PATROLL Claim Chart Submission

U.S. Patent 11,019,372

U.S. Patent 11,019,372 ("*Scale Video Coding*" or the "patent-at-issue") was filed on January 29, 2016, and claims an earliest priority date on January 26, 2005. Claim 6 of the patent-at-issue is directed to a method of an overlay multicast network. The overlay multicast network may provide a set of features to ensure reliable and timely arrival of multicast data. The embodiments include a congestion control system that may prioritize designated layers of data within a data stream over other layers of the same data stream. Each data stream transmitted over the network may be given an equal share of the bandwidth. Addressing in routing tables maintained by routers may utilize summarized addressing based on the difference in location of the router and destination address. Summarization levels may be adjusted to minimize travel distances for packets in the network. Data from high priority data stream layers may also be retransmitted upon request from a destination machine to ensure reliable delivery of data.

The primary reference, U.S. Patent 7,093,028 ("*Microsoft*"), was filed on December 15, 1999, and claims priority on the same date. The patent is directed to a method of scalable video transmission in which client interaction and video content itself are taken into consideration during transmission. The method includes prioritizing/classifying different types of information according to their importance and to packetize or otherwise arrange the prioritized information in a manner such that lower priority information may be dropped during transmission. Thus, when network congestion occurs or there is not enough network bandwidth to transmit all of the prioritized information about an object, some (e.g., lower priority) information may be dropped at the server or at an intermediate network node to reduce the bit rate. Thus, when the server transmits multiple video objects over a channel of limited bandwidth capacity, the bit rate allocated to each object can be adjusted according to several factors, such as information importance and client interaction.

The secondary reference, U.S. Patent 2005/0275752 ("*Koninklijke Philips*"), was filed on April 14, 2005, and claims an earliest priority date of October, 15, 2002. The patent is directed to a method of transmitting scalable coded video over an IP network. The method includes a pre-processing method of multi-track hinting, which efficiently structures layered video into a flexible format so that it can be easily streamed over packet-switching networks in accordance with changing network conditions, complexity constraints and user preferences. A general purpose MPEG server, without major modification, is capable of automatically using multiple channels (i.e., RTP connections), thereby providing the streaming system the flexibility to adapt to changing network conditions, complexity constraints and user preferences by adjusting the number of scalable layers to be transmitted. Accordingly, the multi-track hinting method extends the functions of standard Internet streaming protocols (RTSP, SDP) to enable flexible adaptation.

A sample claim chart comparing claim 1 of *Scale Video Coding* to *Microsoft* and *Koninklijke Philips* is provided below.

US-11019372-B2 ("*Scale Video Coding*")	**A. US-7093028-B1** ("*Microsoft*") **B. US-20050275752-A1** ("*Koninklijke Philips*")
[6.pre] A **method for transmitting video signals**, the method comprising:	**A. US-7093028-B1** "This invention relates generally to data communications and, more particularly, to prioritization **methods and arrangements for selectively transmitting object-based data based on data content** in response to dynamically changing network conditions and/or client preferences." *Microsoft* at col. 1:8-12 "The **object-based media information** may further include a plurality of different types of **video object information**…" *Microsoft* at col. 2:44-45 "1. **A method comprising**…" *Microsoft* at claim 1 **B. US-20050275752-A1** "1. A **method for streaming scalable coded video over a network**, the method comprising…" *Koninklijke Philips* at claim 1
[6.a] **receiving a layered video data stream** comprising a **base layer** and a set of **enhancement layers**;	**A. US-7093028-B1** "By way of further example, the information in the data bitstream of object-based video coding… can be divided into the following types of information… **an Intra (I) coded frame base layer… a Predicted (P) frame base layer… a Bi-directionally (B) predicted frame base layer**… **Intra (I) coded frame enhancement layer… Predicted (P) frame enhancement layer… Bi-directionally (B) predicted frame enhancement layer**." *Microsoft* at col. 5:39-62 "…**receiving a data bitstream that includes object-based media information**…" *Microsoft* at claim 1 "2. The method as recited in claim 1, **wherein the data bitstream includes object-based media information for a single object**." *Microsoft* at claim 2 "3. The method as recited in claim 2, **wherein the single object is a video object**." *Microsoft* at claim 3 "9. The method as recited in claim 3, wherein **the object-based media information** includes a **plurality of different**

	types of video frame layers selected from a group…" *Microsoft* at claim 9 **B. US-20050275752-A1** "…As such, the present invention provides an architectural framework for streaming scalable coded video over IP networks that allow a server to create multiple RTP connections to **accommodate each sub-layer of a layered video stream** which allows for the desired adaptation to channel characteristics, complexity, client preference, etc." *Koninklijke Philips* at para. 25 "FIG. 4 conceptually illustrates a **layered coding scheme 400 implemented by the video encoder 220** of FIG. 2. To construct a scalable coded bit-stream for transmission over an IP network, **the bit-stream must be layered**." *Koninklijke Philips* at para. 34 "In accordance with the principles of the invention, the encoder 220 compression-codes frames of video data into multiple layers, including **a base layer (e.g., base layer video 402)** and **a single enhancement layer (e.g., enhancement layer video 404)**." *Koninklijke Philips* at para. 35
[6.b] **identifying bandwidth-limited conditions** of an **internet protocol network** between **a video router and a plurality of video receivers**;	**A. US-7093028-B1** "The system further includes **at least one video transmission agent (VTA)**, which is coupled to receive the **prioritized object-based data packets from the server device and the control requests from the client device**…" *Microsoft* at col. 3:4-8 "For example, **a server, gateway, router, or other like device may be provided within network 11 to perform this task**." *Microsoft* at col. 6:54-56 "Future generations of the **Internet Protocol** will provide **differential service, whereby data packets will be treated as having a specified priority**." *Microsoft* at col. 8:12-14 "As shown in the two examples of FIGS. 7, 8 and FIGS. 9, 10 the approaches taught by the methods and arrangements perform better than traditional approaches under the same **network bandwidth and packet loss conditions**." *Microsoft* at col. 14:9-12

	"23. The method as recited in claim 1, **wherein the network is an Internet Protocol (IP) based network**." *Microsoft* at claim 23 "24. An arrangement comprising: a server device configured to provide a data bitstream that includes object-based media information having portions of the object-based media information **associated with a plurality of different transmission priority levels and that includes identifications of the associated plurality of different transmission priority levels**…" *Microsoft* at claim 24 **B. US-20050275752-A1** "…being highly adaptable to unpredictable bandwidth variations due to heterogeneous access-technologies of the **receivers (e.g., analog modems, cable modems, XDSL, etc.)**…" *Koninklijke Philips* at para. 3 "…Additionally, **the transport mechanism can be stored in the file by adding specific hint tracks, one per media track**…" *Koninklijke Philips* at para. 27 "…Accordingly, the multi-track hinting method extends the functions of standard **Internet streaming protocols (RTSP, SDP)** to enable flexible adaptation." *Koninklijke Philips* at para. 12 "FIG. 4 conceptually illustrates a layered coding scheme to construct a scalable coded bit-stream for transmission **over an IP network** in accordance with one embodiment of the invention." *Koninklijke Philips* at para. 19 "…As such, the present invention provides an architectural framework for streaming scalable coded video **over IP networks** that allow a server to create multiple RTP connections to accommodate each sub-layer of a layered video stream which allows for the **desired adaptation to channel characteristics, complexity, client preference, etc**." *Koninklijke Philips* at para. 25 "3. The method of claim 2, wherein said step (f) of determining a portion of said encoded second bit-stream to be transmitted is made in accordance with at least one of a **prevailing network condition, a network bandwidth variation, a network complexity constraint and a user preference**." *Koninklijke Philips* at claim 3

[6.c] **forwarding the base layer** to at least two of the **plurality of video receivers** via **the internet protocol network**; and	**A. US-7093028-B1** "**Each data packet is addressed to the receiving node and selectively forwarded between various nodes within the packet switched network** until it reaches the receiving node." *Microsoft* at col. 1:37-40 "…**at least one video transmission agent (ETA) [sic]** that is **part of a network linking the at least one client device to the at least one server device**, **the VTA coupled to receive the prioritized object-based data packets from the server device and the control requests from the client device**…" *Microsoft* at claim 64 **B. US-20050275752-A1** "…c) **generating a first hint track** to **facilitate the transmission of said encoded first bit-stream (base layer) over said network**…" *Koninklijke Philips* at claim 1
[6.d] **selectively forwarding one or more of the set of enhancement layers, but fewer than all of the set of enhancement layers**, to at least two of **the plurality of video receivers through the internet protocol network based upon the identified bandwidth-limited conditions**;	**A. US-7093028-B1** "52. The method as recited in claim 51, wherein, within the received data, at least one of the following statements is true… **…the Intra (I) coded frame enhancement layer data has a higher transmission priority level than Predicted (P) frame enhancement layer data; and** **the Predicted (P) frame enhancement layer data has a higher transmission priority level than Bi-directionally (B) predicted frame enhancement layer data**." *Microsoft* at claim 52 "…**the VTA adapted to selectively output at least a portion of the received prioritized object-based data packets to the client device based on the prioritization and in response to the control requests**." *Microsoft* at claim 64 "65. The system as recited in claim 64, further comprising: **a network operatively coupled between the server device and the client device**, and **wherein the video transmission agent (VTA) is operatively configured within the network**." *Microsoft* at claim 65 **B. US-20050275752-A1** "…d) **generating a plurality of enhancement layer hint tracks** to **facilitate the transmission of at least a portion of said second bit-stream (enhancement layer) over said network**." *Koninklijke* at claim 1

	"3. The method of claim 2, wherein step (f) of determining a portion of said encoded second bit-stream to be transmitted is **made in accordance with at least one of a prevailing network condition, a network bandwidth variation, a network complexity constraint and a user preference**." *Koninklijke* at claim 3
[6.e] wherein the **layered video data stream** is **transmitted according to an internet protocol**; and	**A. US-7093028-B1** "…**the resulting prioritized data stream** can be used to **better control data flow at server 12 or within network 11, meet QoS requirements, enhance user interaction capabilities, and/or better support multicasting services to a plurality of receiving nodes**…" *Microsoft* at col. 8:41-45 "FIG. 6 is a block diagram illustratively depicting how a plurality of VTAs can be used to **control the flow of packetized data between server device 12 and a plurality of clients… with respect to multicasting of video data**." *Microsoft* at col. 9:54-58 "**The bit rate of a video stream** can be **adjusted to network state by discarding low priority packets**." *Microsoft* at col. 10:54-56 "61. The method as recited in claim 47, further comprising: **receiving at least one down-stream preference with regard to the object-based media information**; and **selectively outputting at least one of the portions of the object-based media information based on the down-stream preference**." *Microsoft* at claim 61 **B. US-20050275752-A1** "…an architectural framework for **streaming scalable coded video over IP networks** that allow a server to create multiple RTP connections to accommodate each sub-layer of a **layered video stream** which allows for the desired adaptation to channel characteristics, complexity, etc." *Koninklijke Philips* at para. 10 "…RTP is **an Internet protocol for transmitting real-time data such as audio and video**…" *Koninklijke Philips* at para. 8

[6.f] wherein **each layer of the layered video stream comprises data packets**, **each of which is encoded with a sequence number and a layer identifier**, and **wherein the layer identifier for each data packet is based upon a layer to which the packet belongs**.	**A. US-7093028-B1** "**One advantage of MPEG compared to other video and audio coding formats is that MPEG files are much smaller for the same quality. This is because MPEG sues very sophisticated compression techniques to code frames, or as is the case in MPEG-4 to code objects as separate frame layers**." *Microsoft* at col. 4:50-55 "5. The method as recited in claim 1, wherein associating portions of the object-based media information with the plurality of different transmission priority levels further includes: **placing the portions of the object-based media information in a plurality of data packets**, **wherein each data packet is associated with a specific transmission priority of the plurality of different transmission priority levels**." *Microsoft* at claim 5 "22. **The method as recited in claim 1, wherein the data bitstream includes MPEG-4 encoded video data**." *Microsoft* at claim 22 "…**wherein the received data is packetized according to different transmission priority levels based at least in part on the type of video frame layer and the type of video object information**." *Microsoft* at claim 59 **B. US-20050275752-A1** "…hint tracks for **streaming the media over packet-based network** and **contain information such as timing, data pointers and data for packet headers that a server will use to generate packets from the elementary bit streams (i.e., hint track for audio 110, hint track for video 112)**." *Koninklijke Philips* at para. 6 "…**Each RTP connection will be assigned with a hint track and responsible for delivering packets generated from that track**…" *Koninklijke Philips* at para. 8 "…**The role of the hint track** will then be to **store the information about how the network packets are made, how they can be filled; the hint track indeed contains pre-segmentation information so that a server knows how to fragment each Access Unit into network packets**…" *Koninklijke Philips* at para. 27

	"…1) **identifying those enhancement layer hint tracks** from among said plurality of enhancement layer hint tracks required to satisfy said determined portion to be transmitted…" *Koninklijke Philips* at claim 4