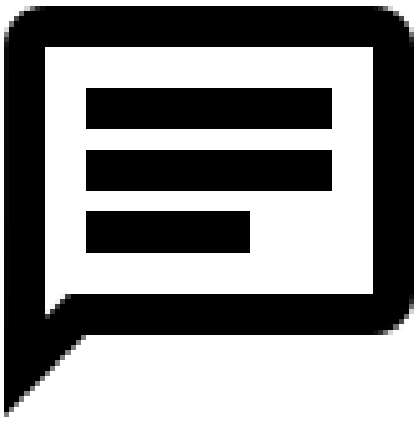
# CPT API (Version 2.1)



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# CPT Enums

| commands | | |
|---|---|---|
| **Name** | **Value** | **Description** |
| *SEND* | 1 | Designated SEND CMD code |
| *LOGOUT* | 2 | Designated LOGOUT CMD code |
| *GET_USERS* | 3 | Designated GET_USERS CMD code |
| *CREATE_CHANNEL* | 4 | Designated CREATE_CHANNEL CMD code |
| *JOIN_CHANNEL* | 5 | Designated JOIN_CHANNEL CMD code |
| *LEAVE_CHANNEL* | 6 | Designated LEAVE_CHANNEL CMD code |
| *LOGIN* | 7 | Designated LOGIN CMD code |
| *CREATE_VCHAN* | 8 | Designated CREATE_VCHAN CMD code |

# CPT Structs

| CptRequest | | |
|---|---|---|
| **Name** | **Type** | **Description** |
| version | uint8_t | CPT version number. |
| command | uint8_t | CPT command code. |
| channel_id | uint16_t | CPT destination channel ID. |
| msg_len | uint16_t | CPT message length in bytes. |
| msg | char * | CPT message contents. |

| CptResponse | | |
|---|---|---|
| **Name** | **Type** | **Description** |
| code | uint8_t | CPT response code |
| data_size | uint16_t | Size of struct member <data> in bytes. |
| data | uint8_t * | CPT response data |

# CPT Server Response Codes

| CPT Server Response Codes | | | |
|---|---|---|---|
| **CMD** | **CMD_CODE (HEX)** | **CMD_CODE (decimal)** | **DESCRIPTION** |
| *SEND* | 0x01 | 1 | Designated SEND CMD code |
| *LOGOUT* | 0x02 | 2 | Designated LOGOUT CMD code |
| *GET_USERS* | 0x03 | 3 | Designated GET_USERS CMD code |
| *CREATE_CHANNEL* | 0x04 | 4 | Designated CREATE_CHANNEL CMD code |
| *JOIN_CHANNEL* | 0x05 | 5 | Designated JOIN_CHANNEL CMD code |
| *LEAVE_CHANNEL* | 0x06 | 6 | Designated LEAVE_CHANNEL CMD code |
| *LOGIN* | 0x07 | 7 | Designated LOGIN CMD code |
| *CREATE_VCHAN* | 0x08 | 8 | Designated CREATE VOICE CHANNEL code |
| *MESSAGE* | 0x09 | 9 | The channel id is in the CHAN_ID, msg contents are a message sub-packet |
| *USER_CONNECTED* | 0x0A | 10 | The ID of the connected user, msg contents are the username |

| | | | |
|---|---|---|---|
| *USER_DISCONNECTED* | 0x0B | 11 | The ID of the disconnected user, msg contents are the username |
| *MESSAGE_FAILED* | 0x0B | 11 | Message could not be delivered, could be followed by a USER_DISCONNECTED |
| *CHANNEL_CREATED* | 0x0C | 12 | Response sent to requestee, if the channel is created it provides the channel ID in the <CHAN_ID> section |
| *CHANNEL_CREATION_ERROR* | 0x0D | 13 | Response sent to requestee, if the channel cannot be created |
| *CHANNEL_DESTROYED* | 0x0E | 14 | Response sent to all members of channel when it is destroyed |
| *USER_JOINED_CHANNEL* | 0x0F | 15 | Response sent to all members when a new client joins the channel |
| *USER_LEFT_CHANNEL* | 0x10 | 16 | Response sent to all members when a member leaves the channel |
| *USER_LIST* | 0x11 | 17 | A response message from GET_USERS |
| *UKNOWN_CMD* | 0x12 | 18 | Unknown command error |
| *LOGIN_FAIL* | 0x13 | 19 | Login failed error |
| *UKNOWN_CHANNEL* | 0x14 | 20 | Unknown channel ID error |
| *BAD_VERSION* | 0x16 | 21 | Bad CPT Version number error |
| *SEND_FAILED* | 0x17 | 22 | Message failed to send |
| … | … | … | … |
| RESERVED | 0xFF | 255 | Reserved for future CMDs |

# CPT Request Packet Builder Functions

## *cpt_request_init*

```
/**
 * Initialize CptRequest object.
 *
 * Dynamically allocates a cpt struct and
 * initializes all fields.
 *
 * @return Pointer to cpt struct.
*/
CptRequest * cpt_request_init();
```

## *cpt_request_destroy*

```
/**
 * Free all memory and set fields to null.
 *
 * @param cpt   Pointer to a cpt structure.
*/
void cpt_request_destroy(CptRequest * cpt);
```

## *cpt_request_reset*

```
/**
 * Reset packet parameters.
 *
 * Reset the packet parameters,
 * and free memory for certain params.
 *
 * @param packet    A CptRequest struct.
*/
void cpt_request_reset(CptRequest * packet);
```

# CPT Response Packet Builder Functions

## *cpt_response_init*

```
/**
 * Initialize CptResponse server-side packet.
 *
 * Initializes a CptResponse, returning a dynamically
 * allocated pointer to a CptResponse struct.
 *
 * @param res_code    Received client-side packet.
 * @return Pointer to a CptResponse object.
 */
CptResponse * cpt_response_init();
```

## *cpt_response_destroy*

```
/**
 * Destroy CptResponse object.
 *
 * Destroys CptResponse object, freeing any allocated memory
 * and setting all pointers to null.
 *
 * @param response  Pointer to a CptResponse object.
 */
void cpt_response_destroy(CptResponse * response);
```

## *cpt_response_reset*

```
/**
 * Reset packet parameters.
 *
 * Reset the response parameters, and free memory for certain params.
 *
 * @param response      Pointer to a CptResponse object.
*/
void cpt_response_reset(CptResponse * response);
```

# CPT Request Functions

## *cpt_login*

```
/**
 * Prepare a LOGIN request packet for the server.
 *
 * Prepares a LOGIN request to the server. If successful,
 * the resulting data in <serial_buf> will contain a CPT packet
 * with the necessary information to instruct the server to
 * persist the client's information until cpt_logout() is called.
 *
 * @param cpt            CPT packet information and any other necessary data.
 * @param serial_buf     A buffer intended for storing the result.
 * @param name           Client login name.
 * @return The size of the serialized packet in <serial_buf>.
*/
size_t cpt_login(void * client_info, uint8_t * serial_buf, char * name);
```

## *cpt_logout*

```
/**
 * Prepare a LOGOUT request packet for the server.
 *
 * Prepares a LOGOUT request to the server. If successful,
 * the resulting data in <serial_buf> will contain a CPT packet
 * with the necessary information to instruct the server to remove
 * any instance of the requesting client's information.
 *
 * @param cpt            CPT packet information and any other necessary data.
 * @param serial_buf     A buffer intended for storing the result.
 * @return Size of the resulting serialized packet in <serial_buf>
*/
size_t cpt_logout(void * client_info, uint8_t * serial_buf);
```

## *cpt_get_users*

```
/**
 * Prepare a GET_USERS request packet for the server.
 *
 * Prepares a GET_USERS request to the server. If successful,
 * the resulting data in <serial_buf> will contain a CPT packet
 * with the necessary information to instruct the server to
 * send back a list of users specified by the <channel_id>.
 *
 * @param client_info    CPT packet information and any other necessary data.
 * @param serial_buf     A buffer intended for storing the result.
 * @param channel_id     The ID of the CHANNEL to get users from.
 * @return Size of the resulting serialized packet in <serial_buf>
*/
size_t cpt_get_users(void * client_info, uint8_t * serial_buf, uint16_t
channel_id);
```

## *cpt_create_channel*

```
/**
 * Prepare a CREATE_CHANNEL request packet for the server.
 *
 * Prepares a CREATE_CHANNEL request to the server. If successful,
 * the resulting data in <serial_buf> will contain a CPT packet
 * with the necessary information to instruct the server to create
 * a new channel.
 *
 *      > <user_list> may be optionally passed as user selection
 *        parameters for the new Channel.
 *      > If <members> is not NULL, it will be assigned to the
 *        MSG field of the packet.
 *
 * @param cpt            CPT packet information and any other necessary data.
 * @param serial_buf     A buffer intended for storing the result.
 * @param user_list      Whitespace separated user IDs as a string.
 * @return Size of the resulting serialized packet in <serial_buf>
*/
size_t cpt_create_channel(void * client_info, uint8_t * serial_buf, char *
user_list);
```

## *cpt_join_channel*

```
/**
 * Prepare a JOIN_CHANNEL request packet for the server.
 *
 * Prepares a JOIN_CHANNEL request to the server. If successful,
 * the resulting data in <serial_buf> will contain a CPT packet
 * with the necessary information to instruct the server to add
 * the client's information to an existing channel.
 *
 * @param client_info    CPT packet information and any other necessary data.
 * @param serial_buf     A buffer intended for storing the result.
 * @param channel_id     The target channel id.
 * @return Size of the resulting serialized packet in <serial_buf>
*/
size_t cpt_join_channel(void * client_info, uint8_t * serial_buf, uint16_t
channel_id);
```

## *cpt_leave_channel*

```
/**
 * Prepare a LEAVE_CHANNEL request packet for the server.
 *
 * Prepares a LEAVE_CHANNEL request to the server. If successful,
 * the resulting data in <serial_buf> will contain a CPT packet
 * with the necessary information to remove the client's information
 * from the channel specified by <channel_id>.
 *
 * @param client_info    CPT packet information and any other necessary data.
 * @param serial_buf     A buffer intended for storing the result.
 * @param channel_id     The target channel id.
 * @return Size of the resulting serialized packet in <serial_buf>
*/
size_t cpt_leave_channel(void * client_info, uint8_t * serial_buf, uint16_t
channel_id);
```

## *cpt_send*

```
/**
 * Prepare a SEND request packet for the server.
 *
 * Prepares a SEND request to the server. If successful,
 * the resulting data in <serial_buf> will contain a CPT packet
 * with the necessary information to instruct the server to SEND
 * the message specified by <msg> to every user in the channel
 * specified within the packet CHAN_ID field.
 *
 * @param client_info    CPT packet information and any other necessary data.
 * @param serial_buf     A buffer intended for storing the result.
 * @param msg            Intended chat message.
 * @return Size of the resulting serialized packet in <serial_buf>.
*/
int cpt_send(void * client_info, uint8_t * serial_buf, char * msg);
```

## *cpt_create_vchannel*

```
/**
* Prepare a CREATE_VCHAN request packet for the server.
*
* Prepares a CREATE_VCHAN request to the server. If successful,
* the resulting data in <serial_buf> will contain a CPT packet
* with the necessary information to instruct the server to create
* a new voice channel.
*
*  <user_list> may be optionally passed as user selection
*  parameters for the new voice channel.
*
* @param cpt            CPT packet information and any other necessary data.
* @param serial_buf     A buffer intended for storing the result.
* @param user_list      Whitespace separated user IDs as a string.
* @return Size of the resulting serialized packet in <serial_buf>
*/
size_t cpt_create_vchannel(void * client_info, uint8_t * serial_buf, char *
user_list);
```

# CPT Response Functions

## *cpt_login_response*

```
/**
 * Handle a received 'LOGIN' protocol message.
 *
 * Use information in the CptPacket to handle
 * a LOGIN protocol message from a connected client.
 *
 * If successful, the protocol request will be fulfilled,
 * updating any necessary information contained within
 * <server_info>.
 *
 * @param server_info   Server data structures and information.
 * @param name          Name of user in received Packet MSG field.
 * @return Status Code (SUCCESS if successful, other if failure).
 */
int cpt_login_response(void * server_info, char * name);
```

## *cpt_logout_response*

```
/**
 * Handle a received 'LOGOUT' protocol message.
 *
 * Uses information in a received CptRequest to handle
 * a LOGOUT protocol message from a connected client.
 *
 * If successful, will remove any instance of the user
 * specified by the user <id> from the GlobalChannel
 * and any other relevant data structures.
 *
 * @param server_info   Server data structures and information.
 * @return Status Code (SUCCESS if successful, other if failure).
 */
int cpt_logout_response(void * server_info);
```

## *cpt_get_users_response*

```
/**
 * Handle a received 'LOGOUT' protocol message.
 *
 * Uses information in a received CptRequest to handle
 * a GET_USERS protocol message from a connected client.
 *
 * If successful, the function should collect user information
 * from the channel in the CHAN_ID field of the request packet
 * in the following format:
 *
 *  <user_id><whitespace><username><newline>
 *
 * Example given:
 *      1 'Clark Kent'
 *      2 'Bruce Wayne'
 *      3 'Fakey McFakerson'
 *
 * @param server_info   Server data structures and information.
 * @param channel_id    Target channel ID.
 * @return Status Code (SUCCESS if successful, other if failure).
 */
int cpt_get_users_response(void * server_info, uint16_t channel_id);
```

## *cpt_join_channel_response*

```
/**
 * Handle a received 'JOIN_CHANNEL' protocol message.
 *
 * Uses information in a received CptRequest to handle
 * a JOIN_CHANNEL protocol message from a connected client.
 * If successful, function should add the requesting client
 * user into the channel specified by the CHANNEL_ID field
 * in the CptPacket <channel_id>.
 *
 * @param server_info   Server data structures and information.
 * @param channel_id    Target channel ID.
 * @return Status Code (SUCCESS if successful, other if failure).
 */
int cpt_join_channel_response(void * server_info, uint16_t channel_id);
```

## *cpt_create_channel_response*

```
/**
 * Handle a received 'CREATE_CHANNEL' protocol message.
 *
 * Uses information in a received CptRequest to handle
 * a CREATE_CHANNEL protocol message from a connected client.
 *
 * If a <user_list> was received in the MSG field of the packet,
 * function will also parse the <user_list> string and attempt
 * to add the requested user IDs to the channel.
 *
 * If <id_list> is NULL, function will create a new channel with
 * only the requesting user within it.
 *
 * @param server_info   Server data structures and information.
 * @param id_list       ID list from MSG field of received CPT packet.
 * @return Status Code (SUCCESS if successful, other if failure).
 */
int cpt_create_channel_response(void * server_info, char * id_list);
```

## *cpt_leave_channel_response*

```
/**
 * Handle a received 'LEAVE_CHANNEL' protocol message.
 *
 * Use information in the CptPacket to handle
 * a LEAVE_CHANNEL protocol message from a connected client.
 * If successful, will remove any instance of the user
 * specified by the user <id> from the GlobalChannel
 * and any other relevant data structures.
 *
 * @param server_info   Server data structures and information.
 * @param channel_id    Target channel ID.
 * @return Status Code (SUCCESS if successful, other if failure).
 */
int cpt_leave_channel_response(void * server_info, uint16_t channel_id);
```

## *cpt_send_response*

```
/**
 * Handle a received 'SEND' protocol message.
 *
 * Uses information in a received CptRequest to handle
 * a SEND protocol message from a connected client.
 *
 * If successful, function will send the message in the
 * MSG field of the received packet to every user in the
 * CHAN_ID field of the received packet.
 *
 * @param server_info   Server data structures and information.
 * @param name          Name of user in received Packet MSG field.
 * @return Status Code (0 if successful, other if failure).
 */
int cpt_send_response(void * server_info, char * name);
```

## *cpt_create_vchannel_response*

```
/**
* Handle a received 'CREATE_VCHAN' protocol message.
*
* Uses information in a received CptRequest to handle
* a CREATE_VCHAN protocol message from a connected client.
*
* If a <user_list> was received in the MSG field of the packet,
* function will also parse the <user_list> string and attempt
* to add the requested user IDs to the channel.
*
* If <id_list> is NULL, function will create a new voice channel with
* only the requesting user within it.
*
* @param server_info   Server data structures and information.
* @param id_list       ID list from MSG field of received CPT packet.
* @return Status Code (SUCCESS if successful, other if failure).
*/
int cpt_create_vchannel_response(void * server_info, char * id_list);
```

# CPT Serialize Functions

## *cpt_serialize_request*

```
/**
* Serialize a CptRequest struct for transmission.
*
* @param cpt    A CptRequest struct.
* @return       Size of the serialized packet.
*/
size_t cpt_serialize_request(CptRequest * req, uint8_t * buffer);
```

## *cpt_serialize_response*

```
/**
* Serialize a CptResponse object for transmission.
*
* @param cpt    A CptResponse object.
* @return       Size of the serialized packet.
*/
size_t cpt_serialize_response(CptResponse * res, uint8_t * buffer);
```

# CPT Parse Functions

## *cpt_parse_response*

```
/**
 * @brief Parse serialized server response.
 *
 * @param response  Address to a CptResponse object.
 * @param buffer    Serialized response from server.
 * @return Pointer to filled CptResponse.
 */
CptResponse * cpt_parse_response(uint8_t * res_buf, size_t data_size);
```

## *cpt_parse_request*

```
/**
* Create a cpt struct from a cpt packet.
*
* @param packet    A serialized cpt protocol message.
* @return A pointer to a cpt struct.
*/
CptRequest * cpt_parse_request(uint8_t * req_buf, size_t req_size);
```