

Group 10: c2w protocol specification proposal  
spec-r302-f16-g10

Abstract

Protocol specification for the c2w (Chat While Watching) protocol. The Chat While Watching application proposes a video streaming service associated with a chatrooms, where users watching the same video stream can chat with each other. The c2w protocol satisfies all of the communication requirement of the application (login, chat services and room management), with the notable exception of the video streaming, wich is satisfied by RTP.

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1. Introduction

The Chat While Watching application is a video streaming service associated with chatrooms for each video stream. The client sends a login request to the server using the c2w login format. If the server approves the login it will send an acknowledgment followed by

the list of accessible video streams, and the list of currently connected users across multiple frames. The user can then decide to stay in the main chatroom (without video) or switch to a video chatroom using a request with the c2w room entry format. The user can then send chat messages to the server which will then transmit them to all users in the same room using the c2w chat format. At any time the user can quit the video room he is in by sending a c2w room exit request to the server, and when he is in the main room the room exit request disconnects him.

## 2. Packet format

### 2.1. Basic packet format

The following format is the baseline for all the c2w messages

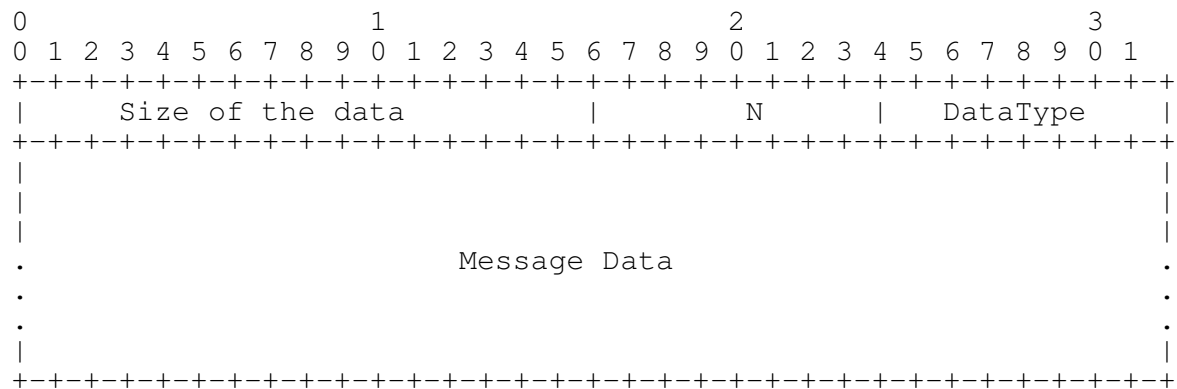


Figure 1

Size of the data (16 bits)

The size of the Message Data field in bytes.

N (8 bits)

The numerotation of the frame sent, used to prevent frame loss by comparing it to the number the recipient is expecting.

DataType (8 bits)

This value represents the type of the data transported in Message Data.

Message Data (variable lenght)

This field contains the important part of the frame. The length of this field is limited by the Size of the data field, to about 65 000 bytes.

## 2.2. Content of DataType

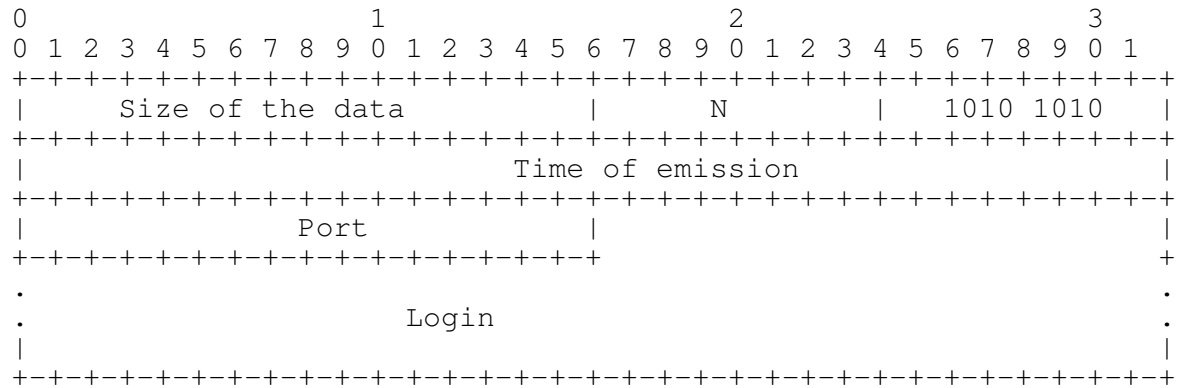
The content of DataType precise what Message Data will contain, and thus how to interpret it.

Type of frame	DataType part 1	DataType part 2	Role
Login request	1010	1010	This frame is sent by the user to create a connection with the server
Login OK	1010	1111	The acknowledgment frame for login request that also tells the client his connection is accepted.
Login denial	1010	0000	The acknowledgement frame for login request that also tells the client his connection is not accepted.
List Video	0101	0101	The server uses it to send the list of video stream available
Update User	1001	1001	The server uses it to add / remove / update user in the user list of the recipient
Room entry	1101	1101	The client sends it to start watching the specified video and access its room
Room exit	0010	0010	The client sends it to exit the current room (if he is in the main room he disconnects)
Chat send	1011	1011	The client sends it to send a message to every other user in the room
Chat receive	0111	0111	The server uses it to broadcast a message sent by a user to every other user in the same room
ACK	1111	1111	The acknowledgment frame for frame that are not login request (those get a special treatment)

Table 1: The type of frame and the content of DataType

### 2.3. Login request

This message is sent when the client wants to connect to the server. The server the client wants to connect to is the recipient of the message (the IP address is not included in this protocol, as it is already in the IP layer). If no answer is received within 5s the request is re-emitted with a new Time of emission field.



Time of emission (32 bits)

The time of the of the emission of the login request, used by the server to define the Time to re-emit value.

Port (16 bits)

The port of the server the user wants to connect to.

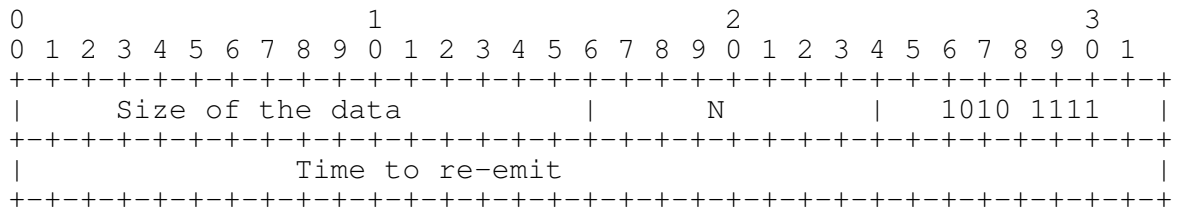
Login (variable length)

The login of the user.

The client will either receive a Login OK frame or a Login Denial frame in return, acknowledging his request and giving an answer to it.

### 2.4. Login OK

This message counts as an ACK frame for the Login request frame, adding to that the information that the connection has been accepted by the server, and the Time to re-emit value that will be used throughout all the connection.



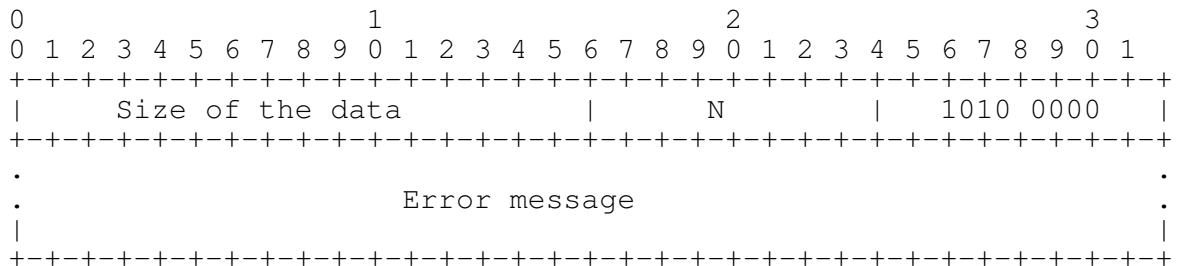
Time to re-emit (32 bits)

The time the client must wait before considering any frame he sent has been lost if he didn't receive an ACK frame.

The server will decide the value of Time to re-emit based on the duration the login request took to travel (obtained through the Time of emission field) multiplied by 4.

## 2.5. Login denial

This message counts as an ACK frame for the Login request frame, adding to that the information that the connection has been refused by the server.

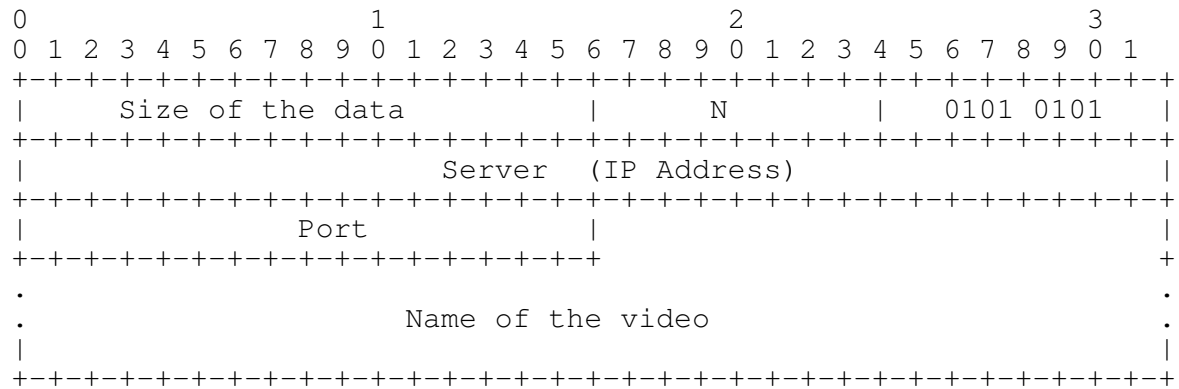


Error message (variable length)

Explain why the login attempt has been denied by the server.

## 2.6. List video

This type of frame is used by the server to send the information necessary to connect to a video stream.



Server (32 bits)

The IP address of the video streaming server.

Port (16 bits)

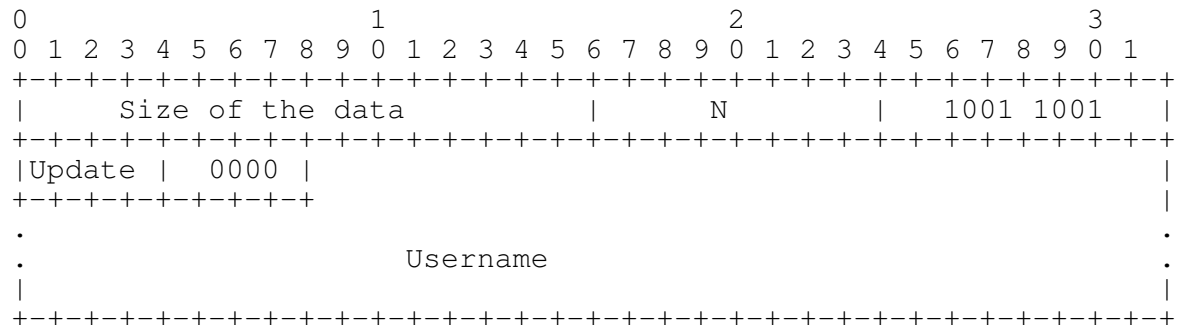
The port of the video in the streaming server.

Video (variable length)

The name of the video.

The frame type is List video, but it does not mean one frame contains the entire list by itself. Each frame contains the identification for one video only (if there are X videos to list the server will have to send X frames). Note that the client does NOT know how many videos there are beforehand, but the acknowledgement system prevents the loss of any video ID (IP, Port and Name).

## 2.7. Update user



Update (4 bits)

Define the type of update on the user in the user list (add it to the list, remove it, change its status).

Username (variable length)  
The name of the user.

Type of update																Update code			
Add user (status : in main room)																1010			
Remove user																0101			
Add user (status : watching a video)																1110			

Content of the field Update

## 2.8. Room entry

0										1										2										3									
0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1								
+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+								
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Server										(IP Address)																													
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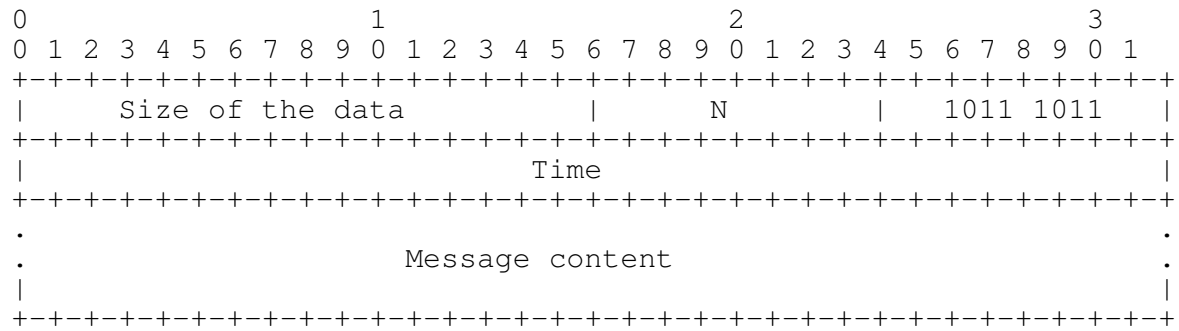
Server (32 bits)  
The IP address of the server streaming the video.

Port (16 bits)  
The port of the video in the server.

## 2.9. Room exit

0																1																2																3															
0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1																						
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## 2.10. Chat send



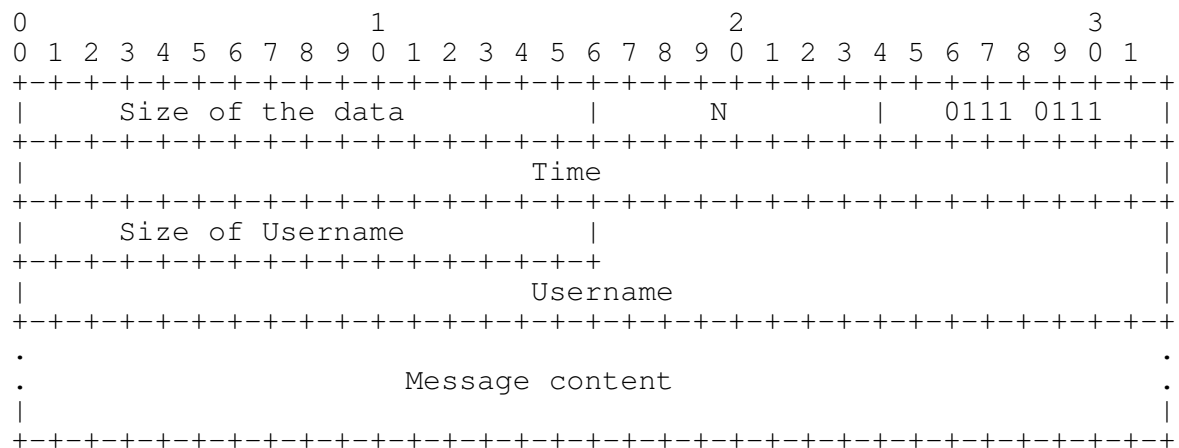
Time (32 bits)

The time when the user sent the message (Unix time).

Message content (variable length)

The content of the message the user sent.

## 2.11. Chat receive



Time (32 bits)

The time when the user sent the message (Unix time).

Size of Username (16 bits)

The size of Username field in bytes.

Username (variable length)

The username of the sender.

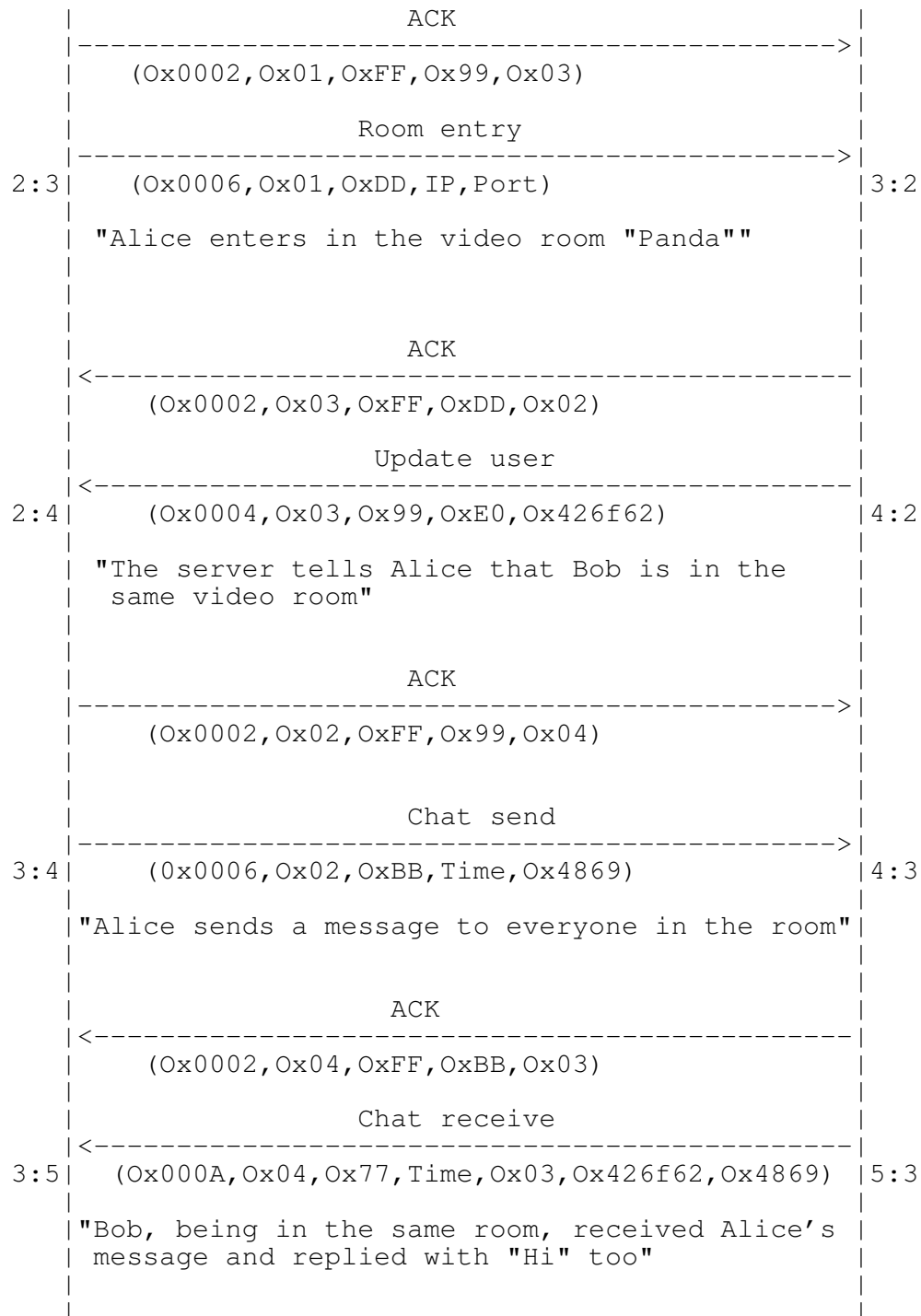
Message content (variable length)

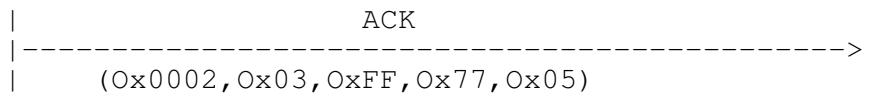
The content of the message the user sent.











#### 4. Conclusion

This protocol can be used either on top of TCP or UDP, as it implements its own reliability method. It satisfies most of the needs of the application Chat While Watching, with the exception of the video stream, which must be satisfied by RTP.

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