



(19) **United States**

(12) **Patent Application Publication**

Brown et al.

(10) **Pub. No.: US 2023/0231932 A1**

(43) **Pub. Date: Jul. 20, 2023**

(54) **PACKET PROCESSING OF STREAMING CONTENT IN A COMMUNICATIONS NETWORK**

*H04N 21/2225* (2006.01)  
*H04N 21/232* (2006.01)  
*H04N 21/44* (2006.01)  
*H04N 21/231* (2006.01)  
*H04L 49/9057* (2006.01)

(71) Applicant: **Level 3 Communications, LLC**,  
Broomfield, CO (US)

(72) Inventors: **Timothy Brown**, Moseley, VA (US);  
**Veronica Kravchenko**, Dublin (IE)

(73) Assignee: **Level 3 Communications, LLC**,  
Broomfield, CO (US)

(52) **U.S. Cl.**  
CPC ..... *H04L 67/5682* (2022.05); *H04L 49/252*  
(2013.01); *H04L 49/9005* (2013.01); *H04L*  
*49/9026* (2013.01); *H04L 49/9036* (2013.01);  
*H04L 49/9057* (2013.01); *H04L 65/765*  
(2022.05); *H04L 67/568* (2022.05); *H04L*  
*67/5681* (2022.05); *H04N 21/232* (2013.01);  
*H04N 21/2225* (2013.01); *H04N 21/23106*  
(2013.01); *H04N 21/44004* (2013.01)

(21) Appl. No.: **18/126,593**

(22) Filed: **Mar. 27, 2023**

**Related U.S. Application Data**

(63) Continuation of application No. 17/395,205, filed on  
Aug. 5, 2021, now Pat. No. 11,616,858.

(60) Provisional application No. 63/062,256, filed on Aug.  
6, 2020.

**Publication Classification**

(51) **Int. Cl.**  
*H04L 67/5682* (2006.01)  
*H04L 49/25* (2006.01)  
*H04L 49/9005* (2006.01)  
*H04L 49/90* (2006.01)  
*H04L 65/75* (2006.01)  
*H04L 67/568* (2006.01)  
*H04L 67/5681* (2006.01)

(57) **ABSTRACT**

Aspects of present disclosure include devices within a transmission path of streamed content forwarding received data packets of the stream to the next device or “hop” in the path prior to buffering the data packet at the device. In this method, typical buffering of the data stream may therefore occur at the destination device for presentation at a consuming device, while the devices along the transmission path may transmit a received packet before buffering. Further, devices along the path may also buffer the content stream after forwarding to fill subsequent requests for dropped data packets of the content stream. Also, in response to receiving the request for the content stream, a device may first transmit a portion of the contents of the gateway buffer to the requesting device to fill a respective buffer at the receiving device.

