Bullet Chatting Logical Architecture and Data Flow Diagram

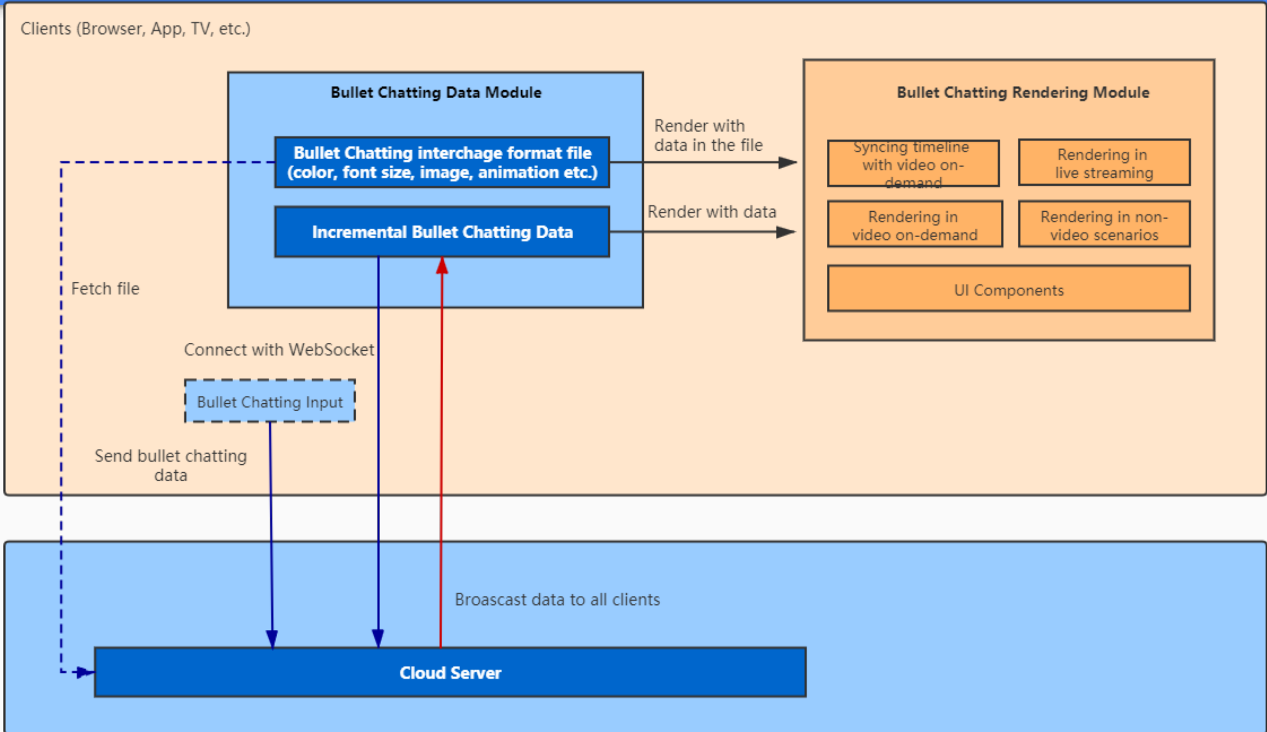
Bullet Chatting Task Force / CG
24 Mar 2020

Agenda

- Bullet Chatting Logical Architecture Diagram
- Bullet Chatting Data Flow Chart
- Whether Bullet Chatting File Standardization is needed
- Necessity of Bullet Chatting Rendering Standardization
- Use cases to be covered by Bullet Chatting Rendering
- Rendering Behaviors to be covered by Bullet Chatting Rendering Standardization

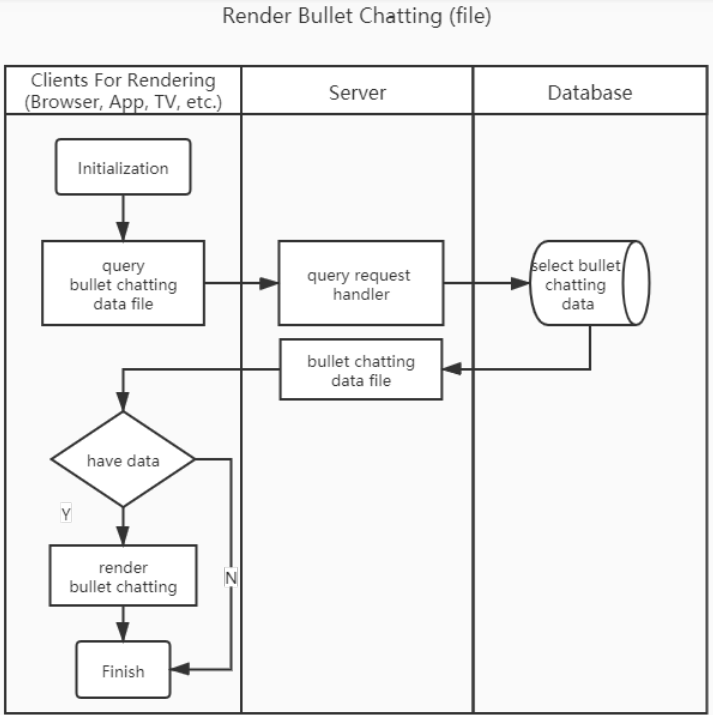
Bullet Chatting Logical Architecture Diagram

- In Bullet Chatting client there are mainly Bullet Chatting Data and Rendering modules
- On initialization the client loads Bullet chatting interchange format file from the server
- When running the client get incremental bullet chatting data by using websocket or polling
- Rendering Module shall cover 3 scenarios: video on-demand, live streaming, non-video
- The server and clients are from the same vendor.


Clients (Browser, App, TV, etc.)
Bullet Chatting Data Module
Bullet Chatting interchage format file (color, font size, image, animation etc.)
Incremental Bullet Chatting Data
Render with data in the file
Render with data
Bullet Chatting Rendering Module
Syncing timeline with video on-demand
Rendering in live streaming
Rendering in video on-demand
Rendering in non-video scenarios
UI Components
Fetch file
Connect with WebSocket
Bullet Chatting Input
Send bullet chatting data
Broascast data to all clients
Cloud Server

Bullet Chatting Data Flow Chart

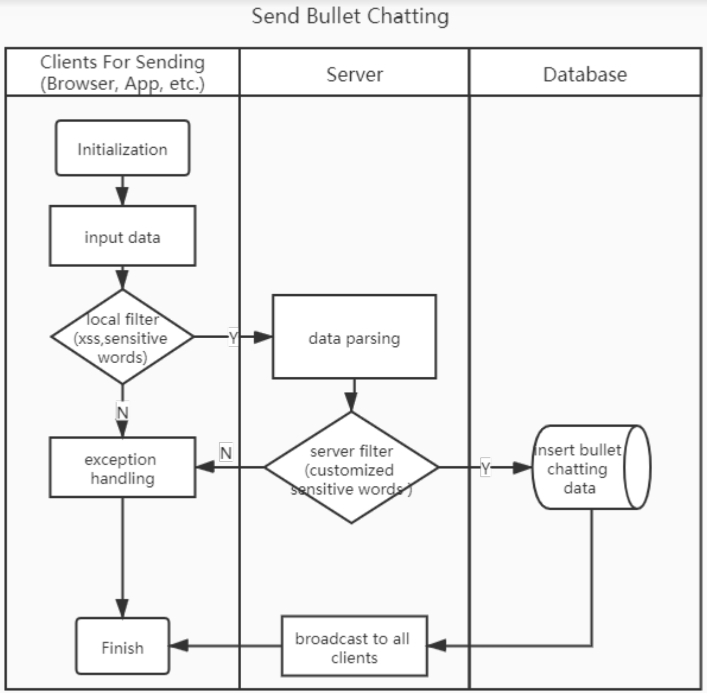
- Rendering Bullet Chatting in file



Render Bullet Chatting (file)
Clients For Rendering (Browser, App, TV, etc.)
Server
Database
Initialization
query bullet chatting data file
query request handler
select bullet chatting data
bullet chatting data file
have data
Y
N
render bullet chatting
Finish

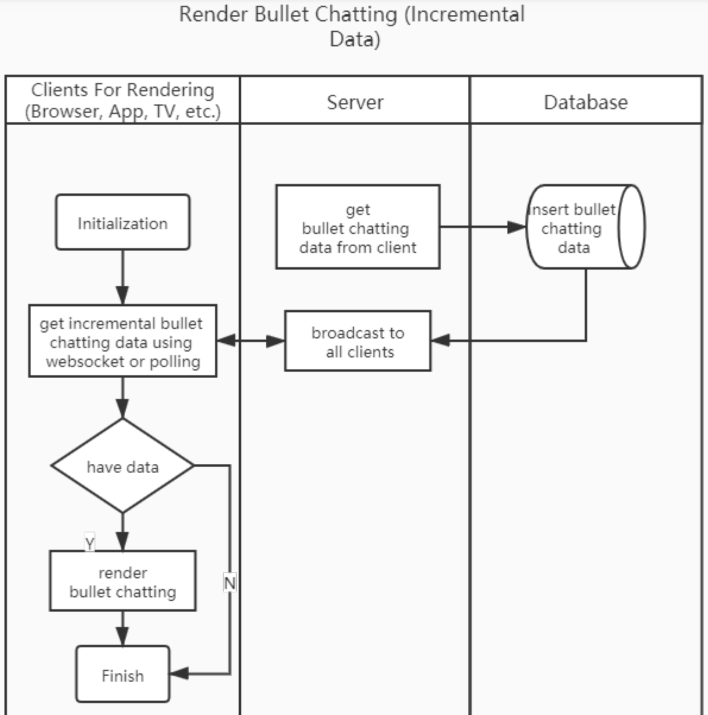
Bullet Chatting Data Flow Chart

- Sending Bullet Chatting


Send Bullet Chatting
Clients For Sending (Browser, App, etc.)
Server
Database
Initialization
input data
local filter (xss,sensitive words)
Y
data parsing
N
exception handling
N
server filter (customized sensitive words)
Y
insert bullet chatting data
Finish
broadcast to all clients

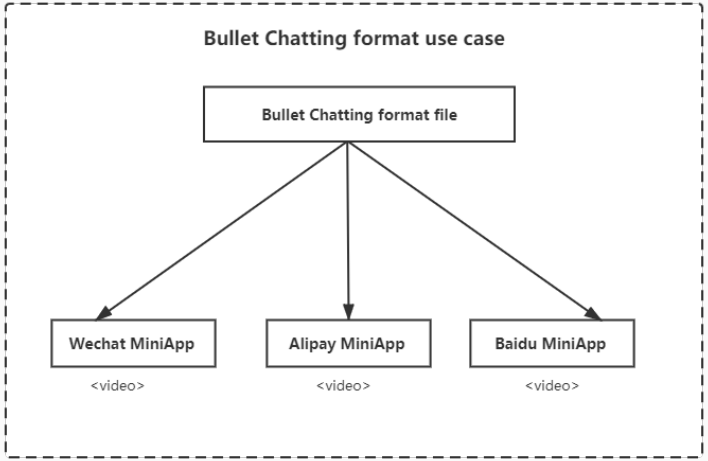
Bullet Chatting Data Flow Chart

- Rendering Incremental Bullet Chatting


Render Bullet Chatting (Incremental Data)
Clients For Rendering (Browser, App, TV, etc.)
Server
Database
Initialization
get incremental bullet chatting data using websocket or polling
have data
Y
N
render bullet chatting
Finish
get bullet chatting data from client
broadcast to all clients
insert bullet chatting data

Whether Bullet Chatting File Standardization is needed

- No requirement for interoperability at present
- Portability requirement
    - Support multiple platform, iOS, Android, desktop OS, etc.
    - Support mini apps for multiple vendors
- Save cost of new developers / companies

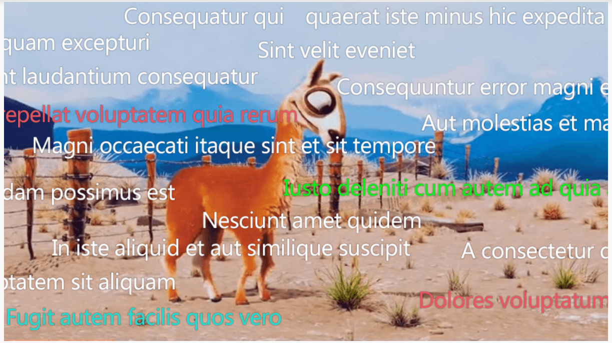


Necessity of Bullet Chatting Rendering Standardization

- Currently Bullet Chatting Rendering is not supported in the browser in a standard way
- At present Web developers mainly use Canvas or CSS to implement Bullet Chatting
  - The Canvas Way
    - **Advantages**: The performance is better when used with WebGL and a large number of bullet chatting text can be displayed at the same time.
    - **Disadvantages**: Not flexible. It is cumbersome to display bullet chat that contains both text and images, and to pause the animation of one of the moving bullet chats. Moreover, resolution issue needs to be addressed on mobile devices.
  - The CSS Way
    - **Advantages**: Simple and flexible. Developers can style the bullet chat through the DOM, and supports the combination of images and text. The user can pause a particular bullet chat of interest.
    - **Disadvantages**: Huge collections of DOM nodes will be generated when the there are much bullet chatting. It will consume more memory and make the page unresponsive. Moreover, to manipulate the bullet chatting such as making the bullet chatting disappear, the corresponding DOM node needs to be removed.

Use cases to be covered by Bullet Chatting Rendering Standardization (1)

- On-demand Video
  - The bullet chatting content includes text, images and animation, etc.
  - The bullet chatting may be sent by a user in real time. For real-time bullet chatting, it is associated with the timeline of the video and will be displayed at the certain time.
    - For example, the user A sends a bullet chatting message at 00:00:10, the other users viewing the video will see the bullet chatting sent by user A at 00:00:10 of the video.
  - If the user pause the video, and the bullet chatting is also paused
  - In some vendors, it is supported - if the use hover one bullet chatting then the bullet chatting stop scrolling, and other bullet chatting is display as usual.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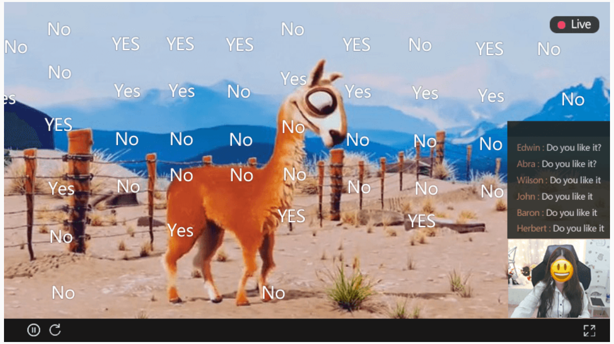
Fugit autem facilis quos vero

Use cases to be covered by Bullet Chatting Rendering Standardization (2)

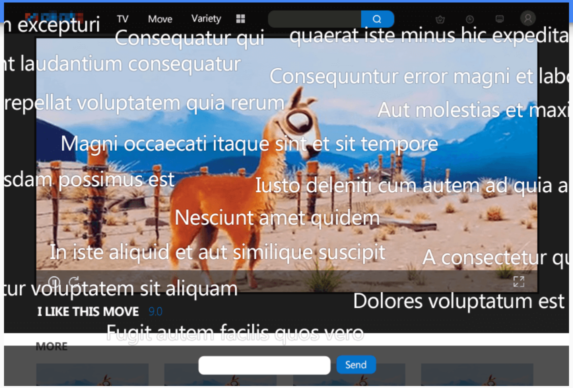
- Live Streaming
  - Irrelative to the media timeline
    - there is no progress bar in live streaming
  - The bullet chatting sent by the user needs to be displayed in real-time on both the anchor's and the viewers' screen.
    - the server broadcasts the bullet chatting via websocket
  - The live streaming can be paused and not be rewound. If the user pause the video, the bullet chatting is also paused.
    - There exists the mixture of on-demand video and live streaming scenario, and it is not supported in Bullet Chatting)



Edwin : Do you like it?
Abra : Do you like it?
Wilson : Do you like it
John : Do you like it
Baron : Do you like it
Herbert : Do you like it

Use cases to be covered by Bullet Chatting Rendering Standardization (3)

- Interaction within a webpage
  - ○ The Bullet Chatting is used in the webpage to promote some products and improve the effect of the page
  - ○ the Bullet Chatting is displayed separately and is not attached to the video
- Interactive wall
  - ○ The user can send the content of the Bullet Chatting to the display wall in an offline event.



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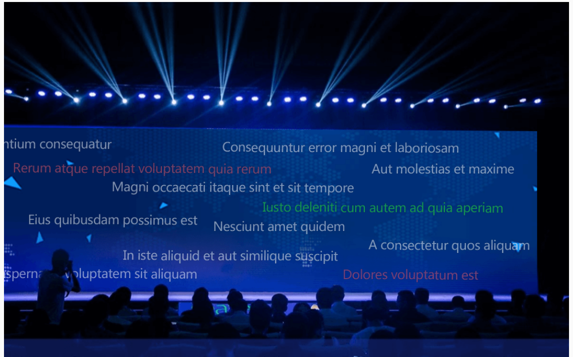

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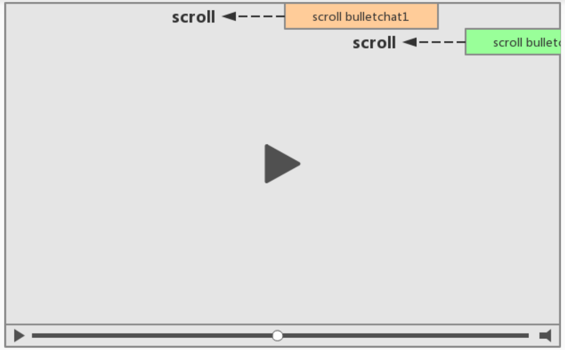
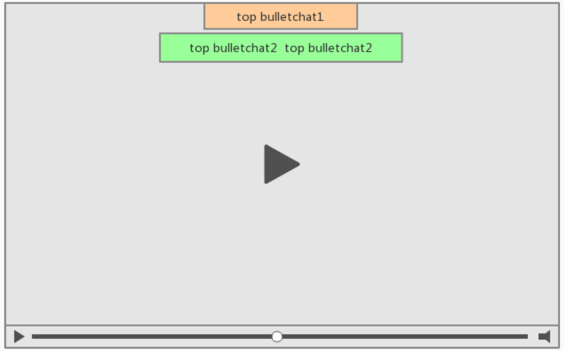
Rendering Behaviors to be covered by Bullet Chatting Rendering Standardization (1)

- Element
  - We propose Bullet Chatting use new elements which are not used as children of the media elements audio and video. The usage of bullet chatting is not limited to those media elements like video. In scenarios like Web page interaction or interactive wall, bullet chatting is independent of any media element.
- Attributes
  - the percentage of the total height of the Bullet Chatting in Bullet Chatting display area
  - whether the Bullet Chatting beyond the display area allows overlap or not
  - The mode of Bullet Chatting: scroll, top, bottom and reverse
- Event:
  - The event is triggered when the Bullet Chatting animation starts / ends.
  - The event is triggered when the Bullet Chatting is terminated unexpectedly, such as the Bullet Chatting is removed or hidden, or because the display area is not displayed.





Rendering Behaviors to be covered by Bullet Chatting Rendering Standardization (2)

- Style:
  - the state of the Bullet Chatting as running or paused
  - the duration of the Bullet Chatting is rendered
  - when the Bullet Chatting animation begins, defining a negative value allows a Bullet Chatting to start moving from the middle
  - Font size, color, border, line height, transparency, shadow, etc.
- Sync with Media Timeline
  - In on-demand video scenario, the bullet chatting is associated with media timeline
    - At present the Bullet Chatting is synchronized and rendered via ontimeupdate, or every media frame is synchronized and rendered via requestAnimationFrame
    - Media Timed Events TF: https://w3c.github.io/me-media-timed-events/#synchronized-rendering-of-web-resources 5.2.2 & 5.2.3