FreeCoAP

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Contents

1 Class Index 1

1.1 Class List 1

2 File Index 3

2.1 File List 3

3 Class Documentation 5

3.1 coap_client_t Struct Reference 5

3.1.1 Detailed Description 5

3.1.2 Member Data Documentation 5

3.1.2.1 cred 5

3.1.2.2 num_retrans 5

3.1.2.3 priority 5

3.1.2.4 sd 6

3.1.2.5 server_host 6

3.1.2.6 server_port 6

3.1.2.7 server_sin 6

3.1.2.8 server_sin_len 6

3.1.2.9 session 6

3.1.2.10 timeout 6

3.1.2.11 timer_fd 6

3.2 coap_msg_op Struct Reference 6

3.2.1 Detailed Description 7

3.2.2 Member Data Documentation 7

3.2.2.1 len 7

3.2.2.2 next 7

3.2.2.3 num 7

3.2.2.4 val 7

3.3 coap_msg_op_list_t Struct Reference 7

3.3.1 Detailed Description 8

3.3.2 Member Data Documentation 8

3.3.2.1 first 8

3.3.2.2 last 8
3.4 coap_msg_t Struct Reference 8
3.4.1 Detailed Description 9
3.4.2 Member Data Documentation 9
3.4.2.1 code_class 9
3.4.2.2 code_detail 9
3.4.2.3 msg_id 9
3.4.2.4 op_list 10
3.4.2.5 payload 10
3.4.2.6 payload_len 10
3.4.2.7 token 10
3.4.2.8 token_len 10
3.4.2.9 type 10
3.4.2.10 ver 10
3.5 coap_server Struct Reference 10
3.5.1 Detailed Description 11
3.5.2 Member Data Documentation 11
3.5.2.1 cred 11
3.5.2.2 dh_params 11
3.5.2.3 handle 12
3.5.2.4 msg_id 12
3.5.2.5 priority 12
3.5.2.6 sd 12
3.5.2.7 sep_list 12
3.5.2.8 trans 12
3.6 coap_server_path Struct Reference 12
3.6.1 Detailed Description 13
3.6.2 Member Data Documentation 13
3.6.2.1 next 13
3.6.2.2 str 13
3.7 coap_server_path_list_t Struct Reference 13
3.7.1 Detailed Description 13
3.7.2 Member Data Documentation 14
3.7.2.1 first 14
3.7.2.2 last 14
3.8 coap_server_trans Struct Reference 14
3.8.1 Detailed Description 15
3.8.2 Member Data Documentation 15
3.8.2.1 active 15
3.8.2.2 client_addr 15

3.8.2.3 client_sin 15
3.8.2.4 client_sin_len 15
3.8.2.5 last_use 15
3.8.2.6 num_retrans 15
3.8.2.7 req 15
3.8.2.8 resp 16
3.8.2.9 server 16
3.8.2.10 session 16
3.8.2.11 timeout 16
3.8.2.12 timer_fd 16

4 File Documentation 17

4.1 lib/include/coap_client.h File Reference 17
4.1.1 Detailed Description 18
4.1.2 Macro Definition Documentation 18
4.1.2.1 COAP_CLIENT_HOST_BUF_LEN 18
4.1.2.2 COAP_CLIENT_PORT_BUF_LEN 18
4.1.3 Function Documentation 18
4.1.3.1 coap_client_create 18
4.1.3.2 coap_client_destroy 19
4.1.3.3 coap_client_exchange 19
4.2 lib/include/coap_log.h File Reference 19
4.2.1 Detailed Description 20
4.2.2 Macro Definition Documentation 20
4.2.2.1 COAP_LOG_DEF_LEVEL 20
4.2.3 Enumeration Type Documentation 21
4.2.3.1 coap_log_level_t 21
4.2.4 Function Documentation 21
4.2.4.1 coap_log_debug 21
4.2.4.2 coap_log_error 21
4.2.4.3 coap_log_get_level 21
4.2.4.4 coap_log_info 21
4.2.4.5 coap_log_notice 21
4.2.4.6 coap_log_set_level 22
4.2.4.7 coap_log_warn 22
4.3 lib/include/coap_msg.h File Reference 22
4.3.1 Detailed Description 25
4.3.2 Macro Definition Documentation 25
4.3.2.1 coap_msg_get_code_class 25
4.3.2.2 coap_msg_get_code_detail 25

4.3.2.3 coap_msg_get_first_op 25
4.3.2.4 coap_msg_get_msg_id 26
4.3.2.5 coap_msg_get_payload 26
4.3.2.6 coap_msg_get_payload_len 26
4.3.2.7 coap_msg_get_token 26
4.3.2.8 coap_msg_get_token_len 26
4.3.2.9 coap_msg_get_type 26
4.3.2.10 coap_msg_get_ver 26
4.3.2.11 coap_msg_is_empty 26
4.3.2.12 COAP_MSG_MAX_BUF_LEN 26
4.3.2.13 COAP_MSG_MAX_CODE_CLASS 26
4.3.2.14 COAP_MSG_MAX_CODE_DETAIL 26
4.3.2.15 COAP_MSG_MAX_MSG_ID 26
4.3.2.16 COAP_MSG_MAX_TOKEN_LEN 27
4.3.2.17 coap_msg_op_get_len 27
4.3.2.18 coap_msg_op_get_next 27
4.3.2.19 coap_msg_op_get_num 27
4.3.2.20 coap_msg_op_get_val 27
4.3.2.21 coap_msg_op_num_is_critical 27
4.3.2.22 coap_msg_op_num_is_unsafe 27
4.3.2.23 coap_msg_op_num_no_cache_key 27
4.3.2.24 coap_msg_op_set_len 27
4.3.2.25 coap_msg_op_set_next 27
4.3.2.26 coap_msg_op_set_num 27
4.3.2.27 coap_msg_op_set_val 27
4.3.2.28 COAP_MSG_OP_URI_PATH_MAX_LEN 28
4.3.2.29 COAP_MSG_OP_URI_PATH_NUM 28
4.3.2.30 COAP_MSG_VER 28
4.3.3 Enumeration Type Documentation 28
4.3.3.1 coap_msg_class_t 28
4.3.3.2 coap_msg_client_err_t 28
4.3.3.3 coap_msg_method_t 28
4.3.3.4 coap_msg_op_num_t 29
4.3.3.5 coap_msg_server_err_t 29
4.3.3.6 coap_msg_success_t 29
4.3.3.7 coap_msg_type_t 30
4.3.4 Function Documentation 30
4.3.4.1 coap_msg_add_op 30
4.3.4.2 coap_msg_check_critical_ops 30
4.3.4.3 coap_msg_check_unsafe_ops 30

4.3.4.4 coap_msg_copy 31
4.3.4.5 coap_msg_create 31
4.3.4.6 coap_msg_destroy 31
4.3.4.7 coap_msg_format 31
4.3.4.8 coap_msg_gen_rand_str 32
4.3.4.9 coap_msg_op_num_is_recognized 32
4.3.4.10 coap_msg_parse 32
4.3.4.11 coap_msg_parse_type_msg_id 33
4.3.4.12 coap_msg_reset 33
4.3.4.13 coap_msg_set_code 33
4.3.4.14 coap_msg_set_msg_id 34
4.3.4.15 coap_msg_set_payload 34
4.3.4.16 coap_msg_set_token 34
4.3.4.17 coap_msg_set_type 35
4.4 lib/include/coap_server.h File Reference 35
4.4.1 Detailed Description 37
4.4.2 Macro Definition Documentation 37
4.4.2.1 COAP_SERVER_ADDR_BUF_LEN 37
4.4.2.2 COAP_SERVER_DIAG_PAYLOAD_LEN 37
4.4.2.3 COAP_SERVER_NUM_TRANS 37
4.4.3 Enumeration Type Documentation 37
4.4.3.1 coap_server_resp_t 37
4.4.4 Function Documentation 37
4.4.4.1 coap_server_add_sep_resp_uri_path 37
4.4.4.2 coap_server_create 38
4.4.4.3 coap_server_destroy 38
4.4.4.4 coap_server_get_next_msg_id 38
4.4.4.5 coap_server_run 39
4.5 lib/src/coap_client.c File Reference 39
4.5.1 Detailed Description 40
4.5.2 Macro Definition Documentation 40
4.5.2.1 COAP_CLIENT_ACK_TIMEOUT_SEC 40
4.5.2.2 COAP_CLIENT_DTLS_MTU 40
4.5.2.3 COAP_CLIENT_DTLS_PRIORITIES 40
4.5.2.4 COAP_CLIENT_DTLS_RETRANS_TIMEOUT 40
4.5.2.5 COAP_CLIENT_DTLS_TOTAL_TIMEOUT 40
4.5.2.6 COAP_CLIENT_MAX_RETRANSMIT 40
4.5.2.7 COAP_CLIENT_RESP_TIMEOUT_SEC 41
4.5.3 Function Documentation 41
4.5.3.1 coap_client_create 41

4.5.3.2 coap_client_destroy 41
4.5.3.3 coap_client_exchange 41
4.6 lib/src/coap_log.c File Reference 42
4.6.1 Detailed Description 42
4.6.2 Function Documentation 43
4.6.2.1 coap_log_debug 43
4.6.2.2 coap_log_error 44
4.6.2.3 coap_log_get_level 44
4.6.2.4 coap_log_info 44
4.6.2.5 coap_log_notice 44
4.6.2.6 coap_log_set_level 44
4.6.2.7 coap_log_warn 45
4.7 lib/src/coap_msg.c File Reference 46
4.7.1 Detailed Description 47
4.7.2 Macro Definition Documentation 47
4.7.2.1 coap_msg_op_list_get_first 47
4.7.2.2 coap_msg_op_list_get_last 47
4.7.2.3 coap_msg_op_list_is_empty 47
4.7.3 Function Documentation 47
4.7.3.1 coap_msg_add_op 47
4.7.3.2 coap_msg_check_critical_ops 48
4.7.3.3 coap_msg_check_unsafe_ops 48
4.7.3.4 coap_msg_copy 48
4.7.3.5 coap_msg_create 49
4.7.3.6 coap_msg_destroy 49
4.7.3.7 coap_msg_format 49
4.7.3.8 coap_msg_gen_rand_str 49
4.7.3.9 coap_msg_op_num_is_recognized 50
4.7.3.10 coap_msg_parse 50
4.7.3.11 coap_msg_parse_type_msg_id 50
4.7.3.12 coap_msg_reset 51
4.7.3.13 coap_msg_set_code 51
4.7.3.14 coap_msg_set_msg_id 51
4.7.3.15 coap_msg_set_payload 52
4.7.3.16 coap_msg_set_token 52
4.7.3.17 coap_msg_set_type 52
4.8 lib/src/coap_server.c File Reference 53
4.8.1 Detailed Description 54
4.8.2 Macro Definition Documentation 54
4.8.2.1 COAP_SERVER_ACK_TIMEOUT_SEC 54

4.8.2.2 COAP_SERVER_DTLS_MTU 54
4.8.2.3 COAP_SERVER_DTLS_NUM_DH_BITS 54
4.8.2.4 COAP_SERVER_DTLS_PRIORITIES 54
4.8.2.5 COAP_SERVER_DTLS_RETRANS_TIMEOUT 54
4.8.2.6 COAP_SERVER_DTLS_TOTAL_TIMEOUT 54
4.8.2.7 COAP_SERVER_MAX_RETRANSMIT 54
4.8.3 Function Documentation 55
4.8.3.1 coap_server_add_sep_resp_uri_path 55
4.8.3.2 coap_server_create 55
4.8.3.3 coap_server_destroy 55
4.8.3.4 coap_server_get_next_msg_id 55
4.8.3.5 coap_server_run 56

Index **57**

Chapter 1

Class Index

1.1 Class List

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

coap_client_t
Client structure 5
coap_msg_op
Option structure 6
coap_msg_op_list_t
Option linked-list structure 7
coap_msg_t
Message structure 8
coap_server
Server structure 10
coap_server_path
URI path structure 12
coap_server_path_list_t
URI path list structure 13
coap_server_trans
Transaction structure 14

Chapter 2

File Index

2.1 File List

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

lib/include/coap_client.h
Include file for the FreeCoAP client library 17
lib/include/coap_log.h
Include file for the FreeCoAP logging module 19
lib/include/coap_msg.h
Include file for the FreeCoAP message parser/formatter library 22
lib/include/coap_server.h
Include file for the FreeCoAP server library 35
lib/src/coap_client.c
Source file for the FreeCoAP client library 39
lib/src/coap_log.c
Source file for the FreeCoAP logging module 42
lib/src/coap_msg.c
Source file for the FreeCoAP message parser/formatter library 46
lib/src/coap_server.c
Source file for the FreeCoAP server library 53

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
- struct sockaddr_in6 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 struct sockaddr_in6 coap_client_t::server_sin

IPv6 socket structture

3.1.2.8 socklen_t coap_client_t::server_sin_len

IPv6 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:

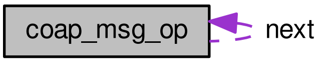
- lib/include/coap_client.h

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:

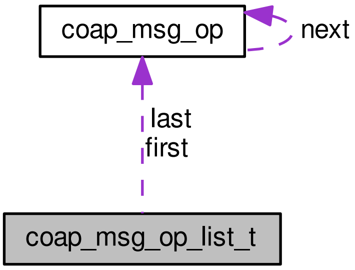
- lib/include/coap_msg.h

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:

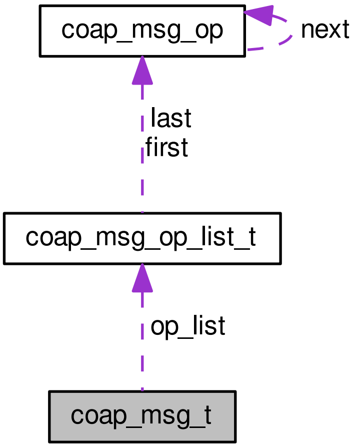
- lib/include/coap_msg.h

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:

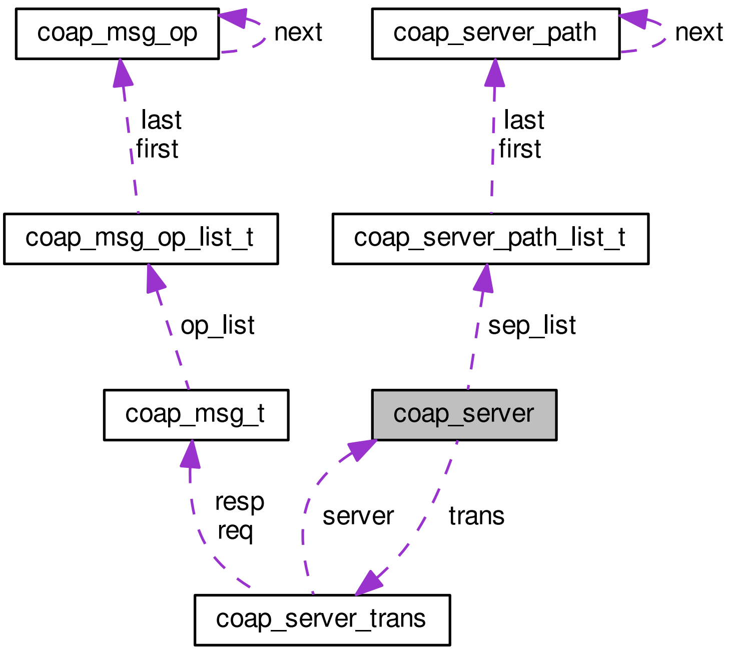
- lib/include/coap_msg.h

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]
- int(∗ handle)(struct coap_server ∗, coap_msg_t ∗, coap_msg_t ∗)
- 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 int(∗ coap_server::handle) (struct coap_server ∗, coap_msg_t ∗, coap_msg_t ∗)

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:

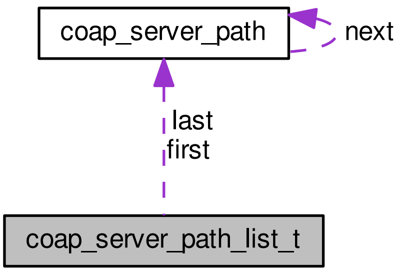
- lib/include/coap_server.h

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:

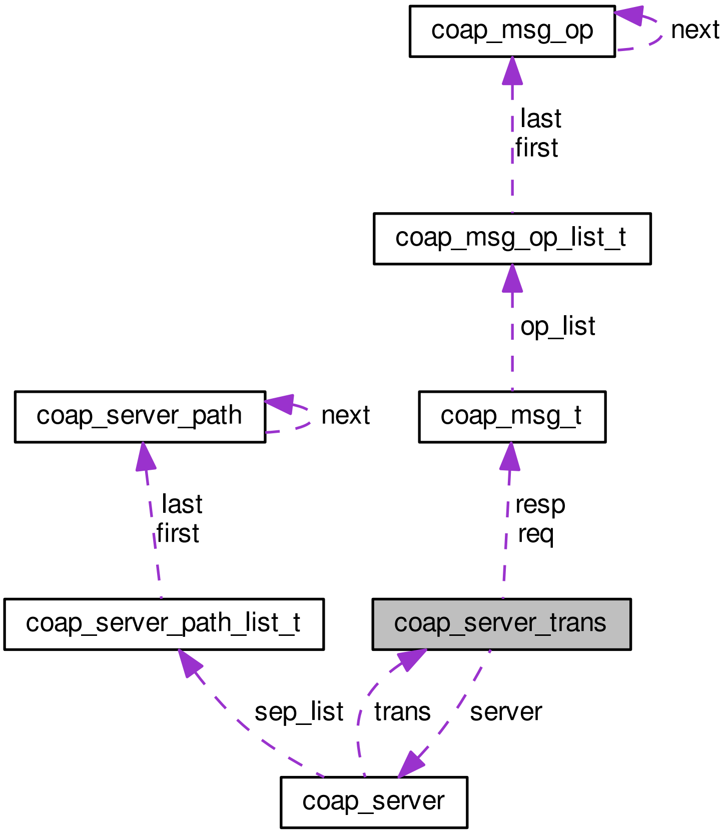
- lib/include/coap_server.h

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
- struct sockaddr_in6 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 struct sockaddr_in6 coap_server_trans::client_sin

IPv6 socket structure

3.8.2.4 socklen_t coap_server_trans::client_sin_len

IPv6 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

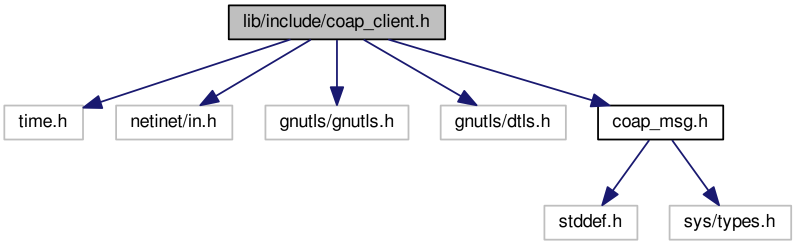
File Documentation

4.1 lib/include/coap_client.h File Reference

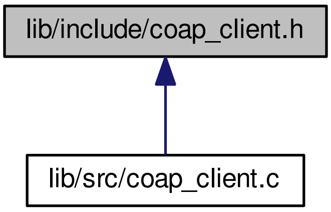
Include file for the FreeCoAP client library.

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

Include 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)

  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*)

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

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.

Parameters

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

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

Returns

Operation status

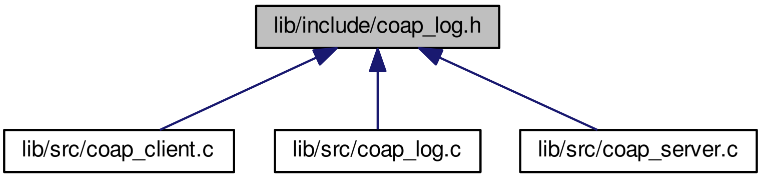
Return values

0	Success
<0	Error

4.2 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.

4.2.1 Detailed Description

Include file for the FreeCoAP logging module.

4.2.2 Macro Definition Documentation

4.2.2.1 #define COAP_LOG_DEF_LEVEL COAP_LOG_ERROR

Default log level

4.2.3 Enumeration Type Documentation

4.2.3.1 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

4.2.4 Function Documentation

4.2.4.1 void coap_log_debug (const char * *msg*, ...)

Log a debug message.

Parameters

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

4.2.4.2 void coap_log_error (const char * *msg*, ...)

Log an error message.

Parameters

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

4.2.4.3 coap_log_level_t coap_log_get_level (void)

Get the log level.

Returns

The current log level

4.2.4.4 void coap_log_info (const char * *msg*, ...)

Log an info message.

Parameters

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

4.2.4.5 void coap_log_notice (const char * *msg*, ...)

Log an notice message.

Parameters

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

4.2.4.6 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

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

Log a warning message.

Parameters

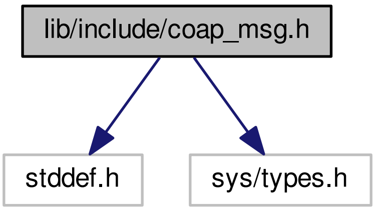
in	*msg*	String containing format specifiers
in	...	arguments for the format specifiers

4.3 lib/include/coap_msg.h File Reference

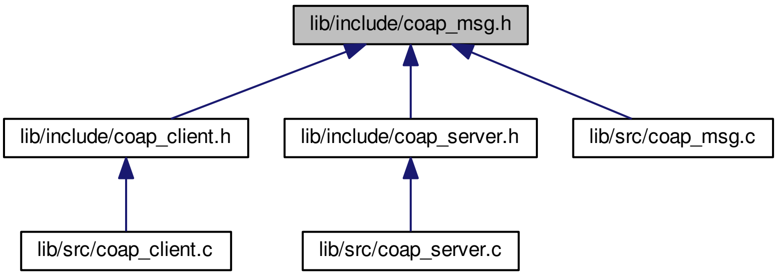
Include file for the FreeCoAP message parser/formatter library.

```
#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_NUM 11
- #define COAP_MSG_OP_URI_PATH_MAX_LEN 256
- #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_ERR = 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, COAP_MSG_DELETE =4 }

  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 }

  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_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_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.
- 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.

4.3.1 Detailed Description

Include file for the FreeCoAP message parser/formatter library.

4.3.2 Macro Definition Documentation

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

Get the code class from a message

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

Get the code detail from a message

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

Get the first option from a message

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

Get the message ID from message

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

Get the payload from a message

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

Get the payload length from a message

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

Get the token from a message

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

Get the token length from a message

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

Get the type from a message

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

Get the version from a message

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

Indicate if a message is empty

4.3.2.12 #define COAP_MSG_MAX_BUF_LEN 1152

Maximum buffer length for header and payload

4.3.2.13 #define COAP_MSG_MAX_CODE_CLASS 7

Maximum code class

4.3.2.14 #define COAP_MSG_MAX_CODE_DETAIL 31

Maximum code detail

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

Maximum message ID

4.3.2.16 #define COAP_MSG_MAX_TOKEN_LEN 8

Maximum token length

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

Get the option length from an option

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

Get the next pointer from an option

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

Get the option number from an option

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

Get the option value from an option

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

Indicate if an option is critical

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

Indicate if an option is unsafe to forward

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

Indicate if an option is not part of the cache key

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

Set the option length in an option

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

Set the next pointer in an option

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

Set the option number in an option

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

Set the option value in an option

4.3.2.28 #define COAP_MSG_OP_URI_PATH_MAX_LEN 256

Maximum buffer length for a reconstructed URI path

4.3.2.29 #define COAP_MSG_OP_URI_PATH_NUM 11

Uri-path option number

4.3.2.30 #define COAP_MSG_VER 0x01

CoAP version

4.3.3 Enumeration Type Documentation

4.3.3.1 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

4.3.3.2 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_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

4.3.3.3 enum coap_msg_method_t

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

4.3.3.4 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_PROXY_URI Proxy-URI option number

COAP_MSG_PROXY_SCHEME Proxy-Scheme option number

COAP_MSG_SIZE1 Size1 option number

4.3.3.5 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

4.3.3.6 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

4.3.3.7 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

4.3.4 Function Documentation

4.3.4.1 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

4.3.4.2 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

4.3.4.3 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

4.3.4.4 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

4.3.4.5 void coap_msg_create (coap_msg_t ∗ *msg*)

Initialise a message structure.

Parameters

out	*msg*	Pointer to a message structure

4.3.4.6 void coap_msg_destroy (coap_msg_t ∗ *msg*)

Deinitialise a message structure.

Parameters

in,out	*msg*	Pointer to a message structure

4.3.4.7 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

4.3.4.8 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

4.3.4.9 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

4.3.4.10 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

4.3.4.11 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

4.3.4.12 void coap_msg_reset (coap_msg_t * *msg*)

Deinitialise and initialise a message structure.

Parameters

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

4.3.4.13 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

4.3.4.14 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

4.3.4.15 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

4.3.4.16 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

4.3.4.17 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

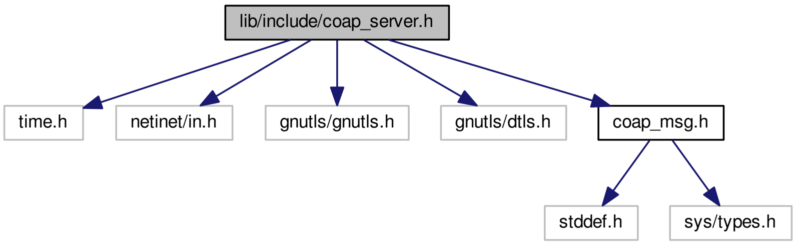
0	Success
<0	Error

4.4 lib/include/coap_server.h File Reference

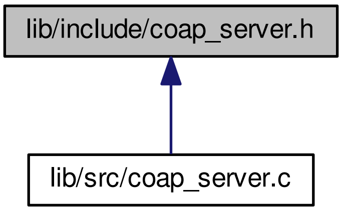
Include file for the FreeCoAP server library.

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

Include 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

Typedefs

- 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, int(∗handle)(coap_server_t ∗, coap_msg_t ∗, coap_msg_t ∗), 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.

4.4.1 Detailed Description

Include file for the FreeCoAP server library.

4.4.2 Macro Definition Documentation

4.4.2.1 #define COAP_SERVER_ADDR_BUF_LEN 128

Buffer length for host addresses

4.4.2.2 #define COAP_SERVER_DIAG_PAYLOAD_LEN 128

Buffer length for diagnostic payloads

4.4.2.3 #define COAP_SERVER_NUM_TRANS 8

Maximum number of active transactions per server

4.4.3 Enumeration Type Documentation

4.4.3.1 enum coap_server_resp_t

Response type enumeration.

Enumerator

COAP_SERVER_PIGGYBACKED Piggybacked response

COAP_SERVER_SEPARATE Separate response

4.4.4 Function Documentation

4.4.4.1 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

4.4.4.2 int coap_server_create (coap_server_t ∗ *server,* int(∗)(coap_server_t ∗, coap_msg_t ∗, coap_msg_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

4.4.4.3 void coap_server_destroy (coap_server_t ∗ *server*)

Deinitialise a server structure.

Parameters

in,out	*server*	Pointer to a server structure

4.4.4.4 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

4.4.4.5 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

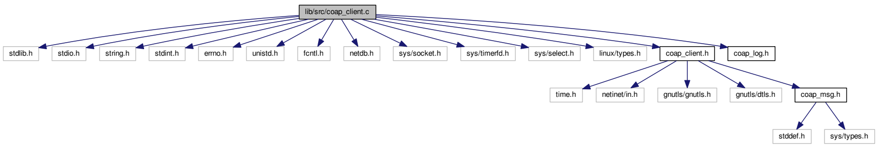
0	Success
<0	Error

4.5 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 <linux/types.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 100
- #define COAP_CLIENT_DTLS_TOTAL_TIMEOUT 5000
- #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)

  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.

4.5.1 Detailed Description

Source file for the FreeCoAP client library.

4.5.2 Macro Definition Documentation

4.5.2.1 #define COAP_CLIENT_ACK_TIMEOUT_SEC 2

Minimum delay to wait before retransmitting a confirmable message

4.5.2.2 #define COAP_CLIENT_DTLS_MTU COAP_MSG_MAX_BUF_LEN

Maximum transmission unit excluding the UDP and IPv6 headers

4.5.2.3 #define COAP_CLIENT_DTLS_PRIORITIES "PERFORMANCE:-VERS-TLS-ALL:+VERS-DTLS1.0:%SERVER_PRECEDEN↩CE"

DTLS priorities

4.5.2.4 #define COAP_CLIENT_DTLS_RETRANS_TIMEOUT 100

Retransmission timeout (msec) for the DTLS handshake

4.5.2.5 #define COAP_CLIENT_DTLS_TOTAL_TIMEOUT 5000

Total timeout (msec) for the DTLS handshake

4.5.2.6 #define COAP_CLIENT_MAX_RETRANSMIT 4

Maximum number of times a confirmable message can be retransmitted

4.5.2.7 #define COAP_CLIENT_RESP_TIMEOUT_SEC 30

Maximum amount of time to wait for a response

4.5.3 Function Documentation

4.5.3.1 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*)

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

Returns

Operation status

Return values

0	Success
<*0*	Error

4.5.3.2 void coap_client_destroy (coap_client_t ∗ *client*)

Deinitialise a client structure.

Parameters

in,out	*client*	Pointer to a client structure

4.5.3.3 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.

Parameters

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

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

Returns

Operation status

Return values

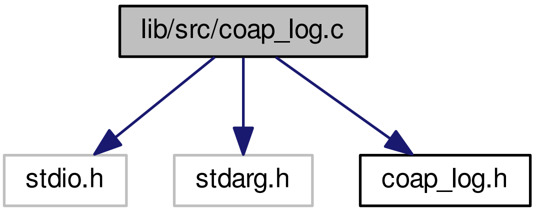
0	Success
<0	Error

4.6 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.

4.6.1 Detailed Description

Source file for the FreeCoAP logging module.

4.6.2 Function Documentation

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

Log a debug message.

Parameters

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

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

Log an error message.

Parameters

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

4.6.2.3 coap_log_level_t coap_log_get_level (void)

Get the log level.

Returns

The current log level

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

Log an info message.

Parameters

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

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

Log an notice message.

Parameters

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

4.6.2.6 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

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

Log a warning message.

Parameters

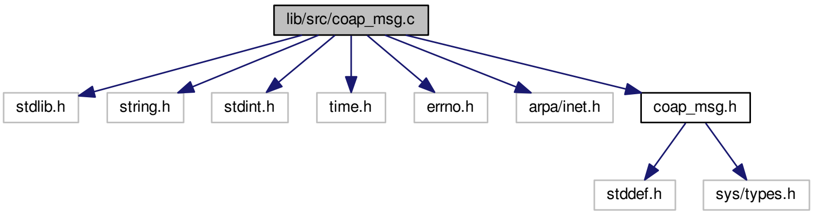
in	*msg*	String containing format specifiers
in	...	arguments for the format specifiers

4.7 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.
- 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.

4.7.1 Detailed Description

Source file for the FreeCoAP message parser/formatter library.

4.7.2 Macro Definition Documentation

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

Get the first option from an option linked-list

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

Get the last option in an option linked-list

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

Indicate whether or not an option linked-list is empty

4.7.3 Function Documentation

4.7.3.1 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

4.7.3.2 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

4.7.3.3 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

4.7.3.4 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

4.7.3.5 void coap_msg_create (coap_msg_t ∗ *msg*)

Initialise a message structure.

Parameters

out	*msg*	Pointer to a message structure

4.7.3.6 void coap_msg_destroy (coap_msg_t ∗ *msg*)

Deinitialise a message structure.

Parameters

in,out	*msg*	Pointer to a message structure

4.7.3.7 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

4.7.3.8 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

4.7.3.9 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

4.7.3.10 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

4.7.3.11 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

4.7.3.12 void coap_msg_reset (coap_msg_t ∗ *msg*)

Deinitialise and initialise a message structure.

Parameters

in,out	*msg*	Pointer to a message structure

4.7.3.13 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

4.7.3.14 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

4.7.3.15 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

4.7.3.16 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

4.7.3.17 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

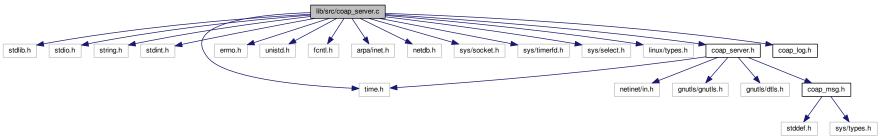
0	Success
<*0*	Error

4.8 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 <linux/types.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 100
- #define COAP_SERVER_DTLS_TOTAL_TIMEOUT 5000
- #define COAP_SERVER_DTLS_NUM_DH_BITS 1024
- #define COAP_SERVER_DTLS_PRIORITIES "PERFORMANCE:-VERS-TLS-ALL:+VERS-DTLS1.0:%SE↩ RVER_PRECEDENCE"

Functions

- int coap_server_create (coap_server_t ∗server, int(∗handle)(coap_server_t ∗, coap_msg_t ∗, coap_msg_t ∗), 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.

4.8.1 Detailed Description

Source file for the FreeCoAP server library.

4.8.2 Macro Definition Documentation

4.8.2.1 #define COAP_SERVER_ACK_TIMEOUT_SEC 2

Minimum delay to wait before retransmitting a confirmable message

4.8.2.2 #define COAP_SERVER_DTLS_MTU COAP_MSG_MAX_BUF_LEN

Maximum transmission unit excluding the UDP and IPv6 headers

4.8.2.3 #define COAP_SERVER_DTLS_NUM_DH_BITS 1024

DTLS Diffie-Hellman key size

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

DTLS priorities

4.8.2.5 #define COAP_SERVER_DTLS_RETRANS_TIMEOUT 100

Retransmission timeout (msec) for the DTLS handshake

4.8.2.6 #define COAP_SERVER_DTLS_TOTAL_TIMEOUT 5000

Total timeout (msec) for the DTLS handshake

4.8.2.7 #define COAP_SERVER_MAX_RETRANSMIT 4

Maximum number of times a confirmable message can be retransmitted

4.8.3 Function Documentation

4.8.3.1 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

4.8.3.2 int coap_server_create (coap_server_t ∗ *server,* int(∗)(coap_server_t ∗, coap_msg_t ∗, coap_msg_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

4.8.3.3 void coap_server_destroy (coap_server_t ∗ *server*)

Deinitialise a server structure.

Parameters

in,out	*server*	Pointer to a server structure

4.8.3.4 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

4.8.3.5 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

active
    coap_server_trans, 15

COAP_CLIENT_ACK_TIMEOUT_SEC
    coap_client.c, 40
COAP_CLIENT_DTLS_MTU
    coap_client.c, 40
COAP_CLIENT_DTLS_PRIORITIES
    coap_client.c, 40
COAP_CLIENT_DTLS_RETRANS_TIMEOUT
    coap_client.c, 40
COAP_CLIENT_DTLS_TOTAL_TIMEOUT
    coap_client.c, 40
COAP_CLIENT_HOST_BUF_LEN
    coap_client.h, 18
COAP_CLIENT_MAX_RETRANSMIT
    coap_client.c, 40
COAP_CLIENT_PORT_BUF_LEN
    coap_client.h, 18
COAP_CLIENT_RESP_TIMEOUT_SEC
    coap_client.c, 40
COAP_LOG_DEBUG
    coap_log.h, 21
COAP_LOG_DEF_LEVEL
    coap_log.h, 20
COAP_LOG_ERROR
    coap_log.h, 21
COAP_LOG_INFO
    coap_log.h, 21
COAP_LOG_NOTICE
    coap_log.h, 21
COAP_LOG_WARN
    coap_log.h, 21
COAP_MSG_ACCEPT
    coap_msg.h, 29
COAP_MSG_ACK
    coap_msg.h, 30
COAP_MSG_BAD_GATEWAY
    coap_msg.h, 29
COAP_MSG_BAD_OPTION
    coap_msg.h, 28
COAP_MSG_BAD_REQ
    coap_msg.h, 28
COAP_MSG_CHANGED
    coap_msg.h, 29
COAP_MSG_CLIENT_ERR
    coap_msg.h, 28
COAP_MSG_CON
    coap_msg.h, 30
COAP_MSG_CONTENT
    coap_msg.h, 29
COAP_MSG_CONTENT_FORMAT
    coap_msg.h, 29
COAP_MSG_CREATED
    coap_msg.h, 29
COAP_MSG_DELETE
    coap_msg.h, 28
COAP_MSG_DELETED
    coap_msg.h, 29
COAP_MSG_ETAG
    coap_msg.h, 29
COAP_MSG_FORBIDDEN
    coap_msg.h, 28
COAP_MSG_GATEWAY_TIMEOUT
    coap_msg.h, 29
COAP_MSG_GET
    coap_msg.h, 28
COAP_MSG_IF_MATCH
    coap_msg.h, 29
COAP_MSG_IF_NONE_MATCH
    coap_msg.h, 29
COAP_MSG_INT_SERVER_ERR
    coap_msg.h, 29
COAP_MSG_LOCATION_PATH
    coap_msg.h, 29
COAP_MSG_LOCATION_QUERY
    coap_msg.h, 29
COAP_MSG_MAX_AGE
    coap_msg.h, 29
COAP_MSG_MAX_BUF_LEN
    coap_msg.h, 26
COAP_MSG_MAX_CODE_CLASS
    coap_msg.h, 26
COAP_MSG_MAX_CODE_DETAIL
    coap_msg.h, 26
COAP_MSG_MAX_MSG_ID
    coap_msg.h, 26
COAP_MSG_MAX_TOKEN_LEN
    coap_msg.h, 26
COAP_MSG_METHOD_NOT_ALLOWED
    coap_msg.h, 28
COAP_MSG_NON
    coap_msg.h, 30
COAP_MSG_NOT_ACCEPTABLE
    coap_msg.h, 28
COAP_MSG_NOT_FOUND
    coap_msg.h, 28
COAP_MSG_NOT_IMPL
    coap_msg.h, 29

COAP_MSG_OP_URI_PATH_MAX_LEN
  coap_msg.h, 27
COAP_MSG_OP_URI_PATH_NUM
  coap_msg.h, 28
COAP_MSG_POST
  coap_msg.h, 28
COAP_MSG_PRECOND_FAILED
  coap_msg.h, 28
COAP_MSG_PROXY_NOT_SUP
  coap_msg.h, 29
COAP_MSG_PROXY_SCHEME
  coap_msg.h, 29
COAP_MSG_PROXY_URI
  coap_msg.h, 29
COAP_MSG_PUT
  coap_msg.h, 28
COAP_MSG_REQ
  coap_msg.h, 28
COAP_MSG_REQ_ENT_TOO_LARGE
  coap_msg.h, 28
COAP_MSG_RST
  coap_msg.h, 30
COAP_MSG_SERV_UNAVAIL
  coap_msg.h, 29
COAP_MSG_SERVER_ERR
  coap_msg.h, 28
COAP_MSG_SIZE1
  coap_msg.h, 29
COAP_MSG_SUCCESS
  coap_msg.h, 28
COAP_MSG_UNAUTHORIZED
  coap_msg.h, 28
COAP_MSG_UNSUP_CONT_FMT
  coap_msg.h, 28
COAP_MSG_URI_HOST
  coap_msg.h, 29
COAP_MSG_URI_PATH
  coap_msg.h, 29
COAP_MSG_URI_PORT
  coap_msg.h, 29
COAP_MSG_URI_QUERY
  coap_msg.h, 29
COAP_MSG_VALID
  coap_msg.h, 29
COAP_MSG_VER
  coap_msg.h, 28
COAP_SERVER_ACK_TIMEOUT_SEC
  coap_server.c, 54
COAP_SERVER_ADDR_BUF_LEN
  coap_server.h, 37
COAP_SERVER_DIAG_PAYLOAD_LEN
  coap_server.h, 37
COAP_SERVER_DTLS_MTU
  coap_server.c, 54
COAP_SERVER_DTLS_NUM_DH_BITS
  coap_server.c, 54
COAP_SERVER_DTLS_PRIORITIES
  coap_server.c, 54
COAP_SERVER_DTLS_RETRANS_TIMEOUT
  coap_server.c, 54
COAP_SERVER_DTLS_TOTAL_TIMEOUT
  coap_server.c, 54
COAP_SERVER_MAX_RETRANSMIT
  coap_server.c, 54
COAP_SERVER_NUM_TRANS
  coap_server.h, 37
COAP_SERVER_PIGGYBACKED
  coap_server.h, 37
COAP_SERVER_SEPARATE
  coap_server.h, 37
client_addr
  coap_server_trans, 15
client_sin
  coap_server_trans, 15
client_sin_len
  coap_server_trans, 15
coap_client.c
  COAP_CLIENT_ACK_TIMEOUT_SEC, 40
  COAP_CLIENT_DTLS_MTU, 40
  COAP_CLIENT_DTLS_PRIORITIES, 40
  COAP_CLIENT_DTLS_RETRANS_TIMEOUT, 40
  COAP_CLIENT_DTLS_TOTAL_TIMEOUT, 40
  COAP_CLIENT_MAX_RETRANSMIT, 40
  COAP_CLIENT_RESP_TIMEOUT_SEC, 40
  coap_client_create, 41
  coap_client_destroy, 41
  coap_client_exchange, 41
coap_client.h
  COAP_CLIENT_HOST_BUF_LEN, 18
  COAP_CLIENT_PORT_BUF_LEN, 18
  coap_client_create, 18
  coap_client_destroy, 19
  coap_client_exchange, 19
coap_client_create
  coap_client.c, 41
  coap_client.h, 18
coap_client_destroy
  coap_client.c, 41
  coap_client.h, 19
coap_client_exchange
  coap_client.c, 41
  coap_client.h, 19
coap_client_t, 5
  cred, 5
  num_retrans, 5
  priority, 5
  sd, 5
  server_host, 6
  server_port, 6
  server_sin, 6
  server_sin_len, 6
  session, 6
  timeout, 6
  timer_fd, 6
coap_log.c
  coap_log_debug, 43

coap_log_error, 44
coap_log_get_level, 44
coap_log_info, 44
coap_log_notice, 44
coap_log_set_level, 44
coap_log_warn, 44
coap_log.h
COAP_LOG_DEBUG, 21
COAP_LOG_DEF_LEVEL, 20
COAP_LOG_ERROR, 21
COAP_LOG_INFO, 21
COAP_LOG_NOTICE, 21
COAP_LOG_WARN, 21
coap_log_debug, 21
coap_log_error, 21
coap_log_get_level, 21
coap_log_info, 21
coap_log_level_t, 21
coap_log_notice, 21
coap_log_set_level, 22
coap_log_warn, 22
coap_log_debug
coap_log.c, 43
coap_log.h, 21
coap_log_error
coap_log.c, 44
coap_log.h, 21
coap_log_get_level
coap_log.c, 44
coap_log.h, 21
coap_log_info
coap_log.c, 44
coap_log.h, 21
coap_log_level_t
coap_log.h, 21
coap_log_notice
coap_log.c, 44
coap_log.h, 21
coap_log_set_level
coap_log.c, 44
coap_log.h, 22
coap_log_warn
coap_log.c, 44
coap_log.h, 22
coap_msg.c
coap_msg_add_op, 47
coap_msg_check_critical_ops, 48
coap_msg_check_unsafe_ops, 48
coap_msg_copy, 48
coap_msg_create, 49
coap_msg_destroy, 49
coap_msg_format, 49
coap_msg_gen_rand_str, 49
coap_msg_op_list_get_first, 47
coap_msg_op_list_get_last, 47
coap_msg_op_list_is_empty, 47
coap_msg_op_num_is_recognized, 50
coap_msg_parse, 50
coap_msg_parse_type_msg_id, 50
coap_msg_reset, 51
coap_msg_set_code, 51
coap_msg_set_msg_id, 51
coap_msg_set_payload, 52
coap_msg_set_token, 52
coap_msg_set_type, 52
coap_msg.h
COAP_MSG_ACCEPT, 29
COAP_MSG_ACK, 30
COAP_MSG_BAD_GATEWAY, 29
COAP_MSG_BAD_OPTION, 28
COAP_MSG_BAD_REQ, 28
COAP_MSG_CHANGED, 29
COAP_MSG_CLIENT_ERR, 28
COAP_MSG_CON, 30
COAP_MSG_CONTENT, 29
COAP_MSG_CONTENT_FORMAT, 29
COAP_MSG_CREATED, 29
COAP_MSG_DELETE, 28
COAP_MSG_DELETED, 29
COAP_MSG_ETAG, 29
COAP_MSG_FORBIDDEN, 28
COAP_MSG_GATEWAY_TIMEOUT, 29
COAP_MSG_GET, 28
COAP_MSG_IF_MATCH, 29
COAP_MSG_IF_NONE_MATCH, 29
COAP_MSG_INT_SERVER_ERR, 29
COAP_MSG_LOCATION_PATH, 29
COAP_MSG_LOCATION_QUERY, 29
COAP_MSG_MAX_AGE, 29
COAP_MSG_MAX_BUF_LEN, 26
COAP_MSG_MAX_CODE_CLASS, 26
COAP_MSG_MAX_CODE_DETAIL, 26
COAP_MSG_MAX_MSG_ID, 26
COAP_MSG_MAX_TOKEN_LEN, 26
COAP_MSG_METHOD_NOT_ALLOWED, 28
COAP_MSG_NON, 30
COAP_MSG_NOT_ACCEPTABLE, 28
COAP_MSG_NOT_FOUND, 28
COAP_MSG_NOT_IMPL, 29
COAP_MSG_OP_URI_PATH_MAX_LEN, 27
COAP_MSG_OP_URI_PATH_NUM, 28
COAP_MSG_POST, 28
COAP_MSG_PRECOND_FAILED, 28
COAP_MSG_PROXY_NOT_SUP, 29
COAP_MSG_PROXY_SCHEME, 29
COAP_MSG_PROXY_URI, 29
COAP_MSG_PUT, 28
COAP_MSG_REQ, 28
COAP_MSG_REQ_ENT_TOO_LARGE, 28
COAP_MSG_RST, 30
COAP_MSG_SERV_UNAVAIL, 29
COAP_MSG_SERVER_ERR, 28
COAP_MSG_SIZE1, 29
COAP_MSG_SUCCESS, 28
COAP_MSG_UNAUTHORIZED, 28
COAP_MSG_UNSUP_CONT_FMT, 28

COAP_MSG_URI_HOST, 29
COAP_MSG_URI_PATH, 29
COAP_MSG_URI_PORT, 29
COAP_MSG_URI_QUERY, 29
COAP_MSG_VALID, 29
COAP_MSG_VER, 28
coap_msg_add_op, 30
coap_msg_check_critical_ops, 30
coap_msg_check_unsafe_ops, 30
coap_msg_class_t, 28
coap_msg_client_err_t, 28
coap_msg_copy, 31
coap_msg_create, 31
coap_msg_destroy, 31
coap_msg_format, 31
coap_msg_gen_rand_str, 32
coap_msg_get_code_class, 25
coap_msg_get_code_detail, 25
coap_msg_get_first_op, 25
coap_msg_get_msg_id, 25
coap_msg_get_payload, 26
coap_msg_get_payload_len, 26
coap_msg_get_token, 26
coap_msg_get_token_len, 26
coap_msg_get_type, 26
coap_msg_get_ver, 26
coap_msg_is_empty, 26
coap_msg_method_t, 28
coap_msg_op_get_len, 27
coap_msg_op_get_next, 27
coap_msg_op_get_num, 27
coap_msg_op_get_val, 27
coap_msg_op_num_is_critical, 27
coap_msg_op_num_is_recognized, 32
coap_msg_op_num_is_unsafe, 27
coap_msg_op_num_no_cache_key, 27
coap_msg_op_num_t, 28
coap_msg_op_set_len, 27
coap_msg_op_set_next, 27
coap_msg_op_set_num, 27
coap_msg_op_set_val, 27
coap_msg_parse, 32
coap_msg_parse_type_msg_id, 33
coap_msg_reset, 33
coap_msg_server_err_t, 29
coap_msg_set_code, 33
coap_msg_set_msg_id, 34
coap_msg_set_payload, 34
coap_msg_set_token, 34
coap_msg_set_type, 35
coap_msg_success_t, 29
coap_msg_type_t, 29

coap_msg_add_op
coap_msg.c, 47
coap_msg.h, 30

coap_msg_check_critical_ops
coap_msg.c, 48
coap_msg.h, 30

coap_msg_check_unsafe_ops
coap_msg.c, 48
coap_msg.h, 30

coap_msg_class_t
coap_msg.h, 28

coap_msg_client_err_t
coap_msg.h, 28

coap_msg_copy
coap_msg.c, 48
coap_msg.h, 31

coap_msg_create
coap_msg.c, 49
coap_msg.h, 31

coap_msg_destroy
coap_msg.c, 49
coap_msg.h, 31

coap_msg_format
coap_msg.c, 49
coap_msg.h, 31

coap_msg_gen_rand_str
coap_msg.c, 49
coap_msg.h, 32

coap_msg_get_code_class
coap_msg.h, 25

coap_msg_get_code_detail
coap_msg.h, 25

coap_msg_get_first_op
coap_msg.h, 25

coap_msg_get_msg_id
coap_msg.h, 25

coap_msg_get_payload
coap_msg.h, 26

coap_msg_get_payload_len
coap_msg.h, 26

coap_msg_get_token
coap_msg.h, 26

coap_msg_get_token_len
coap_msg.h, 26

coap_msg_get_type
coap_msg.h, 26

coap_msg_get_ver
coap_msg.h, 26

coap_msg_is_empty
coap_msg.h, 26

coap_msg_method_t
coap_msg.h, 28

coap_msg_op, 6
len, 7
next, 7
num, 7
val, 7

coap_msg_op_get_len
coap_msg.h, 27

coap_msg_op_get_next
coap_msg.h, 27

coap_msg_op_get_num
coap_msg.h, 27

coap_msg_op_get_val

coap_msg.h, 27
coap_msg_op_list_get_first
coap_msg.c, 47
coap_msg_op_list_get_last
coap_msg.c, 47
coap_msg_op_list_is_empty
coap_msg.c, 47
coap_msg_op_list_t, 7
first, 8
last, 8
coap_msg_op_num_is_critical
coap_msg.h, 27
coap_msg_op_num_is_recognized
coap_msg.c, 50
coap_msg.h, 32
coap_msg_op_num_is_unsafe
coap_msg.h, 27
coap_msg_op_num_no_cache_key
coap_msg.h, 27
coap_msg_op_num_t
coap_msg.h, 28
coap_msg_op_set_len
coap_msg.h, 27
coap_msg_op_set_next
coap_msg.h, 27
coap_msg_op_set_num
coap_msg.h, 27
coap_msg_op_set_val
coap_msg.h, 27
coap_msg_parse
coap_msg.c, 50
coap_msg.h, 32
coap_msg_parse_type_msg_id
coap_msg.c, 50
coap_msg.h, 33
coap_msg_reset
coap_msg.c, 51
coap_msg.h, 33
coap_msg_server_err_t
coap_msg.h, 29
coap_msg_set_code
coap_msg.c, 51
coap_msg.h, 33
coap_msg_set_msg_id
coap_msg.c, 51
coap_msg.h, 34
coap_msg_set_payload
coap_msg.c, 52
coap_msg.h, 34
coap_msg_set_token
coap_msg.c, 52
coap_msg.h, 34
coap_msg_set_type
coap_msg.c, 52
coap_msg.h, 35
coap_msg_success_t
coap_msg.h, 29
coap_msg_t, 8
code_class, 9
code_detail, 9
msg_id, 9
op_list, 9
payload, 10
payload_len, 10
token, 10
token_len, 10
type, 10
ver, 10
coap_msg_type_t
coap_msg.h, 29
coap_server, 10
cred, 11
dh_params, 11
handle, 11
msg_id, 12
priority, 12
sd, 12
sep_list, 12
trans, 12
coap_server.c
COAP_SERVER_ACK_TIMEOUT_SEC, 54
COAP_SERVER_DTLS_MTU, 54
COAP_SERVER_DTLS_NUM_DH_BITS, 54
COAP_SERVER_DTLS_PRIORITIES, 54
COAP_SERVER_DTLS_RETRANS_TIMEOUT, 54
COAP_SERVER_DTLS_TOTAL_TIMEOUT, 54
COAP_SERVER_MAX_RETRANSMIT, 54
coap_server_add_sep_resp_uri_path, 55
coap_server_create, 55
coap_server_destroy, 55
coap_server_get_next_msg_id, 55
coap_server_run, 56
coap_server.h
COAP_SERVER_ADDR_BUF_LEN, 37
COAP_SERVER_DIAG_PAYLOAD_LEN, 37
COAP_SERVER_NUM_TRANS, 37
COAP_SERVER_PIGGYBACKED, 37
COAP_SERVER_SEPARATE, 37
coap_server_add_sep_resp_uri_path, 37
coap_server_create, 38
coap_server_destroy, 38
coap_server_get_next_msg_id, 38
coap_server_resp_t, 37
coap_server_run, 39
coap_server_add_sep_resp_uri_path
coap_server.c, 55
coap_server.h, 37
coap_server_create
coap_server.c, 55
coap_server.h, 38
coap_server_destroy
coap_server.c, 55
coap_server.h, 38
coap_server_get_next_msg_id
coap_server.c, 55

coap_server.h, 38
coap_server_path, 12
next, 13
str, 13
coap_server_path_list_t, 13
first, 14
last, 14
coap_server_resp_t
coap_server.h, 37
coap_server_run
coap_server.c, 56
coap_server.h, 39
coap_server_trans, 14
active, 15
client_addr, 15
client_sin, 15
client_sin_len, 15
last_use, 15
num_retrans, 15
req, 15
resp, 15
server, 16
session, 16
timeout, 16
timer_fd, 16
code_class
coap_msg_t, 9
code_detail
coap_msg_t, 9
cred
coap_client_t, 5
coap_server, 11

dh_params
coap_server, 11

first
coap_msg_op_list_t, 8
coap_server_path_list_t, 14

handle
coap_server, 11

last
coap_msg_op_list_t, 8
coap_server_path_list_t, 14
last_use
coap_server_trans, 15
len
coap_msg_op, 7
lib/include/coap_client.h, 17
lib/include/coap_log.h, 19
lib/include/coap_msg.h, 22
lib/include/coap_server.h, 35
lib/src/coap_client.c, 39
lib/src/coap_log.c, 42
lib/src/coap_msg.c, 46
lib/src/coap_server.c, 53

msg_id
coap_msg_t, 9
coap_server, 12

next
coap_msg_op, 7
coap_server_path, 13
num
coap_msg_op, 7
num_retrans
coap_client_t, 5
coap_server_trans, 15

op_list
coap_msg_t, 9

payload
coap_msg_t, 10
payload_len
coap_msg_t, 10
priority
coap_client_t, 5
coap_server, 12

req
coap_server_trans, 15
resp
coap_server_trans, 15

sd
coap_client_t, 5
coap_server, 12
sep_list
coap_server, 12
server
coap_server_trans, 16
server_host
coap_client_t, 6
server_port
coap_client_t, 6
server_sin
coap_client_t, 6
server_sin_len
coap_client_t, 6
session
coap_client_t, 6
coap_server_trans, 16
str
coap_server_path, 13

timeout
coap_client_t, 6
coap_server_trans, 16
timer_fd
coap_client_t, 6
coap_server_trans, 16
token
coap_msg_t, 10
token_len
coap_msg_t, 10
trans

coap_server, 12
type
coap_msg_t, 10

val
coap_msg_op, 7
ver
coap_msg_t, 10