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DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN,
HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR,
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TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE,
DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU,
LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK,
SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ,
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[Continued on next page]

(54) **Title:** REDUCTION OF LATENCY IN VIDEO DISTRIBUTION NETWORKS USING ADAPTIVE BIT RATES

(57) **Abstract:** Systems and methods are provided for reducing and controlling playback latency in an unmanaged, buffered data network. A delay cost function is determined, the function representing the effect of playback latency on end user experience. An encoder transmits audiovisual data through the network to a client device. Network latency is measured, and the delay cost function is evaluated to establish an encoding bitrate for the encoder. The encoding of the audiovisual data is altered in response to dynamic network conditions, thereby controlling end-to-end playback latency of the system, which is represented by the playout length of data buffered between the encoder and the client device.

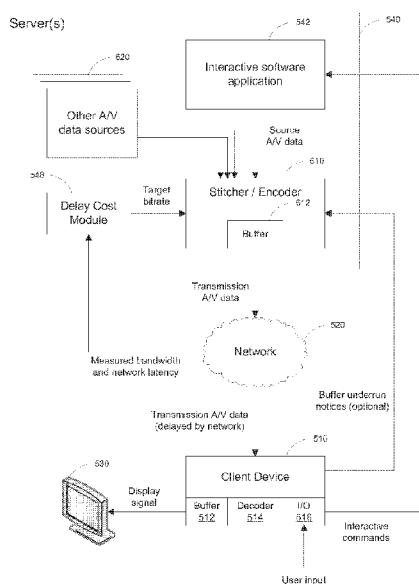


FIG. 6



— *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))*

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2012/032010**A. CLASSIFICATION OF SUBJECT MATTER*****H04N 21/238(2011.01)i***

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

H04N 21/238; H04J 3/06; H04N 7/15; H04N 7/26; H04N 7/12; H04N 11/02

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Korean utility models and applications for utility models

Japanese utility models and applications for utility models

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

eKOMPASS(KIPO internal) & Keywords: encoding, audiovisual, transmit, latency, delay cost

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 2009-0225790 A1 (SHAY GREGORY F. et al.) 10 September 2009 See abstract; claim 17 and figures 1-9.	1-34
A	US 2010-0067571 A1 (WHITE PATRICK et al.) 18 March 2010 See abstract; paragraphs 0024-0028; figures 1-3.	1-34
A	US 2011-0002376 A1 (AHMED S. NADEEM et al.) 06 January 2011 See abstract; paragraphs 0033-0064; figures 1-6.	1-34
A	US 2010-0226428 A1 (THEVATHASAN HARESH et al.) 09 September 2010 See abstract; paragraphs 0040-0041.	1-34



Further documents are listed in the continuation of Box C.



See patent family annex.

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"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

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INTERNATIONAL SEARCH REPORT

Information on patent family members

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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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US 2011-0002376 A1	06.01.2011	None	
US 2010-0226428 A1	09.09.2010	None	