definition Documentation

4.6.2.1 #define COAP_CLIENT_ACK_TIMEOUT_SEC 2

Minimum delay to wait before retransmitting a confirmable message

4.6.2.2 #define COAP_CLIENT_DTLS_HANDSHAKE_ATTEMPTS 60

Maximum number of DTLS handshake attempts

4.6.2.3 #define COAP_CLIENT_DTLS_MTU COAP_MSG_MAX_BUF_LEN

Maximum transmission unit excluding the UDP and IPv6 headers

4.6.2.4 #define COAP_CLIENT_DTLS_PRIORITIES "PERFORMANCE:-VERS-TLS-ALL:+VERS-DTLS1.0:%SERVER_PRECEDENCE"

DTLS priorities

4.6.2.5 #define COAP_CLIENT_DTLS_RETRANS_TIMEOUT 1000

Retransmission timeout (msec) for the DTLS handshake

4.6.2.6 #define COAP_CLIENT_DTLS_TOTAL_TIMEOUT 60000

Total timeout (msec) for the DTLS handshake

4.6.2.7 #define COAP_CLIENT_MAX_RETRANSMIT 4

Maximum number of times a confirmable message can be retransmitted

4.6.2.8 #define COAP_CLIENT_RESP_TIMEOUT_SEC 30

Maximum amount of time to wait for a response

4.6.3 Function Documentation

4.6.3.1 int coap_client_create (coap_client_t ∗ *client*, const char ∗ *host*, const char ∗ *port*, const char ∗ *key_file_name*, const char ∗ *cert_file_name*, const char ∗ *trust_file_name*, const char ∗ *crl_file_name*, const char ∗ *common_name*)

Initialise a client structure.

Parameters

out	*client*	Pointer to a client structure
in	*host*	Pointer to a string containing the host address of the server
in	*port*	Port number of the server
in	*key_file_name*	String containing the DTLS key file name
in	*cert_file_name*	String containing the DTLS certificate file name
in	*trust_file_name*	String containing the DTLS trust file name
in	*crls_file_name*	String containing the DTLS certificate revocation list file name
in	*common_name*	String containing the common name of the server

Returns

Operation status

Return values

0	Success
<*0*	Error

4.6.3.2 void coap_client_destroy (coap_client_t ∗ *client*)

Deinitialise a client structure.

Parameters

in,out	*client*	Pointer to a client structure

4.6.3.3 int coap_client_exchange (coap_client_t ∗ *client,* coap_msg_t ∗ *req,* coap_msg_t ∗ *resp*)

Send a request to the server and receive the response.

This function sets the message ID and token fields of the request message overriding any values set by the calling function.

Parameters

in,out	*client*	Pointer to a client structure
in	*req*	Pointer to the request message
out	*resp*	Pointer to the response message

Returns

Operation status

Return values

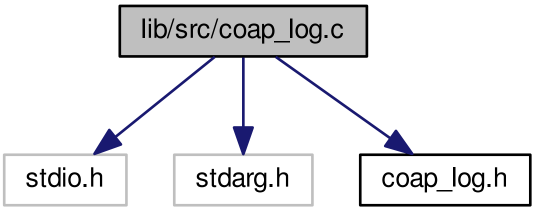
0	Success
<*0*	Error

4.7 lib/src/coap_log.c File Reference

Source file for the FreeCoAP logging module.

```
#include <stdio.h>
#include <stdarg.h>
#include "coap_log.h"
```

Include dependency graph for coap_log.c:



Functions

- void coap_log_set_level (coap_log_level_t level)

  Set the log level.
- coap_log_level_t coap_log_get_level (void)

  Get the log level.
- void coap_log_error (const char ∗msg,...)

  Log an error message.
- void coap_log_warn (const char ∗msg,...)

  Log a warning message.
- void coap_log_notice (const char ∗msg,...)

  Log an notice message.
- void coap_log_info (const char ∗msg,...)

  Log an info message.
- void coap_log_debug (const char ∗msg,...)

  Log a debug message.

4.7.1 Detailed Description

Source file for the FreeCoAP logging module.

4.7.2 Function Documentation

4.7.2.1 void coap_log_debug (const char ∗ *msg,* *...*)

Log a debug message.

Parameters

in	*msg*	String containing format specifiers
in	...	arguments for the format specifiers

4.7.2.2 void coap_log_error (const char ∗ *msg,* *...*)

Log an error message.

Parameters

in	*msg*	String containing format specifiers
in	...	arguments for the format specifiers

4.7.2.3 coap_log_level_t coap_log_get_level (void)

Get the log level.

Returns

The current log level

4.7.2.4 void coap_log_info (const char ∗ *msg,* *...*)

Log an info message.

Parameters

in	*msg*	String containing format specifiers
in	...	arguments for the format specifiers

4.7.2.5 void coap_log_notice (const char ∗ *msg,* *...*)

Log an notice message.

Parameters

in	*msg*	String containing format specifiers
in	...	arguments for the format specifiers

4.7.2.6 void coap_log_set_level (coap_log_level_t *level*)

Set the log level.

Messages with a severity below this level will be filtered. Error messages cannot be filtered.

Parameters

in	*level*	The new log level

< Warning log level

< Notice warning level

< Informational warning level

< Debug warning level

4.7.2.7 void coap_log_warn (const char ∗ *msg,* *...*)

Log a warning message.

Parameters

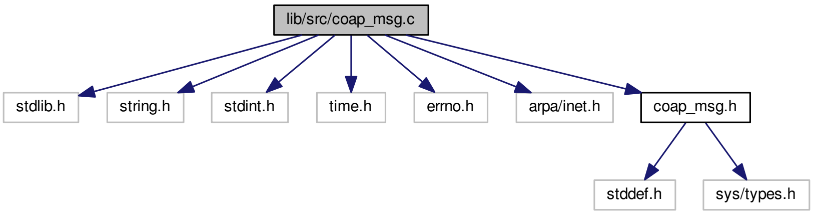
in	*msg*	String containing format specifiers
in	*...*	arguments for the format specifiers

4.8 lib/src/coap_msg.c File Reference

Source file for the FreeCoAP message parser/formatter library.

```
#include <stdlib.h>
#include <string.h>
#include <stdint.h>
#include <time.h>
#include <errno.h>
#include <arpa/inet.h>
#include "coap_msg.h"
```

Include dependency graph for coap_msg.c:



Macros

- #define coap_msg_op_list_get_first(list) ((list)->first)
- #define coap_msg_op_list_get_last(list) ((list)->last)
- #define coap_msg_op_list_is_empty(list) ((list)->first == NULL)

Functions

- void coap_msg_gen_rand_str (char ∗buf, size_t len)

  Generate a random string of bytes.
- int coap_msg_op_num_is_recognized (unsigned num)

  Check if option is recognized.
- int coap_msg_op_parse_block_val (unsigned ∗num, unsigned ∗more, unsigned ∗size, const char ∗val, unsigned len)

  Parse Block1 or Block2 option value.
- int coap_msg_op_format_block_val (char ∗val, unsigned len, unsigned num, unsigned more, unsigned size)

  Format Block1 or Block2 option value.
- void coap_msg_create (coap_msg_t ∗msg)

  Initialise a message structure.
- void coap_msg_destroy (coap_msg_t ∗msg)

  Deinitialise a message structure.
- void coap_msg_reset (coap_msg_t ∗msg)

  Deinitialise and initialise a message structure.
- unsigned coap_msg_check_critical_ops (coap_msg_t ∗msg)

  Check that all of the critical options in a message are recognized.
- unsigned coap_msg_check_unsafe_ops (coap_msg_t ∗msg)

  Check that all of the unsafe options in a message are recognized.
- int coap_msg_parse_type_msg_id (char ∗buf, size_t len, unsigned ∗type, unsigned ∗msg_id)

  Extract the type and message ID values from a message.
- ssize_t coap_msg_parse (coap_msg_t ∗msg, char ∗buf, size_t len)

  Parse a message.
- int coap_msg_set_type (coap_msg_t ∗msg, unsigned type)

  Set the type in a message.
- int coap_msg_set_code (coap_msg_t ∗msg, unsigned code_class, unsigned code_detail)

  Set the code in a message.
- int coap_msg_set_msg_id (coap_msg_t ∗msg, unsigned msg_id)

  Set the message ID in a message.
- int coap_msg_set_token (coap_msg_t ∗msg, char ∗buf, size_t len)

  Set the token in a message.
- int coap_msg_add_op (coap_msg_t ∗msg, unsigned num, unsigned len, const char ∗val)

  Add a token to a message structure.
- int coap_msg_set_payload (coap_msg_t ∗msg, char ∗buf, size_t len)

  Set the payload in a message.
- ssize_t coap_msg_format (coap_msg_t ∗msg, char ∗buf, size_t len)

  Format a message.
- int coap_msg_copy (coap_msg_t ∗dst, coap_msg_t ∗src)

  Copy a message.
- size_t coap_msg_uri_path_to_str (coap_msg_t ∗msg, char ∗buf, size_t len)

  Convert the URI path in a message to a string representation.

4.8.1 Detailed Description

Source file for the FreeCoAP message parser/formatter library.

4.8.2 Macro Definition Documentation

4.8.2.1 #define coap_msg_op_list_get_first(*list*) ((list)->first)

Get the first option from an option linked-list

4.8.2.2 #define coap_msg_op_list_get_last(*list*) ((list)->last)

Get the last option in an option linked-list

4.8.2.3 #define coap_msg_op_list_is_empty(*list*) ((list)->first == NULL)

Indicate whether or not an option linked-list is empty

4.8.3 Function Documentation

4.8.3.1 int coap_msg_add_op (coap_msg_t ∗ *msg,* unsigned *num,* unsigned *len,* const char ∗ *val*)

Add a token to a message structure.

Parameters

`in,out`	*msg*	Pointer to a message structure
`in`	*num*	Option number
`in`	*len*	Option length
`in`	*val*	Pointer to a buffer containing the option value

Returns

Operation status

Return values

0	Success
<*0*	Error

4.8.3.2 unsigned coap_msg_check_critical_ops (coap_msg_t ∗ *msg*)

Check that all of the critical options in a message are recognized.

Parameters

in	*msg*	Pointer to message structure

Returns

Operation status or bad option number

Return values

0	Success
>*0*	Bad option number

4.8.3.3 unsigned coap_msg_check_unsafe_ops (**coap_msg_t** ∗ *msg*)

Check that all of the unsafe options in a message are recognized.

Parameters

in	*msg*	Pointer to message structure

Returns

Operation status or bad option number

Return values

0	Success
>*0*	Bad option number

4.8.3.4 int coap_msg_copy (**coap_msg_t** ∗ *dst,* **coap_msg_t** ∗ *src*)

Copy a message.

Parameters

in,out	*dst*	Pointer to the destination message structure
in	*src*	Pointer to the source message structure

Returns

Operation status

Return values

0	Success
<*0*	Error

4.8.3.5 void coap_msg_create (coap_msg_t ∗ *msg*)

Initialise a message structure.

Parameters

`out`	*msg*	Pointer to a message structure

4.8.3.6 void coap_msg_destroy (coap_msg_t ∗ *msg*)

Deinitialise a message structure.

Parameters

`in,out`	*msg*	Pointer to a message structure

4.8.3.7 ssize_t coap_msg_format (coap_msg_t ∗ *msg,* char ∗ *buf,* size_t *len*)

Format a message.

Parameters

`in`	*msg*	Pointer to a message structure
`out`	*buf*	Pointer to a buffer to contain the formatted message
`in`	*len*	Length of the buffer

Returns

Length of the formatted message or error code

Return values

>*0*	Length of the formatted message
<*0*	Error

4.8.3.8 void coap_msg_gen_rand_str (char ∗ *buf,* size_t *len*)

Generate a random string of bytes.

Parameters

out	*buf*	Pointer to the buffer to store the random string
in	*len*	Length of the buffer

4.8.3.9 int coap_msg_op_format_block_val (char ∗ *val,* unsigned *len,* unsigned *num,* unsigned *more,* unsigned *size*)

Format Block1 or Block2 option value.

Parameters

out	*val*	Pointer to option value
in	*len*	Length of option value
in	*num*	Block number
in	*more*	More value
in	*size*	Block size

Returns

Length of the formatted option value or error code

Return values

>*0*	Length of the formatted option value
<*0*	Error

4.8.3.10 int coap_msg_op_num_is_recognized (unsigned *num*)

Check if option is recognized.

Parameters

in	*num*	Option number

Returns

Operation status

Return values

1	Option is recognized
0	Option is not recognized

4.8.3.11 int coap_msg_op_parse_block_val (unsigned ∗ *num*, unsigned ∗ *more*, unsigned ∗ *size*, const char ∗ *val*, unsigned *len*)

Parse Block1 or Block2 option value.

Parameters

out	*num*	Pointer to Block number
out	*more*	Pointer to More value
out	*size*	Pointer to Block size
in	*val*	Pointer to the option value
in	*len*	Option length

Returns

Operation status

Return values

0	Success
<*0*	Error

4.8.3.12 ssize_t coap_msg_parse (coap_msg_t ∗ *msg*, char ∗ *buf*, size_t *len*)

Parse a message.

Parameters

in,out	*msg*	Pointer to a message structure
in	*buf*	Pointer to a buffer containing the message
in	*len*	Length of the buffer

Returns

Operation status

Return values

0	Success
<*0*	Error

4.8.3.13 int coap_msg_parse_type_msg_id (char ∗ *buf*, size_t *len*, unsigned ∗ *type*, unsigned ∗ *msg_id*)

Extract the type and message ID values from a message.

If a message contains a format error, this function will attempt to extract the type and message ID so that a reset message can be returned to the sender.

Parameters

in	*buf*	Pointer to a buffer containing the message
in	*len*	Length of the buffer
out	*type*	Pointer to field to store the type value
out	*msg↩ _id*	Pointer to a field to store the message ID value

Returns

Operation status

Return values

0	Success
<*0*	Error

4.8.3.14 void coap_msg_reset (coap_msg_t ∗ *msg*)

Deinitialise and initialise a message structure.

Parameters

in,out	*msg*	Pointer to a message structure

4.8.3.15 int coap_msg_set_code (coap_msg_t ∗ *msg,* unsigned *code_class,* unsigned *code_detail*)

Set the code in a message.

Parameters

out	*msg*	Pointer to a message structure
in	*code_class*	Code class
in	*code_detail*	Code detail

Returns

Operation status

Return values

0	Success
<*0*	Error

4.8.3.16 int coap_msg_set_msg_id (coap_msg_t ∗ *msg*, unsigned *msg_id*)

Set the message ID in a message.

Parameters

`out`	*msg*	Pointer to a message structure
`in`	*msg↩ _id*	Message ID

Returns

Operation status

Return values

0	Success
<*0*	Error

4.8.3.17 int coap_msg_set_payload (coap_msg_t ∗ *msg*, char ∗ *buf*, size_t *len*)

Set the payload in a message.

Free the buffer in the message structure containing the current payload if there is one, allocate a buffer to contain the new payload and copy the buffer argument into the new payload buffer.

Parameters

`in,out`	*msg*	Pointer to a message structure
`in`	*buf*	Pointer to a buffer containing the payload
`in`	*len*	Length of the buffer

Returns

Operation status

Return values

0	Success
<*0*	Error

4.8.3.18 int coap_msg_set_token (coap_msg_t ∗ *msg*, char ∗ *buf*, size_t *len*)

Set the token in a message.

Parameters

out	*msg*	Pointer to a message structure
in	*buf*	Pointer to a buffer containing the token
in	*len*	Length of the buffer

Returns

Operation status

Return values

0	Success
<*0*	Error

4.8.3.19 int coap_msg_set_type (coap_msg_t * *msg*, unsigned *type*)

Set the type in a message.

Parameters

out	*msg*	Pointer to a message structure
in	*type*	Message type

Returns

Operation status

Return values

0	Success
<*0*	Error

4.8.3.20 size_t coap_msg_uri_path_to_str (coap_msg_t * *msg*, char * *buf*, size_t *len*)

Convert the URI path in a message to a string representation.

Parameters

in	*msg*	Pointer to a message structure
out	*buf*	Pointer to a buffer to hold the string
in	*len*	Length of the buffer

Returns

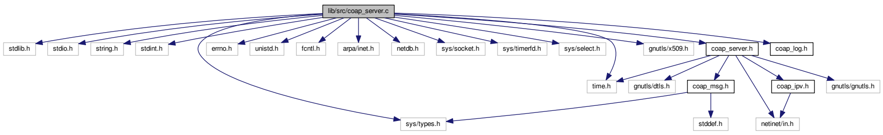
The number of bytes that would be written to the buffer it was large enough

4.9 lib/src/coap_server.c File Reference

Source file for the FreeCoAP server library.

```
#include <stdlib.h>
#include <stdio.h>
#include <string.h>
#include <stdint.h>
#include <time.h>
#include <errno.h>
#include <unistd.h>
#include <fcntl.h>
#include <arpa/inet.h>
#include <netdb.h>
#include <sys/socket.h>
#include <sys/timerfd.h>
#include <sys/select.h>
#include <sys/types.h>
#include <gnutls/x509.h>
#include "coap_server.h"
#include "coap_log.h"
```

Include dependency graph for coap_server.c:



Macros

- #define COAP_SERVER_ACK_TIMEOUT_SEC 2
- #define COAP_SERVER_MAX_RETRANSMIT 4
- #define COAP_SERVER_DTLS_MTU COAP_MSG_MAX_BUF_LEN
- #define COAP_SERVER_DTLS_RETRANS_TIMEOUT 1000
- #define COAP_SERVER_DTLS_TOTAL_TIMEOUT 60000
- #define COAP_SERVER_DTLS_HANDSHAKE_ATTEMPTS 60
- #define COAP_SERVER_DTLS_NUM_DH_BITS 1024
- #define COAP_SERVER_DTLS_PRIORITIES "PERFORMANCE:-VERS-TLS-ALL:+VERS-DTLS1.0:%SERVER_PRECEDENCE"

Functions

- int coap_server_create (coap_server_t ∗server, coap_server_handler_t handle, const char ∗host, const char ∗port, const char ∗key_file_name, const char ∗cert_file_name, const char ∗trust_file_name, const char ∗crl_file_name)

  Initialise a server structure.

- void coap_server_destroy (coap_server_t ∗server)

  Deinitialise a server structure.
- unsigned coap_server_get_next_msg_id (coap_server_t ∗server)

  Get a new message ID value.
- int coap_server_add_sep_resp_uri_path (coap_server_t ∗server, const char ∗str)

  Register a URI path that requires a separate response.
- int coap_server_run (coap_server_t ∗server)

  Run the server.

4.9.1 Detailed Description

Source file for the FreeCoAP server library.

4.9.2 Macro Definition Documentation

4.9.2.1 #define COAP_SERVER_ACK_TIMEOUT_SEC 2

Minimum delay to wait before retransmitting a confirmable message

4.9.2.2 #define COAP_SERVER_DTLS_HANDSHAKE_ATTEMPTS 60

Maximum number of DTLS handshake attempts

4.9.2.3 #define COAP_SERVER_DTLS_MTU COAP_MSG_MAX_BUF_LEN

Maximum transmission unit excluding the UDP and IPv6 headers

4.9.2.4 #define COAP_SERVER_DTLS_NUM_DH_BITS 1024

DTLS Diffie-Hellman key size

4.9.2.5 #define COAP_SERVER_DTLS_PRIORITIES "PERFORMANCE:-VERS-TLS-ALL:+VERS-DTLS1.0:%SERVER_PRECEDE←NCE"

DTLS priorities

4.9.2.6 #define COAP_SERVER_DTLS_RETRANS_TIMEOUT 1000

Retransmission timeout (msec) for the DTLS handshake

4.9.2.7 #define COAP_SERVER_DTLS_TOTAL_TIMEOUT 60000

Total timeout (msec) for the DTLS handshake

4.9.2.8 #define COAP_SERVER_MAX_RETRANSMIT 4

Maximum number of times a confirmable message can be retransmitted

4.9.3 Function Documentation

4.9.3.1 int coap_server_add_sep_resp_uri_path (coap_server_t ∗ *server,* const char ∗ *str*)

Register a URI path that requires a separate response.

Parameters

in,out	*server*	Pointer to a server structure
in	*str*	String representation of a URI path

Returns

Operation status

Return values

0	Success
<*0*	Error

4.9.3.2 int coap_server_create (coap_server_t ∗ *server,* coap_server_handler_t *handle,* const char ∗ *host,* const char ∗ *port,* const char ∗ *key_file_name,* const char ∗ *cert_file_name,* const char ∗ *trust_file_name,* const char ∗ *crl_file_name*)

Initialise a server structure.

Parameters

out	*server*	Pointer to a server structure
in	*handle*	Call-back function to handle client requests
in	*host*	Pointer to a string containing the host address of the server
in	*port*	Port number of the server
in	*key_file_name*	String containing the DTLS key file name
in	*cert_file_name*	String containing the DTLS certificate file name
in	*trust_file_name*	String containing the DTLS trust file name
in	*crl_file_name*	String containing the DTLS certificate revocation list file name

Returns

Operation status

Return values

0	Success
$<$*0*	Error

4.9.3.3 void coap_server_destroy (coap_server_t ∗ *server*)

Deinitialise a server structure.

Parameters

in,out	*server*	Pointer to a server structure

4.9.3.4 unsigned coap_server_get_next_msg_id (coap_server_t ∗ *server*)

Get a new message ID value.

Parameters

in,out	*server*	Pointer to a server structure

Returns

message ID value

4.9.3.5 int coap_server_run (coap_server_t ∗ *server*)

Run the server.

Listen for incoming requests. For each request received, call the handle call-back function in the server structure and send the response to the client.

Parameters

in,out	*server*	Pointer to a server structure

Returns

Operation status

Return values

0	Success
$<$*0*	Error

Index