

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Sony Interactive Entertainment LLC
Petitioner

v.

Intellectual Pixels Limited
Patent Owner

Case IPR2021-00237
Patent No. 10,681,109
Filed: December 4, 2020

PETITIONER'S DEMONSTRATIVE EXHIBITS



**United States Patent and Trademark Office
Before the Patent Trial and Appeal Board**

**Sony Interactive Entertainment LLC, Petitioner,
v.
Intellectual Pixels Limited, Patent Owner.**

Case No. IPR2021-00237

Inter Partes Review of U.S. Patent No. 10,681,109

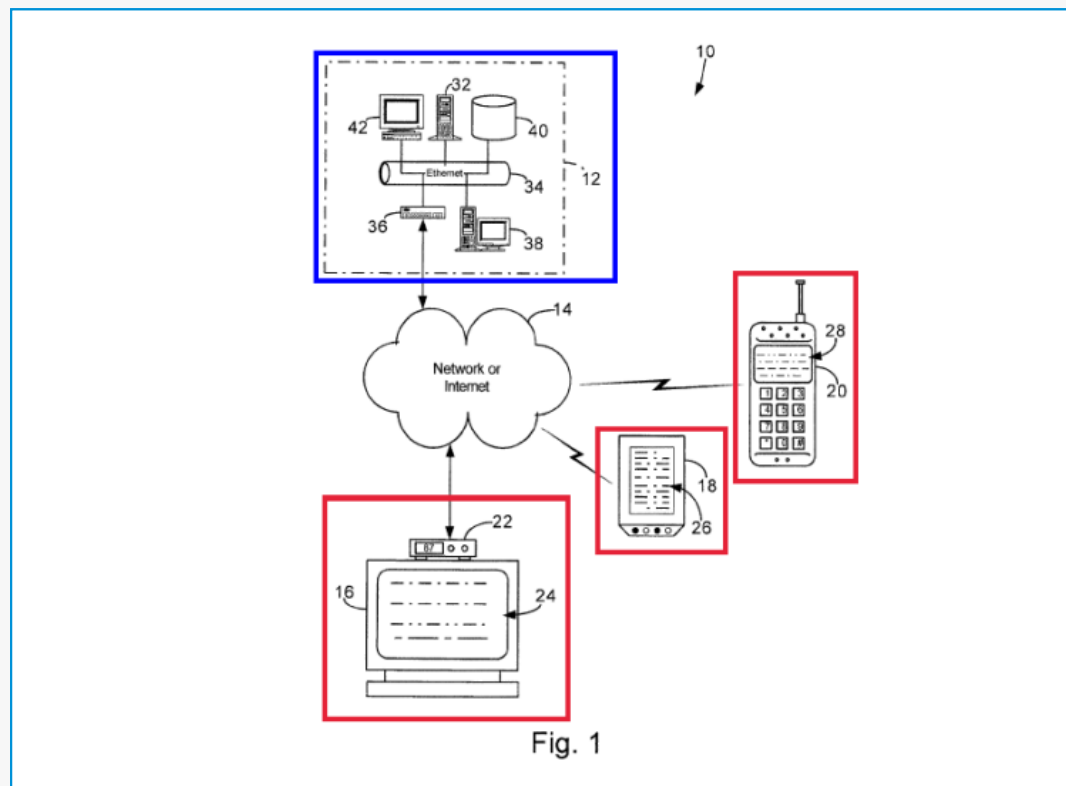
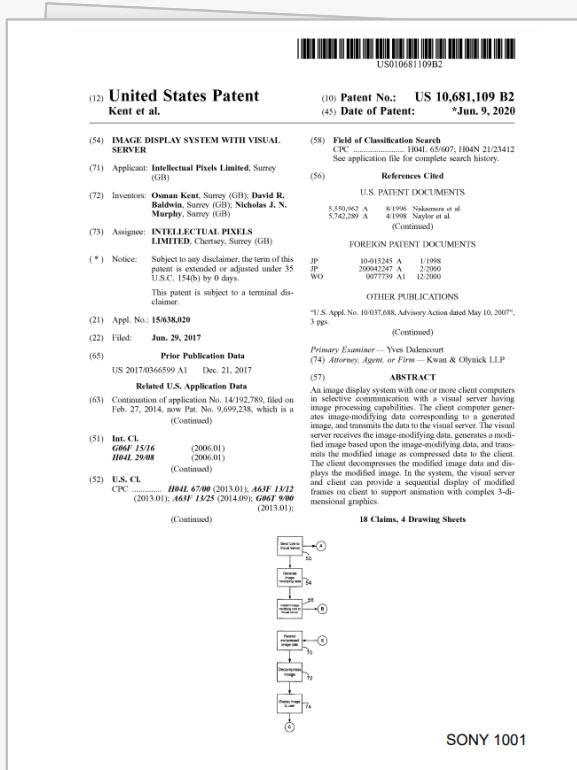
March 10, 2022

Overview of Grounds

Grounds / Claims Challenged*	35 U.S.C.	Reference(s)
I. Claims 1 and 3-12	103(a)	Wiltshire (Ex. 1004) + Saha (Ex. 1005)
II. Claim 2	103(a)	Wiltshire (Ex. 1004) + Saha (Ex. 1005) + Chen (Ex. 1006)
III. Claims 6, 11, and 12	103(a)	Wiltshire (Ex. 1004) + Saha (Ex. 1005) + PC Magazine (Ex. 1007)

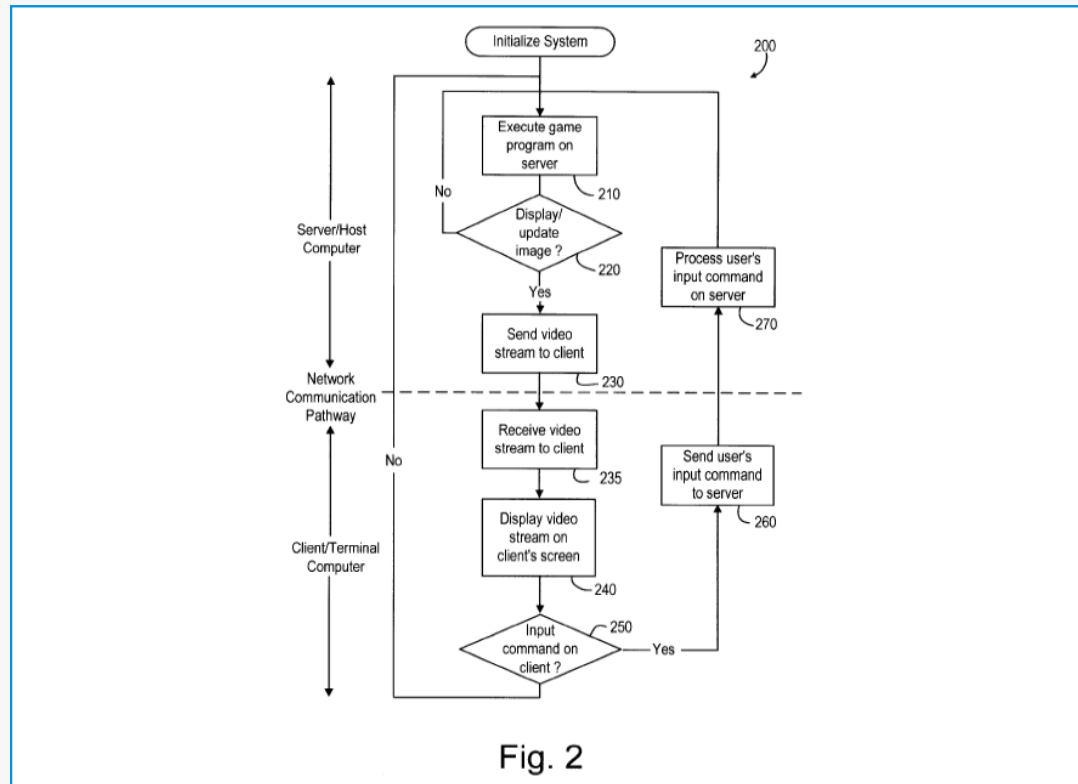
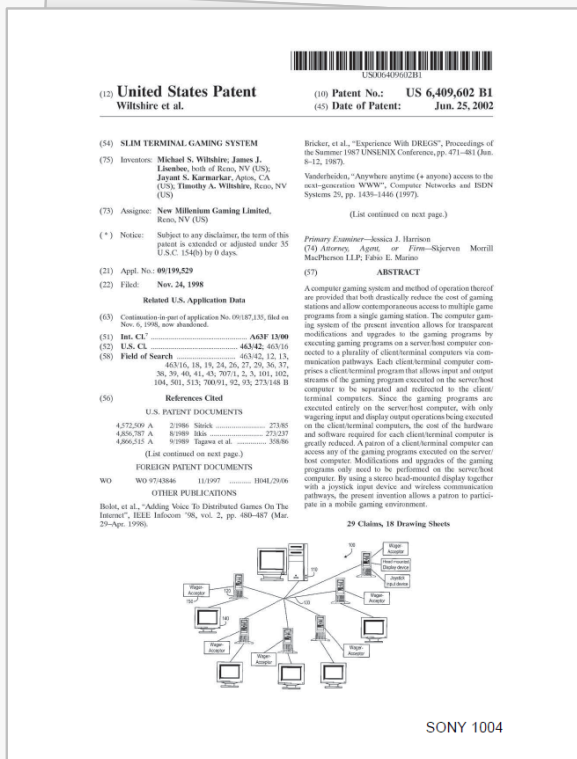
* Patent Owner disclaimed challenged claims 13-18. See Ex. 2001.

Petition at 11



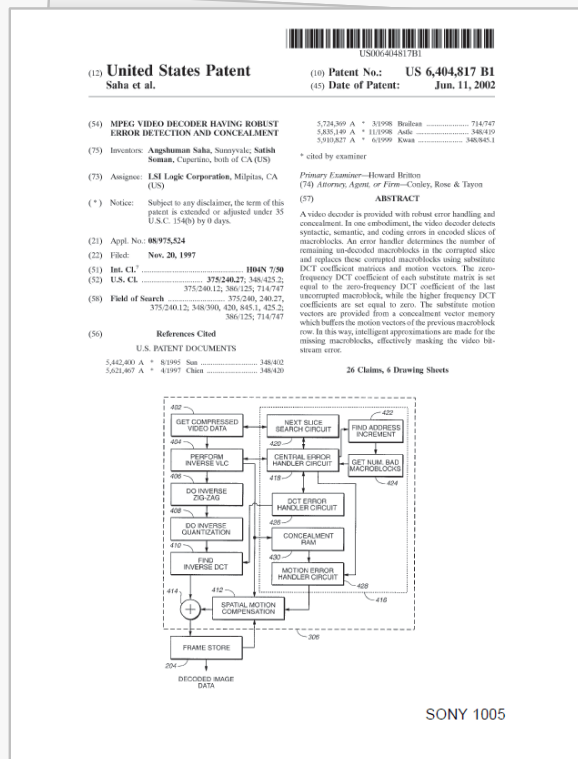
Ex. 1001 ('109 Patent) at Fig. 1

Petition at 16



Ex. 1004 (Wiltshire) at Fig. 2

Prior Art: Saha (Ex. I 005)



The compression standard referred to as **MPEG** (Moving Pictures Experts Group) compression is a set of methods for **compression and decompression of full motion video images** which uses the interframe and intraframe compression techniques described above. MPEG compression uses both motion compensation and discrete cosine transform (DCT) processes, among others, and can yield very high compression ratios.

Ex. I005 (Saha) at 1:64-2:4

Petition at 18, 33

Prior Art: PC Magazine (Ex. I 007)

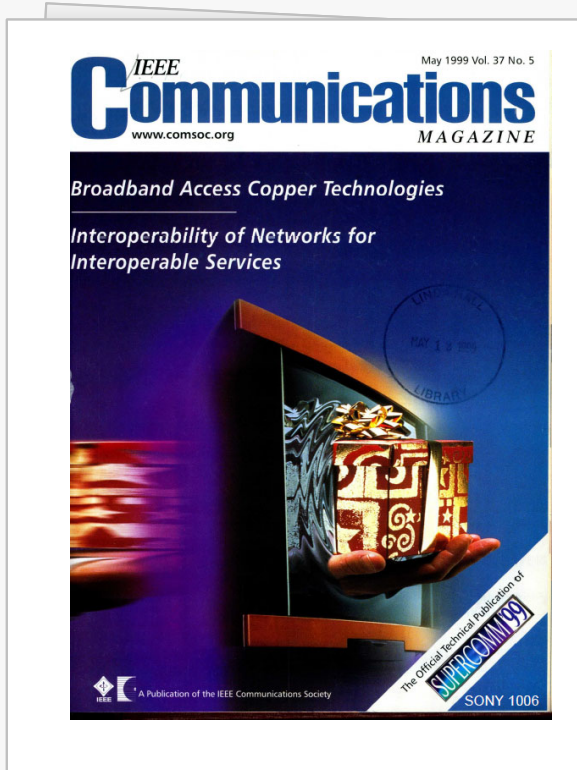


Petition at 18, 67



Ex. I007 (PC Magazine) at 10

Prior Art: Chen (Ex. 1006)



The Development and Standardization of Asymmetrical Digital Subscriber Line

Walter Y. Chen, Motorola

ABSTRACT It has been almost a decade since the original proposal of ADSL was brought to the attention of a telecommunication standards body. During that time, the idea of ADSL has been modified and refined to fit market demand, many generations of ADSL chip set have been developed, and numerous trials have been conducted to prove its viability. In this article, the early development and standardization efforts of ADSL are reviewed. This is followed by a discussion of practical issues such as central office network interface and customer premises configuration options. These issues have not been addressed extensively but implied by standards documents. The effect of in-house wiring and recent industry-wide standardization activities are then briefly addressed.

Ex. 1006 (Chen) at Abstract.

Petition at 17-18

Independent Claim I

Element	Claim Language
I[Preamble]	I. A method of hosting an interactive software application comprising:
I[a]	running at a server the interactive software application;
I[b]	receiving at the server user input signals from a client device, wherein the user input signals are used to control updating of the state of the interactive software application;
I[c]	generating at least one updated image at the server in response to updating the state of the interactive software application; and
I[d]	compressing the at least one updated image and transmitting the compressed updated image to the client device, wherein the server transmits the updated image as a compressed frame that can be decompressed and displayed as an updated image at the client device.

Petition at 13

Dependent Claims 2-7

Element	Claim Language
[2]	2.The method as recited in claim 1 wherein a first bandwidth for transmitting the user input data between the client device and the server and a second bandwidth for transmitting the compressed updated image from the server to the client device are asymmetric.
[3]	3.The method as recited in claim 1 wherein the server is configured for bidirectional communications with a plurality of client devices, the bidirectional communication including receiving at the server user input signals and transmitting the compressed updated image.
[4]	4.The method as recited in claim 1 wherein the server is configured to receive user input data and transmit compressed updated images with a plurality of client devices.
[5]	5.The method as recited in claim 1 wherein at least two of the plurality of client devices include different device platforms.
[6]	6.The method as recited in claim 1 wherein the client device is a mobile device .
[7]	7.The method as recited in claim 1 wherein the interactive software application is an interactive game that is configured to run at the server, which is in bidirectional communication with a plurality of client devices, and wherein said updating the state of the software application includes updating the game state of the interactive game

Petition at 59, 66

Independent Claim 8

Element	Claim Language
8[Preamble]	8. An image display system, comprising:
I[a]	a server having a processor and memory configured to execute an interactive software application and further configured for:
I[b]	receiving at the server user input signals from a client device, wherein the user input signals are used to control updating the state of the interactive software application;
I[c]	generating at least one updated image at the server in response to updating the state of the interactive software application running on the server by the user input signals; and
I[d]	compressing the at least one updated image and transmitting the compressed updated image to the client device, wherein the server transmits the updated image as a frame and wherein the client device is configured for decompressing of the compressed updated image and displaying the updated image on a display coupled to the client device.

Petition at 44-45

Dependent Claims 9-12

Element	Claim Language
[9]	9.The image display system of claim 8, wherein the user input signals are generated at the client device to update the state of the interactive software application from the state that initiated the current image displayed on the display coupled to the client device.
[10]	10.The image display system of claim 8 wherein the server is configured to exchange user input data and compressed updated images with a plurality of client devices.
[11]	11.The image display system of claim 8 wherein the interactive software application is a game and wherein the client device is a mobile device .
[12]	12.The image display system of claim 10 wherein the interactive software application is a game and wherein at least one of the plurality of client devices is a mobile device .

Petition at 50-51

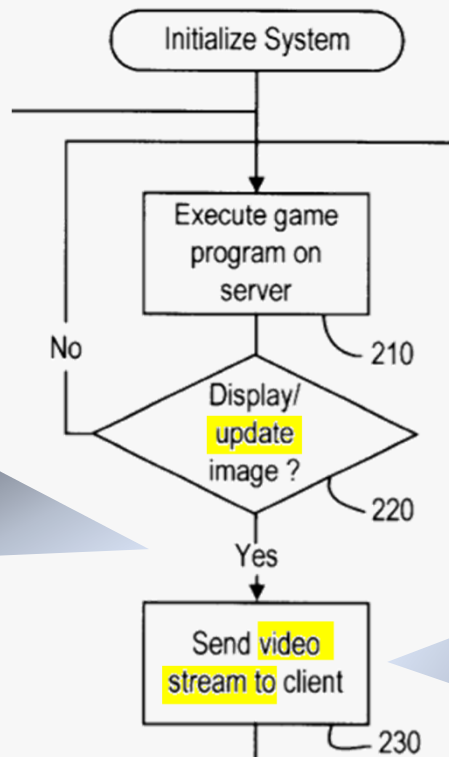
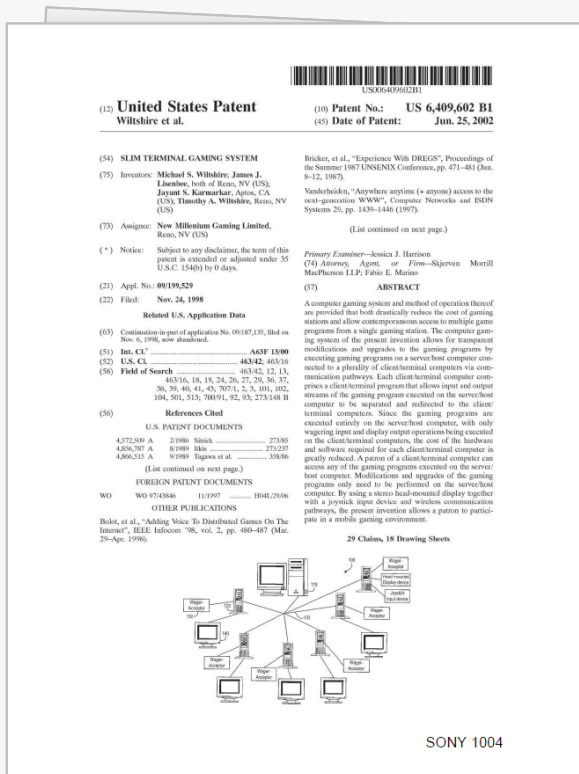
Summary of Disputed Issues

Issue	Grounds	Addressed in Papers
I. Wiltshire and Saha disclose “compressing at least one updated image” (claims 1-12)	I	Pet. at 27-34, 44-45; Reply at 12-18
II. Wiltshire and Saha disclose a “[compressed] frame” (claims 1-12)	I	Pet. at 27-34, 44-45; Reply at 1-7, 18-20
III. Each of Wiltshire and PC Magazine discloses a “mobile device” (claims 6, 11, 12)	I, III	Pet. at 39-40, 50-51, 66-72; Reply at 7-12, 20-24
IV. A POSITA would have been motivated to combine PC Magazine with Wiltshire and Saha (claims 6, 11, 12)	III	Pet. at 66-72; Reply at 24-25
V. A POSITA would have been motivated to combine Chen with Wiltshire and Saha (claim 2)	II	Pet. at 58-65; Reply at 25-28

Summary of Disputed Issues

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Prior Art: Wiltshire (Ex. 1004)



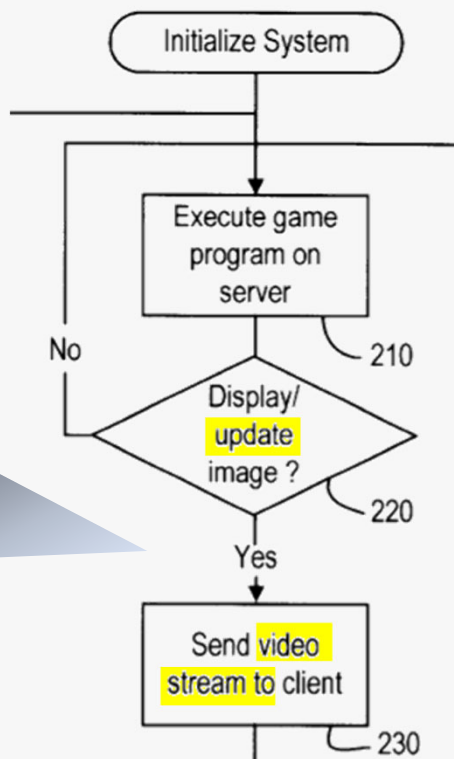
“Data compression techniques” to form “compressed video MPEG stream” to reduce “bandwidth”

Ex. 1004 at 7:62-64; 7:13-18.

Petition at 24-28; Reply at 12-18

Ex. 1004 (Wiltshire) at 7:9-18; 7:62-64; 8:61-63; Fig. 2

Wiltshire Discloses “compressing at least one updated image”



Updated
image

Ex. 1004 at 7:9-12;
8:61-63.

is executed on server/host computer 110 in stage 210. Stage 220 then determines whether an image is to be displayed on the screen of client/terminal computer 120, in which case operation 200 proceeds to stage 230. Otherwise, operation 200 proceeds to stage 250. In stage 230, an image is sent from server/host computer 110 to client/terminal computer 120. The image may include any type of graphical information including a bitmap, a JPEG file, a TIFF file or even an encoded audio/video stream such as a compressed video MPEG stream. The image is generated by game computer

Ex. 1004 (Wiltshire) at 7:9-18

game program 112. Game program 112, then responds to input command 112 by updating the state of the game and possibly modifying the image displayed on screen 140.

Ex. 1004 (Wiltshire) at 8:61-63; Fig. 2

Petition at 24-28 Reply at 12-18

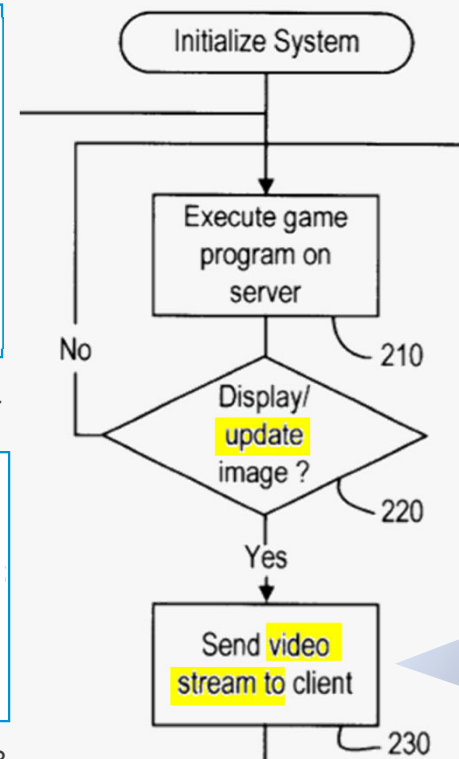
Wiltshire Discloses “compressing at least one updated image”

Since only a very limited amount of information needs to be transferred over communications pathways 130 between server/host computer 110 and client/terminal computers 120, the communication network bandwidth required for efficient operation of computer gaming system 100 is in the order of 10 MB/s. This bandwidth requirement can be further reduced using data compression techniques to about 100 KB/sec.

Ex. 1004 (Wiltshire) at 7:57-64

200 proceeds to stage 250. In stage 230, an image is sent from server/host computer 110 to client/terminal computer 120. The image may include any type of graphical information including a bitmap, a JPEG file, a TIFF file or even an encoded audio/video stream such as a compressed video MPEG stream. The image is generated by game computer

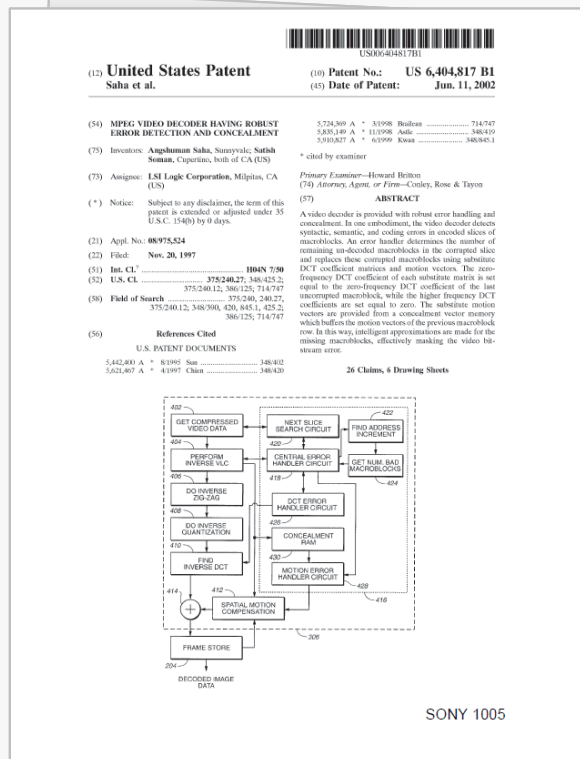
Ex. 1004 (Wiltshire) at 7:13-18



“Data compression techniques” to form “compressed video MPEG stream” to reduce “bandwidth”

Ex. 1004 at 7:62-64; 7:13-18.

MPEG Compression as Disclosed in Wiltshire Was Well-Known to POSITAs from Prior Art Like Saha



The compression standard referred to as MPEG (Moving Pictures Experts Group) compression is a set of methods for compression and decompression of full motion video images which uses the interframe and intraframe compression techniques described above. MPEG compression uses both motion compensation and discrete cosine transform (DCT) processes, among others, and can yield very high compression ratios.

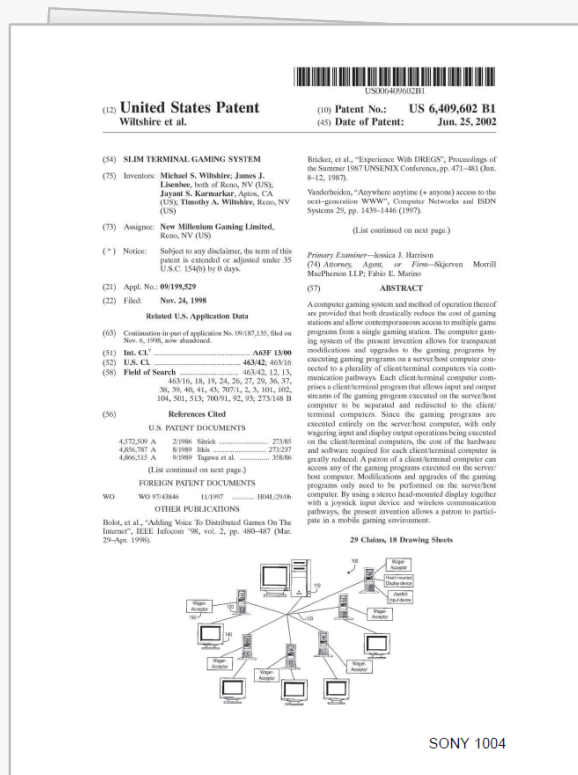
Ex. 1005 (Saha) at 1:64-2:4

Petition at 28-31, 33

Patent Owner's Reliance on an Alternative Embodiment in Wiltshire Is Misplaced

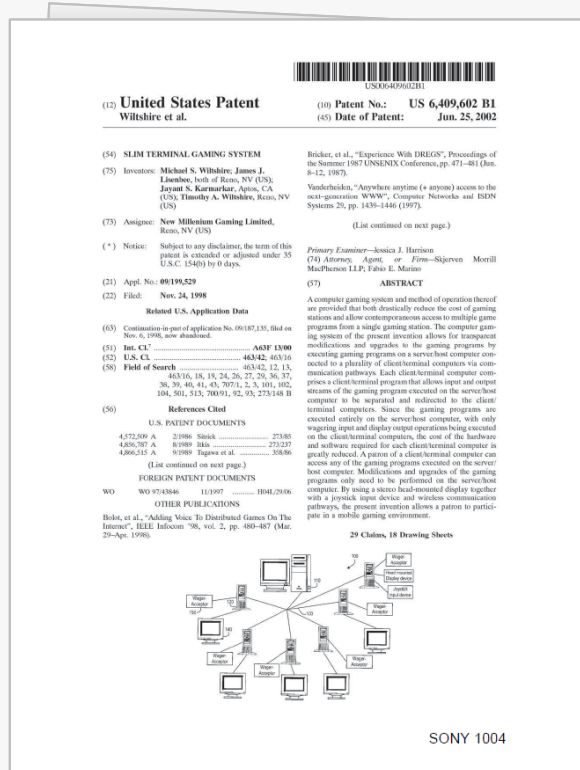
Moreover, in **some embodiments**, images for use by computer gaming system **100** are preloaded into a memory of client/terminal computers **120** to further reduce the amount of communication network bandwidth required.

Ex. 1004 (Wiltshire) at 8:8-11

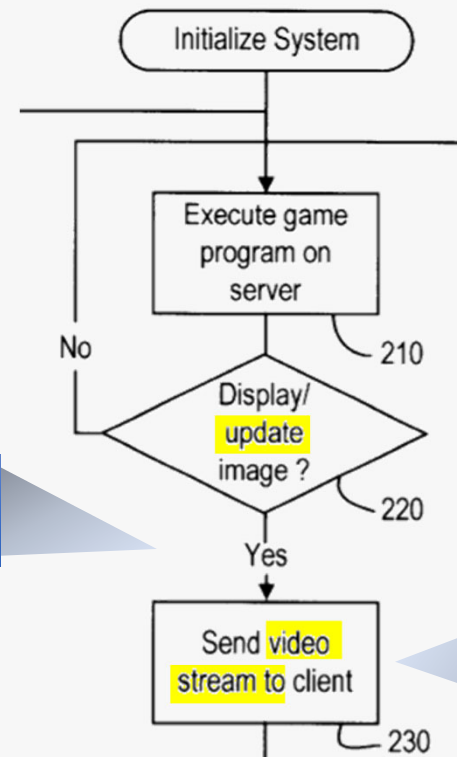


Reply at 12-13

Wiltshire's Main Embodiment (Fig. 2) Transmits an Updated Image



Updated image
Ex. 1004 at 7:9-12; 8:61-63.



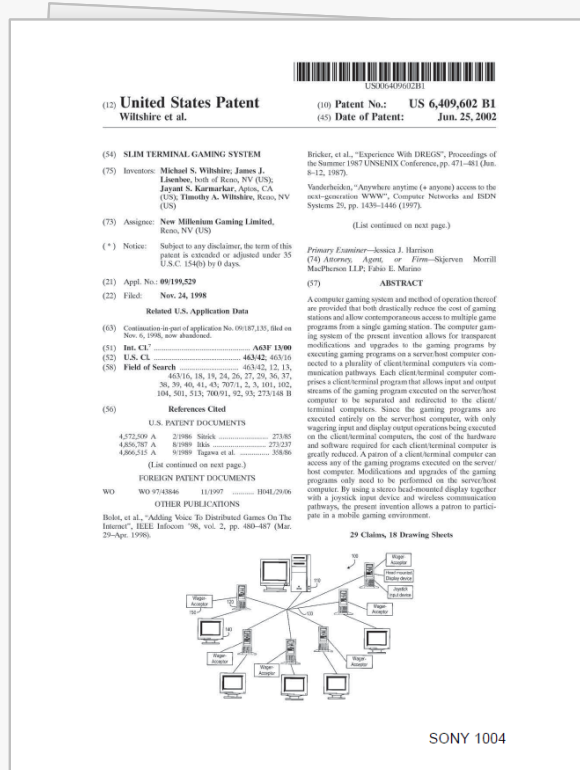
"Data compression techniques" to form "compressed video MPEG stream" to reduce "bandwidth"

Ex. 1004 at 7:62-64; 7:13-18.

Petition at 27-28; Reply at 12-15

Ex. 1004 (Wiltshire) at 7:9-18; 7:62-64; 8:61-63; Fig. 2

Wiltshire's Main Embodiment (Fig. 2) Transmits an Updated Image



The terms “game” and “gaming,” as used herein, include

...

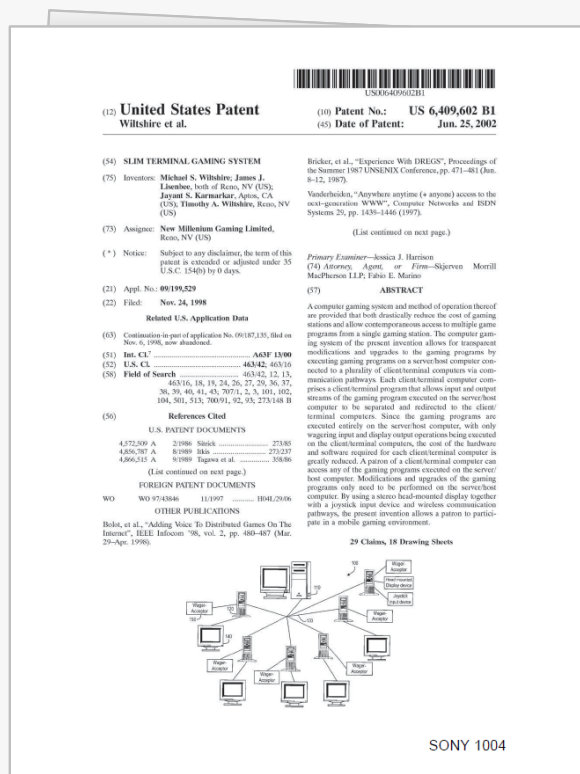
Pinochle, Hearts, Spades; video based games such as Doom, Pong, Packman, Myst; video games based on sports such as golf, baseball, football, basketball, soccer, rugby; arcade type games; non-house stake games between two or more

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Ex. 1004 (Wiltshire) at 1:26-43

Reply at 12-13

Patent Owner Concedes Its “Jackpot” Example Is Undisclosed



EX2009, ¶¶62-63. For example, although Wiltshire does not disclose this example, if a player won a jackpot, the server could send a video clip banner (compressed video MPEG stream) to play at the top of the screen showing the word “Jackpot” surrounded by fireworks. That scenario need not involve the creation of a new image

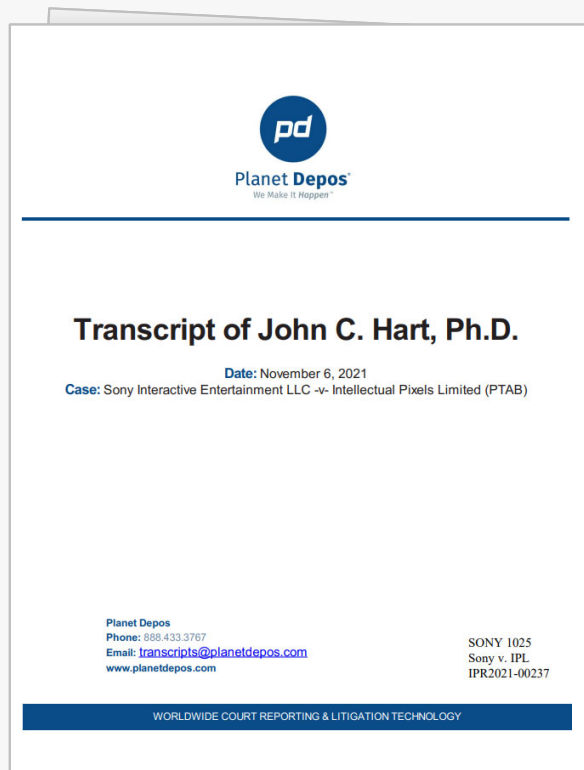
POR at 28

Reply at 16

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE – ALL COLOR ANNOTATIONS ADDED UNLESS OTHERWISE INDICATED

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Dr. Hart's Testimony Refutes Patent Owner's Hypothetical



Q. That's Exhibit 1004. So at column 7, lines roughly 17, there is a reference in Wiltshire to a compressed video MPEG stream.

Do you see that?

A. Yeah, in the list of things that an image may include.

Q. Do you agree with me that if the server in Wiltshire transmits a compressed video MPEG stream to the client, the client would need to decompress it for display?

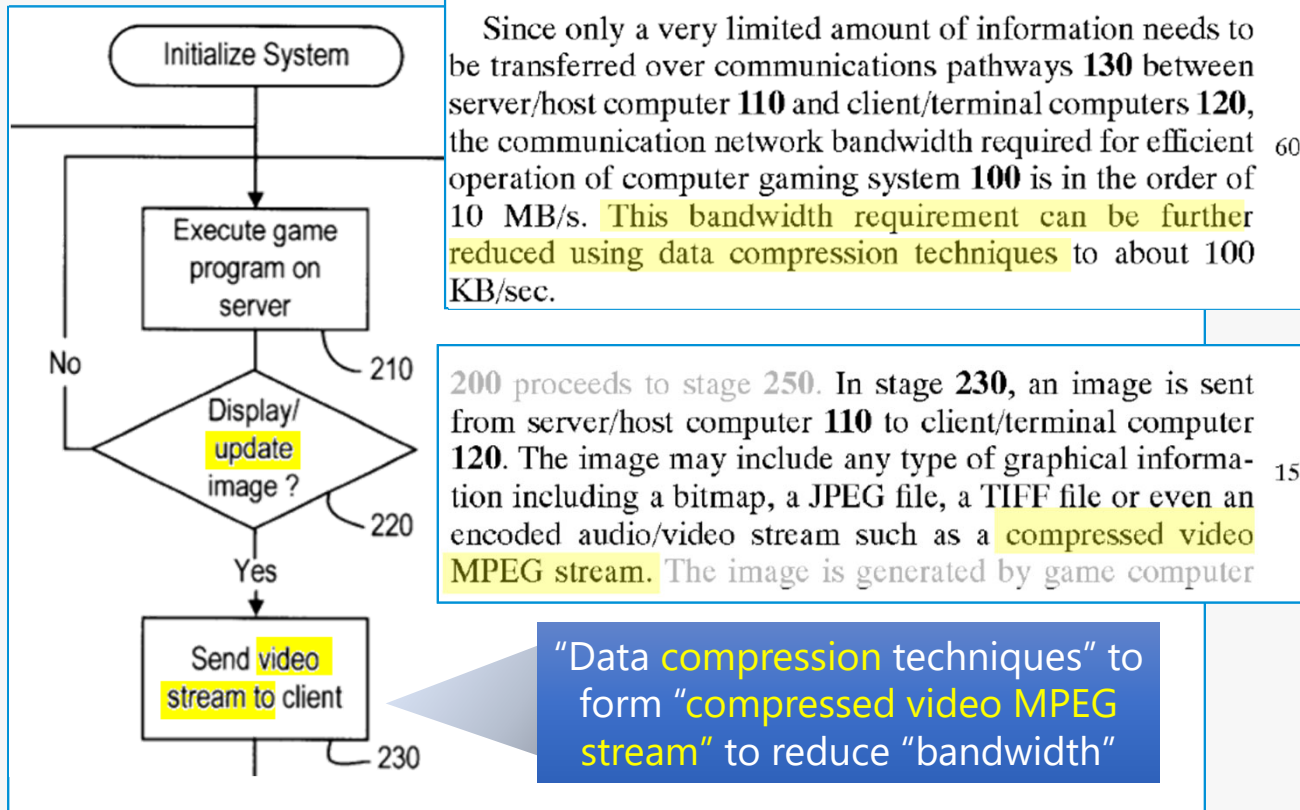
A. I don't think Wiltshire was disclosing the transmission of a compressed MPEG video stream to the client.

Reply at 15-16

Ex. 1025 (11/6/21 Hart Dep.) at 149:17-150:4

Wiltshire Discloses Compression at the Same Level of Detail as the '109 Patent

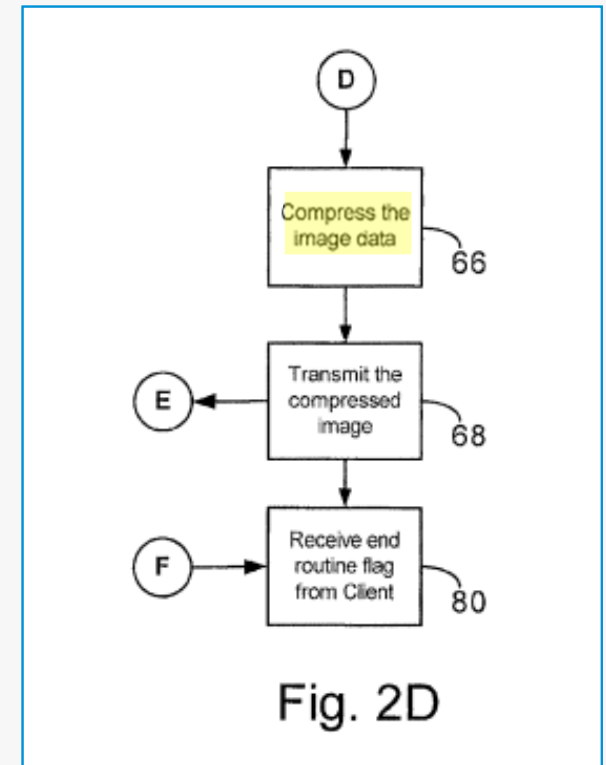
Wiltshire



Reply at 13-18

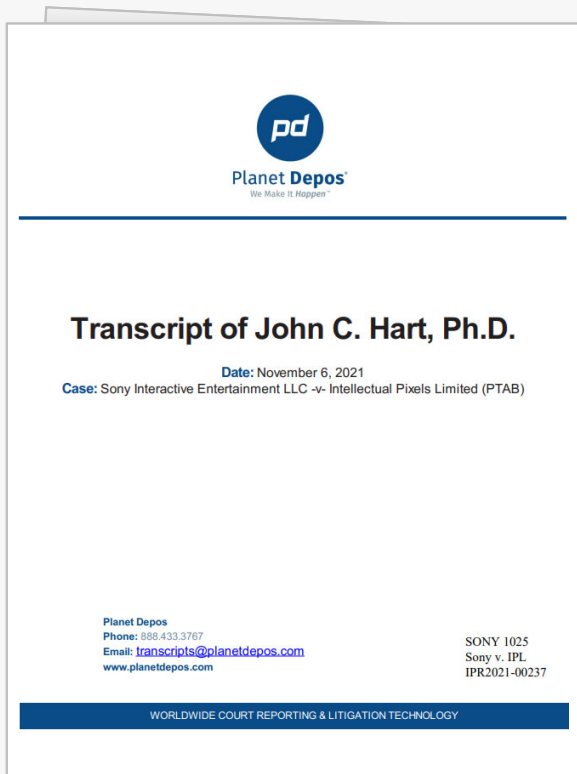
Ex. 1004 (Wiltshire) at 7:57-64; 7:13-18, Fig. 2

'109 Patent



Ex. 1001 ('109 patent) at Fig. 2D

Wiltshire Discloses Compression at the Same Level of Detail as the '109 Patent



Q. But there's no specific discussion of the details of a hardware subsystem for encoding in the '109 specification, right?

...

THE WITNESS: In this context of the '109 and because the choice of compression is up to the implementer, an MPEG is used as an example, there was no need to go into the details of what's inside Box 66. Box 66 was sufficient to communicate to a person of ordinary skill in the art that compression needs to occur to the data -- to the image data after it's generated, but before it's transmitted.

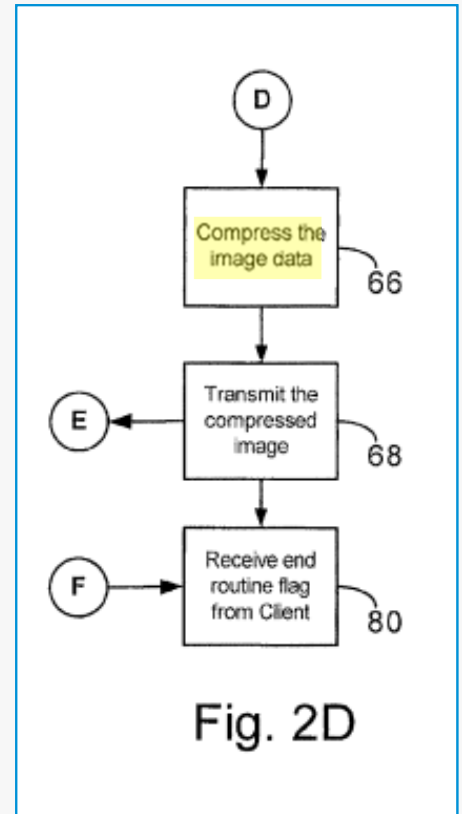


Fig. 2D

Ex. 1001 ('109 patent) at Fig. 2D

Reply at 16-18

Ex. 1025 (11/6/21 Hart Dep.) at 147:3-16

Levoy Confirms the Compression used in Wiltshire and Saha Was “Straightforward” to a POSITA Years Before the ’109 Patent

Polygon-Assisted JPEG and MPEG Compression of Synthetic Images

Marc Levoy
Computer Science Department
Stanford University

Abstract

Recent advances in realtime image compression and decompression hardware make it possible for a high-performance graphics engine to operate as a rendering server in a networked environment. If the client is a low-end workstation or set-top box, then the rendering task can be split across the two devices. In this paper, we explore one strategy for doing this. For each frame, the server generates a high-quality rendering and a low-quality rendering, subtracts the two, and sends the difference in compressed form. The client generates a matching low-quality rendering, adds the decompressed difference image, and displays the composite. Within this paradigm, there is wide latitude to choose what constitutes a high-quality versus low-quality rendering. We have experimented with textured versus untextured surfaces, fine versus coarse tessellation of curved surfaces, Phong versus Gouraud interpolated shading, and antialiased versus nonantialiased edges. In all cases, our polygon-assisted compression looks subjectively better for a fixed network bandwidth than compressing and sending the high-quality rendering. We describe a software simulation that uses JPEG and MPEG-1 compression, and we show results for a variety of scenes.

CR Categories: I.4.2 [Computer Graphics]: Compression — Approximate methods; I.3.2 [Computer Graphics]: Graphics Systems — Distributed/network graphics
Additional keywords: client-server graphics, JPEG, MPEG, polygon-assisted compression

1. Introduction

In this era of open systems, it is common for multiple graphics engines that are software compatible but have greatly differing performance to reside on the same network. A research group might have a dozen low-end workstations on desktops and one high-performance workstation in a centralized laboratory. Future multi-user video games may have hundreds of set-top boxes connected by cable or phone lines to a centralized game server. Recent advances in realtime image compression and decompression hardware make it possible for the high-performance machine to operate as a rendering server for the low-end machines. This can be accomplished straightforwardly by rendering on the server, then compressing and transmitting an image stream to the client. The client decompresses and displays the image stream in a window distinct from its own frame buffer.

Unfortunately, the standards for compressing images and video — mainly JPEG [Wallace91] and MPEG [Le Gall91] — were developed for use on natural scenes, and they are not well suited

for compressing synthetic images. In particular, they perform poorly at the edges of objects and in smoothly shaded areas.

In this paper, we consider an alternative solution that partitions the rendering task between client and server. We use the server to render those features that cannot be rendered in real time on the client — typically textures and complex shading. These are compressed using JPEG or MPEG and sent to the client. We use the client to render those features that compress poorly using JPEG or MPEG — typically edges and smooth shading. The two renderings are combined in the client for display on its screen. The resulting image is subjectively better for the same bandwidth than can be obtained using JPEG or MPEG alone. Alternatively, we can produce an image of comparable quality using less bandwidth.

The remainder of the paper is organized as follows. In section 2, we give an overview of our solution, and we suggest typical hardware realizations. In section 3, we describe a software simulator we have built to test our idea, and we discuss several implementation issues. In section 4, we explore ways to partition the rendering task between client and server. Some partitionings work well, and some do not, as we shall see. In sections 5 and 6, we discuss related work, limitations, and extensions.

2. Client-server relationship

Figure 1 shows the flow of data in our proposed client-server system. The hardware consists of a high-performance workstation (henceforth called the server), a low-performance workstation (henceforth called the client), and a network. To produce each frame of synthetic imagery, these two machines perform the following three steps:

- (1) On the server, compute a high-quality and low-quality rendering of the scene using one of the partitioning strategies described in section 4.
- (2) Subtract the two renderings, apply lossy compression to the difference image, and send it to the client.
- (3) On the client, decompress the difference image, compute a low-quality rendering that matches the low-quality rendering computed on the server, add the two images, and display the resulting composite image.

Depending on the partitioning strategy, there may be two geometric models describing the scene or one model with two rendering options. The low-quality model may reside on both machines, or it may be transmitted from server to client (or client to server) for each frame. If the model resides on both machines, this can be implemented using display lists or two cooperating copies of the application program. The latter solution is commonly used in networked visual simulation applications.

To provide interactive performance, the server in such a system would normally be a graphics workstation with hardware-accelerated rendering. The client might be a lower-end hardware-accelerated workstation, or it might be a PC performing rendering in software, or it might be a set-top box utilizing a

server. Recent advances in realtime image compression and decompression hardware make it possible for the high-performance machine to operate as a rendering server for the low-end machines. This can be accomplished straightforwardly by rendering on the server, then compressing and transmitting an image stream to the client. The client decompresses and displays the image stream in a window distinct from its own frame buffer.

©1995 ACM-0-89791-701-4/95/008...\$3.50

Address: Center for Integrated Systems, Email: levoy@cs.stanford.edu, Stanford University, 380B, http://www.graphics.stanford.edu, Stanford, CA 94305-4070

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SONY 1016

Ex. 1016 (Levoy) at 21

Petition at 9; Reply at 18; Ex. 1002 (Fuchs Dec.) ¶127; Ex. 1033 (Fuchs Reply Dec.) ¶¶51-53

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE – ALL COLOR ANNOTATIONS ADDED UNLESS OTHERWISE INDICATED

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IV. A POSITA would have been motivated to combine PC Magazine with Wiltshire and Saha (claims 6, 11, 12)	III	Pet. at 66-72; Reply at 24-25
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Disputed Construction of the Claim Term “Frame”

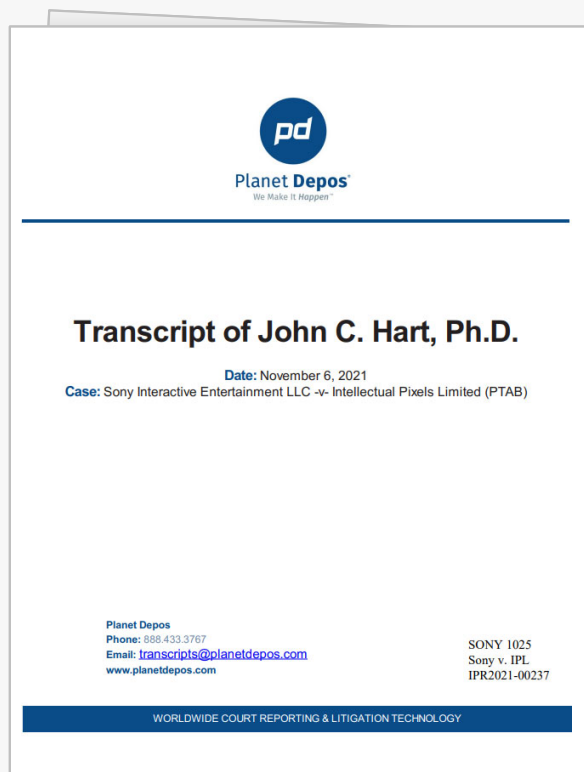
Claim Term	Petitioner’s Construction	Patent Owner’s Construction
“the server transmits the updated images as a compressed frame that can be decompressed and displayed as an updated image at the client device”	“ <u>frames</u> represent the still images that are ordered in a sequence to produce a video or animated sequence”	“a single instance of the display” (POR at 12) “... because the frame is transmitted to the client ..., the relevant display is the client display.” (POR at 33, 37) “term ‘display’ ... refers specifically to the full image generated by the application at any given instance in time, ... that is displayed to the user.” (Ex. 1025 ¶48)

Common Ground: a “frame” represents a single instance in time of a video or animated sequence.

Parties’ Dispute: whether it is improper to add the additional requirement that a “frame” must be “of the display,” as Patent Owner proposes.

Ex. 1001 (’109 patent) at claim 1; Ex. 1002 (Fuchs Dec.) ¶¶ 31, 89; Ex. 1033 (Fuchs Reply Dec.) ¶ 18; Petition at 18-19; Reply at 1-7, POR at 12

Disputed Construction of the Claim Term “Frame”



Q. Now, there is a sentence, it's right around line 19 or 20 in column 2 of Saha that reads: MPEG compression uses this inherent redundancy to encode or compress frames in the sequence.

Do you see that?

A. Yes, I do.

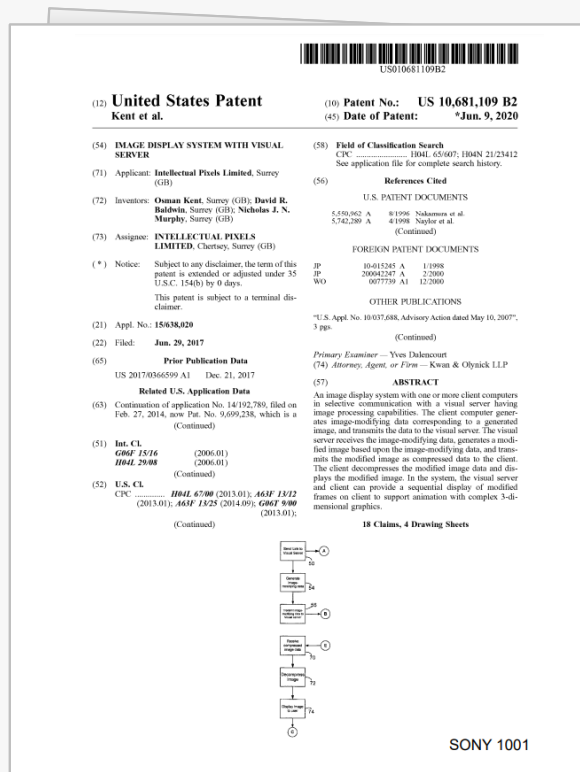
Q. So Saha discloses compressing frames, using MPEG, correct?

A. Yes.

Ex. 1025 (11/6/21 Hart Dep.) at 104:21-105:5

Reply at 1

Intrinsic Evidence: Plain Claim Language



1. A method of hosting an interactive software application comprising:

running at a server the interactive software application;

receiving at the server user input signals from a client device, wherein the user input signals are used to control updating of the state of the interactive software application;

generating at least one updated image at the server in response to updating the state of the interactive software application; and

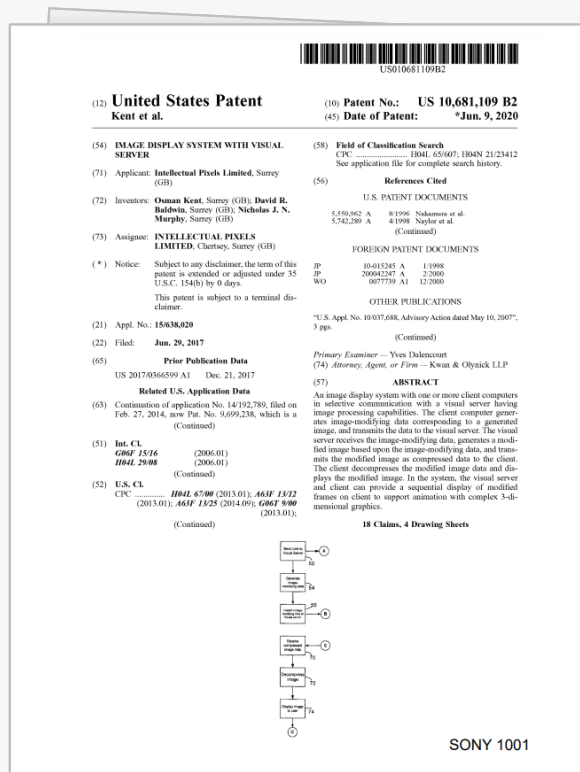
compressing the at least one updated image and transmitting the compressed updated image to the client device, wherein the server transmits the updated image as a compressed frame that can be decompressed and displayed as an updated image at the client device.

Ex. 1001 ('109 Patent) at claim 1

Petition at 13; Reply at 3, 1-7; Ex. 1002 (Fuchs Dec.) ¶¶ 31, 40, 89; Ex. 1033 (Fuchs Reply Dec.) ¶ 12-13, 17

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE – ALL COLOR ANNOTATIONS ADDED UNLESS OTHERWISE INDICATED

Intrinsic Evidence: Specification



(57)

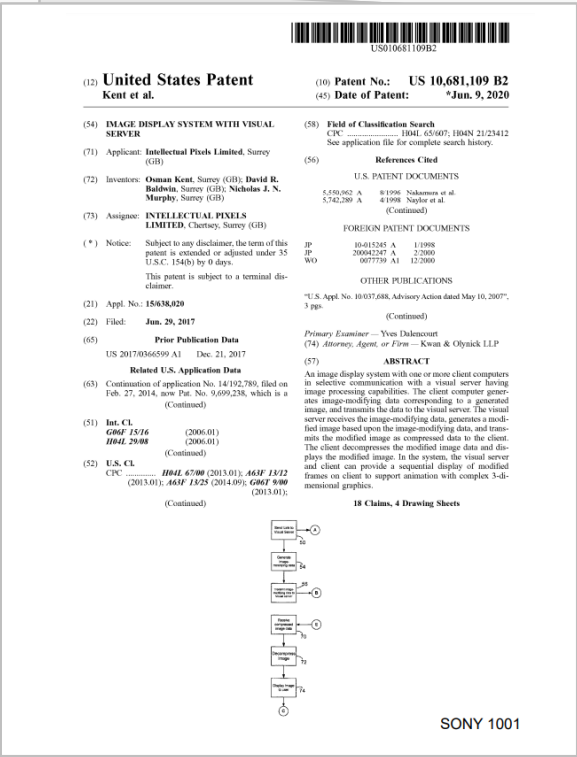
ABSTRACT

An image display system with one or more client computers in selective communication with a visual server having image processing capabilities. The client computer generates image-modifying data corresponding to a generated image, and transmits the data to the visual server. The visual server receives the image-modifying data, generates a modified image based upon the image-modifying data, and transmits the modified image as compressed data to the client. The client decompresses the modified image data and displays the modified image. In the system, the visual server and client can provide a sequential display of modified frames on client to support animation with complex 3-dimensional graphics.

Ex. 1001 ('109 Patent) at Abstract

Reply at 3-4; Ex. 1033 (Fuchs Reply Dec.) ¶118

Intrinsic Evidence: Specification

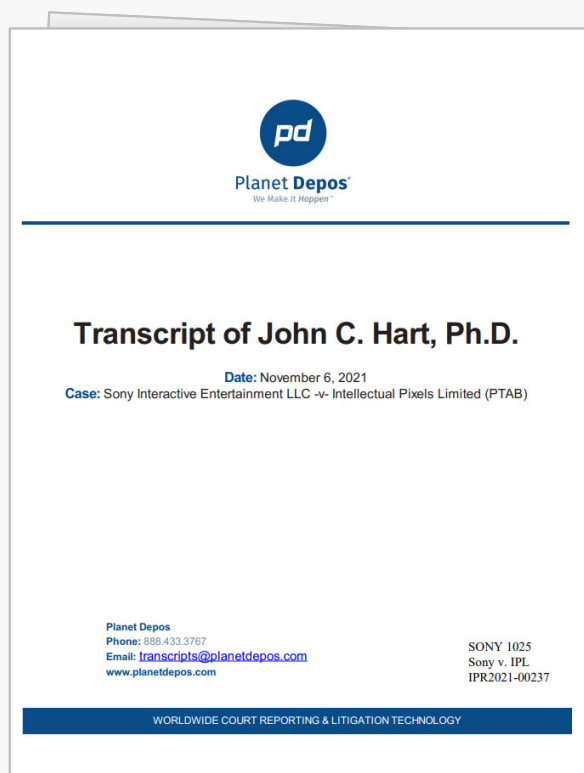


In generating the image-modifying data at the client and processing the image-modifying data at the visual server, the typical data processing segment is a frame. Alternately, the

Ex. 1001 ('109 Patent) at 4:10-12

Reply at 4; Ex. 1033 (Fuchs Reply Dec.) ¶19

Intrinsic Evidence: Specification



Reply at 4

Q. Am I right that the use of the term frame in column 6, line 66, does not characterize the frame in terms of the display?

...

THE WITNESS: I don't think I've rendered an opinion on that particular use of the term frame. That use of the term frame is in the context of the Visual Server generating and transmitting a modified image to the client, based on the client transmitting image modifying data to the Visual Server.

...

Ex. 1025 (11/6/21 Hart Dep.) at 116:22-117:8

If the system 10 is displaying a series of images on the client 16, 18,20, such as in multimedia animation, the visual server 12 transmits the modified image to the client 16,18,20 as a frame, and preferably but not necessarily, the client 16,18,20 transmits the image-modifying data to the visual server 12 as data sufficient to generate an image frame.

Ex. 1001 ('109 patent) at 6:63-7:1

Intrinsic Evidence: Prosecution History

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of: KENT, Osman et al.	Attorney Docket No.: IPTLP002C5
Application No.: 15/638,020	Examiner: DALENCOURT, Yves
Filed: June 29, 2017	Group: 2457
TITLE: IMAGE DISPLAY SYSTEM WITH VISUAL SERVER	Confirmation No.: 5023

DECLARATION OF EFS-WEB TRANSMISSION

I hereby certify that this correspondence is being transmitted electronically through EFS-WEB to the Commissioner for Patents, P.O. Box 1450 Alexandria, VA 22313-1450 on January 27, 2020.

Signed: Justice McGahay
Justice McGahay

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

AMENDMENT AFTER NON-FINAL

Dear Commissioner:

Applicants respectfully request that the Examiner enter the following amendments in response to the Non-Final Office Action dated September 27, 2019, a response to which is due January 27, 2020 with a one-month extension. Please enter the following amendments and consider the following remarks:

Amendments to the Claims are reflected in the listing of claims which begin on page 2 of this paper.

Remarks/Arguments begin on page 5 of this paper.

15/638,020 1

IPL EX2004
Sony v. IPL, IPR2021-00237
Page 268 of 494

Sections 102, 103 Rejections

On page 6 of the Office Action the Examiner has indicated that Yamada teaches all of the limitations of claim 21, and by extension uses the same analysis in rejecting claims 28-36. Applicant respectfully submits that Yamada does not teach or suggest all of the limitations of independent claims. For example, with respect to claim 21 Yamada does not teach or suggest “compressing the at least one updated image and transmitting the compressed updated image to the client device “ much less transmitting the “updated image as a compressed frame”. First, there is absolutely no mention of a “frame” in Yamada. Second, there is nothing to suggest that Yamada first generates a frame of image data and then compresses that frame prior to transmitting it to a remote client device.

Ex. 2004 ('109 File History) at 273

Reply at 4-5; Ex. 1033 (Fuchs Reply Dec.) ¶¶21-26

Intrinsic Evidence: Prosecution History

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of: KENT, Osman et al.	Attorney Docket No.: IPTLP002C5
Application No.: 15/638,020	Examiner: DALENCOURT, Yves
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15/638,020 1

IPL EX2004
Sony v. IPL, IPR2021-00237
Page 268 of 494

Yamada (US 6,929,549) generally describes a gaming system that uses a hard drive located on a STB, the hard drive used for storage of the game software received from an external source by the STB, but delegates to the game machine (such as controller 1 in FIG. 1) responsibilities for execution of the game.

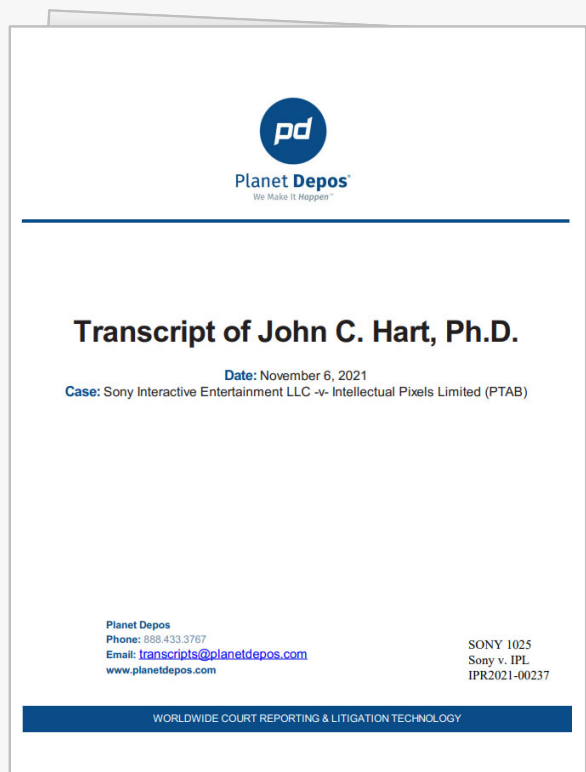
“The game software information stored in the information storage unit of the server device is supplied to the game executing device via the digital communication line in response to the request issued by the game executing device. **In the game executing device, a game image is generated** in accordance with the supplied information and the resultant image is output over the digital communication line to supply it to the display device.” (Col. 3, lines 20-27) (emphasis added).

Yamada clearly teaches that the game software information stored on the hard disk of the STB is used by the game machine 1 to execute a game. This local execution of the game fails to meet the limitations of claim 21 which further includes the limitation that the server runs the interactive software application.

Ex. 2004 ('109 File History) at 273

Reply at 4-5; Ex. 1033 (Fuchs Reply Dec.) ¶¶21-26

Intrinsic Evidence: Prosecution History



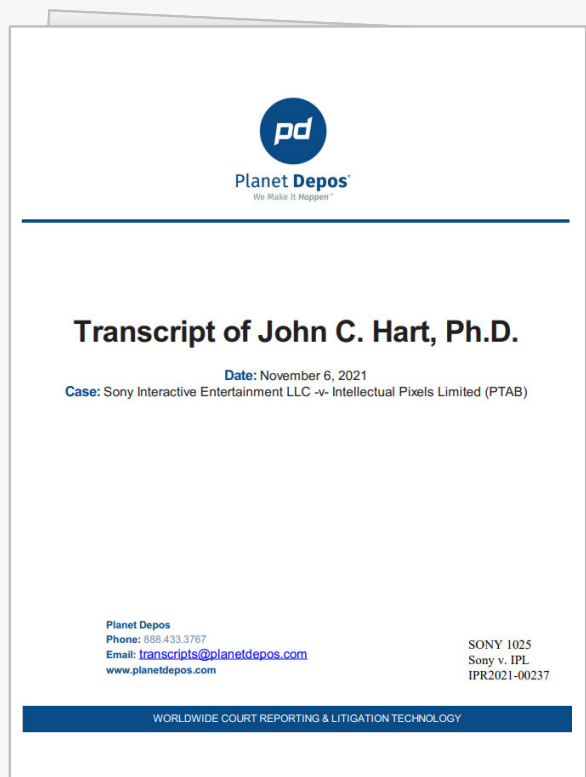
Q. So in the sentence I read from page 273 from the file history, the applicant was distinguishing Yamada, because Yamada locally executes a game, rather than the server running an interactive software application, right?

THE WITNESS: I see that that sentence states that, yes.

Ex. 1025 (11/6/21 Hart Dep.) at 96:6-13

Reply at 4-5

Intrinsic Evidence: Prosecution History



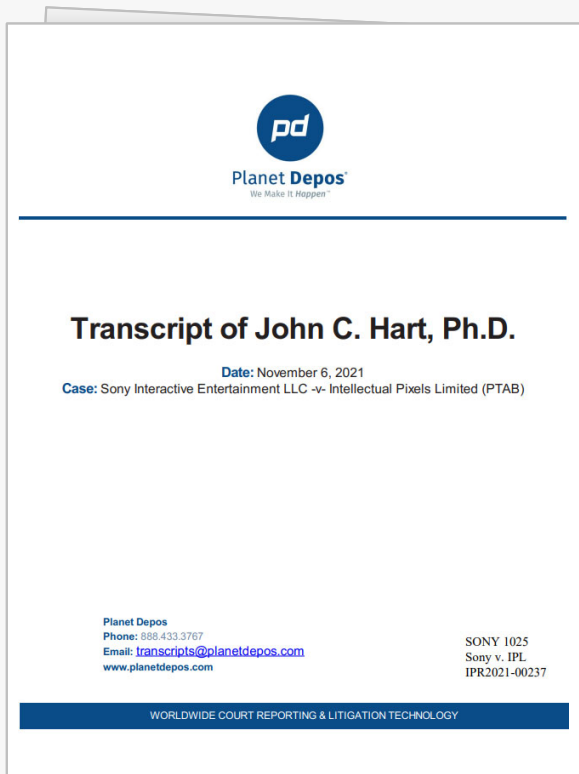
Q. Now, do you agree with me that on page 273 of the file history, the applicant does not discuss MPEG?

A. I don't see the term MPEG used in page 273.

Ex. 1025 (11/6/21 Hart Dep.) at 96:15-19

Reply at 4-5

MPEG Frames Are “Compressed Frames”



Q. In your view, is an MPEG frame within the scope of a compressed frame as that term is used in the '109 patent?

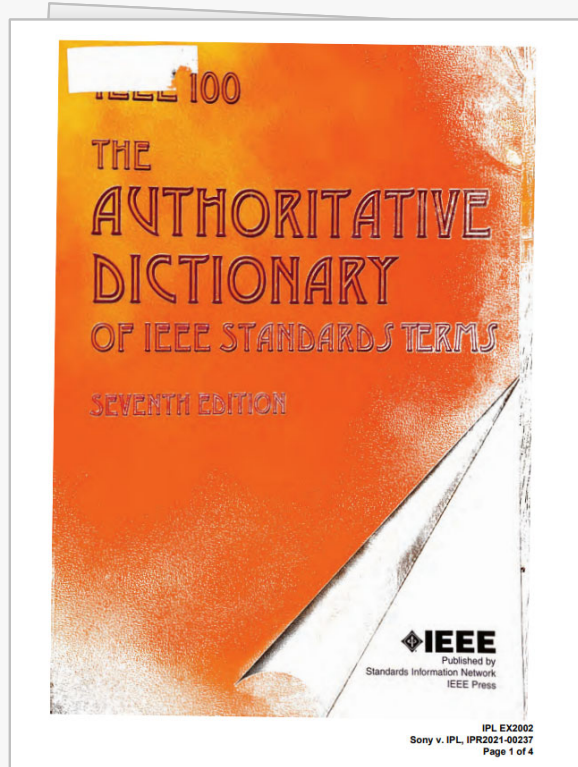
A. So, yes, I believe that's within the scope. There are some embodiments in the '109 describing the output of the Visual Server being compressed, using, for example, MPEG or using, for example, H.261 as a compressed frame as specified in Claim 1.

...

Ex. 1025 (11/6/21 Hart Dep.) at 114:7-15

Reply at 6-7

Extrinsic Evidence: IEEE Dictionary (Ex. 2002)

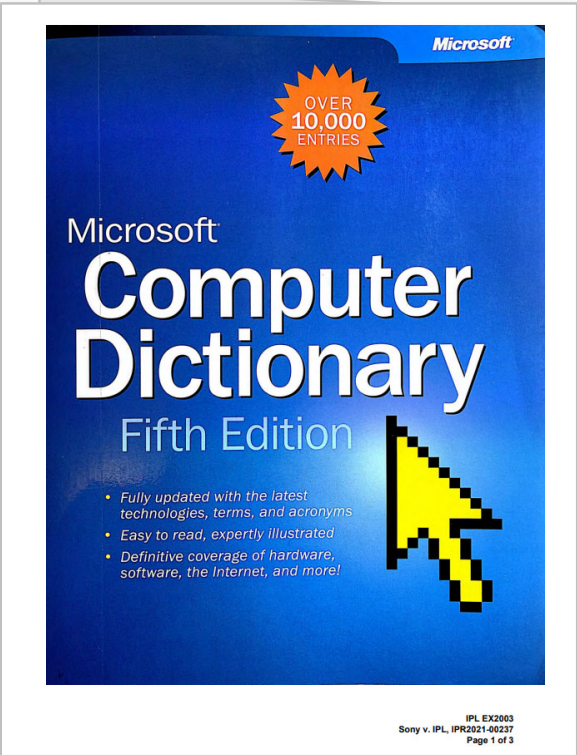


- frame (1) **(television)** The total area, occupied by the picture, that is scanned while the picture signal is not blanked.
- (2) **(facsimile)** A rectangular area, the width of which is the available line and the length of which is determined by the service requirements. (BT/COM/AV) [34], 168-1956w
- (3) **(test, measurement, and diagnostic equipment)** A cross section of tape containing one bit in each channel and possibly a parity bit. *Synonym:* tape line. (MIL) [2]
- (4) **(data) (data transmission)** A set of consecutive digit time slots in which the position of each digit time slot can be identified by reference to a framing signal. (PE) 599-1985w
- (5) **(telecommunications circuits and systems)** A cyclic set of consecutive timeslots in which the relative position of each timeslot can be identified. (COM/TA) 1007-1991r
- (6) A component of the module that provides structural support and enhanced thermal performance. (C/BA) 1101.7-1995
- (7) (A) A group of digits transmitted as a unit that carries a protocol data unit on a network. (B) A unit of transmission at the data link layer or, sometimes, the physical layer. (C) 610.7-1995

Reply at 5-6

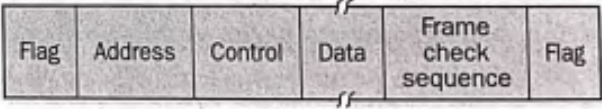
Ex. 2002 (IEEE Dictionary) at 4

Extrinsic Evidence: Microsoft Computer Dictionary (Ex. 2003)



frame *n.* **1.** In asynchronous serial communications, a unit of transmission that is sometimes measured in elapsed time and begins with the start bit that precedes a character and ends with the last stop bit that follows the character. **2.** In synchronous communications, a package of information transmitted as a single unit. Every frame follows the same basic organization and contains control information, such as synchronizing characters, station address, and an error-checking value, as well as a variable amount of data. For example, a frame used in the widely accepted HDLC and related SDLC protocols begins and ends with a unique flag (01111110). See the illustration. *See also* HDLC, SDLC. **3.** A single screen-sized image that can be displayed in sequence with other, slightly different, images to create animated drawings. **4.** The storage required to hold one screen-sized image of text, graphics, or both. **5.** A rectangular space containing, and defining the proportions of, a graphic. **6.** The part of an on-screen window (title

bar and other elements) that is controlled by the operating system rather than by the application running in the window. **7.** A rectangular section of the page displayed by a Web browser that is a separate HTML document from the rest of the page. Web pages can have multiple frames, each of which is a separate document. Associated with each frame are the same capabilities as for an unframed Web page, including scrolling and linking to another frame or Web site; these capabilities can be used independently of other frames on the page. Frames, which were introduced in Netscape Navigator 2.0, are often used as a table of contents for one or more HTML documents on a Web site. Most current Web browsers support frames, although older ones do not. *See also* HTML document, Web browser.

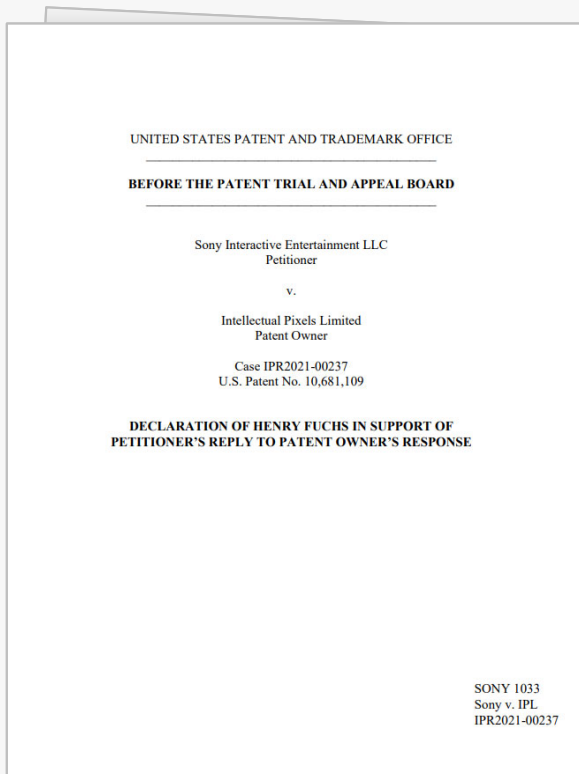


Frame. The fields in an HDLC-SDLC frame.

Ex. 2003 (Microsoft Dictionary) at 3

Reply at 6

Extrinsic Evidence: “Frameless Rendering: Double Buffering Considered Harmful” (Ex. 2008)



30. Patent Owner also references an article I co-authored in 1994 entitled “Frameless Rendering: Double Buffering Considered Harmful.” POR at 15; Ex. 2008 (Frameless Rendering paper). In that article, we explained a different rendering strategy that could serve as an alternative to double frame buffered displays that provides better refresh rates. Ex. 2008 (Frameless Rendering paper), Abstract. A frame buffer generally refers to a particular area of memory that stores an image ready to be displayed. There is nothing in that article that limits “frames,” as used in the ’109 patent, to have to be displayed on a full screen on a client after being transmitted to the client from a server. To the contrary, the examples of frames shown in the article can be displayed in windows on a client, and still be considered frames as used in the ’109 patent.

Ex. 1033 (Fuchs Reply Decl.) ¶ 30

Reply at 6

Wiltshire and Saha Disclose “Compressed Frames”

200 proceeds to stage 250. In stage 230, an image is sent from server/host computer 110 to client/terminal computer 120. The image may include any type of graphical information including a bitmap, a JPEG file, a TIFF file or even an encoded audio/video stream such as a compressed video MPEG stream. The image is generated by game computer

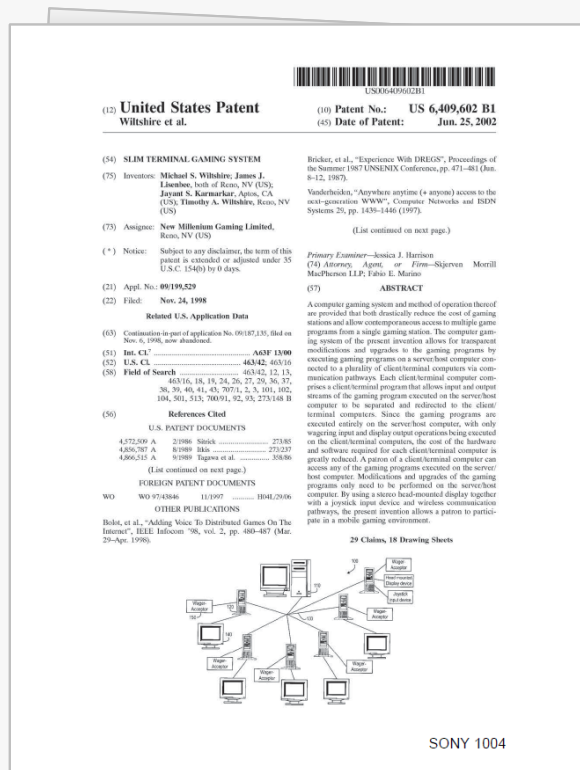
15

Ex. 1004 (Wiltshire) at 7:13-18

provided by client operating system 124. Client/terminal program 122 then causes the image to be displayed on a screen of client/terminal computer 120 in stage 240. Stage

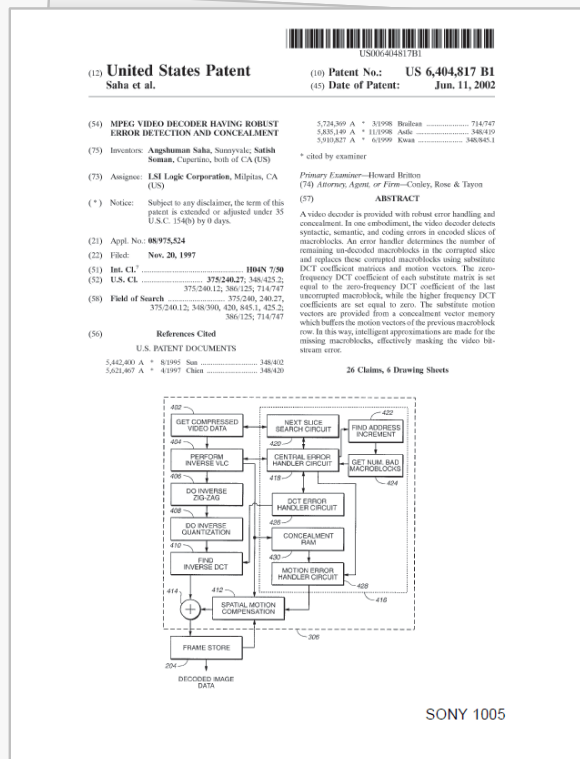
25

Ex. 1004 (Wiltshire) at 7:25-27



Petition at 27-34; Reply at 18-20

Wiltshire and Saha Disclose “Compressed Frames”



The compression standard referred to as **MPEG** (Moving Pictures Experts Group) compression is a set of methods for compression and decompression of full motion video images which uses the **interframe and intraframe compression** techniques described above. MPEG compression uses both

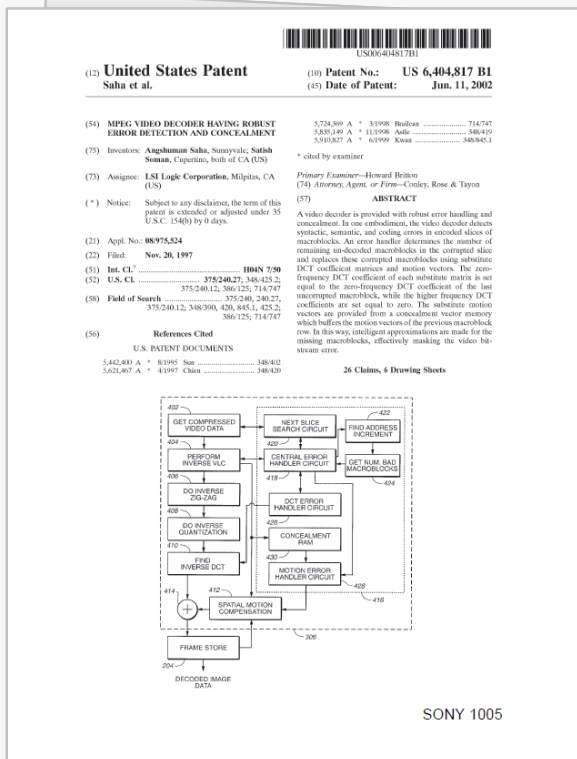
Ex. 1005 (Saha) at 1:64-2:1

MPEG compression uses this inherent redundancy to encode or compress frames in the sequence.

Ex. 1005 (Saha) at 2:19-20

Petition at 28-34; Reply at 18-20

Wiltshire and Saha Disclose “Compressed Frames”



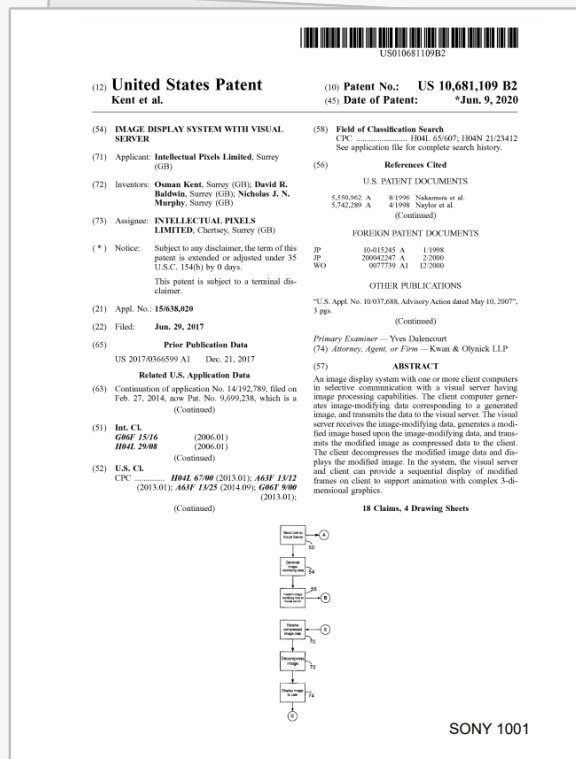
SONY 1005

An MPEG stream includes three types of pictures, referred to as the Intra (I) frame, the Predicted (P) frame, and the Bi-directional Interpolated (B) frame. The I (intra) frames contain the video data for the entire frame of video and are typically placed every 10 to 15 frames. Intraframes provide entry points into the file for random access, and are generally only moderately compressed. Predicted frames are encoded with reference to a past frame, i.e., a prior Intraframe or Predicted frame. Thus P frames only include changes relative to prior I or P frames. In general, P frames receive a fairly high amount of compression and are used as references for future P frames. Thus, both I and P frames are used as references for subsequent frames. Bi-directional pictures include the greatest amount of compression and

Ex. 1005 (Saha) at 2:22-35

Petition at 28-34; Reply at 12-18

Wiltshire and Saha Disclose “Compressed Frames”



The use of an industry standard image compression protocol such as MPEG allows us to make use of facilities that are already present in most clients. Set-top boxes already need to decode MPEG data in order to display digital television; mobile telephones will soon need to support MPEG protocols for video conferencing or television display.

Ex. 1001 ('109 Patent) at 9:32-38

Petition at 28, 30; Reply at 12-18; Ex. 1002 (Fuchs Dec.) ¶¶ 85, 91

DEMONSTRATIVE EXHIBIT – NOT EVIDENCE – ALL COLOR ANNOTATIONS ADDED UNLESS OTHERWISE INDICATED

Wiltshire and Saha Disclose “Compressed Frames” under Patent Owner’s Construction

FIGS. 4A, 4B, 5A, 5B, 6A, 6B, 7A, 7B, 8A, 8B, 9A, 9B, 9C and 9D illustrate the **images displayed** on screen 140 of client/terminal computer 120 during operation 200 of computer gaming system 100.

Ex. 1004 (Wiltshire) at 8:38-41; see also *id.* at 3:23-57

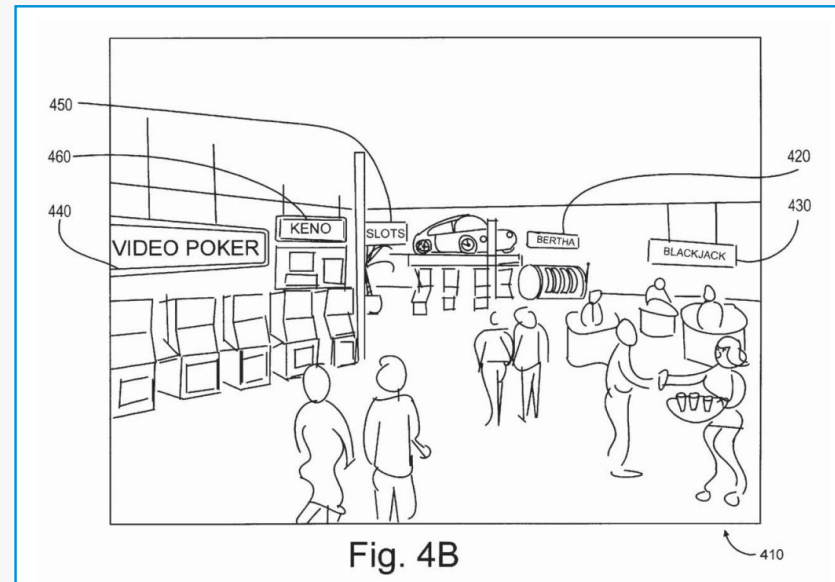
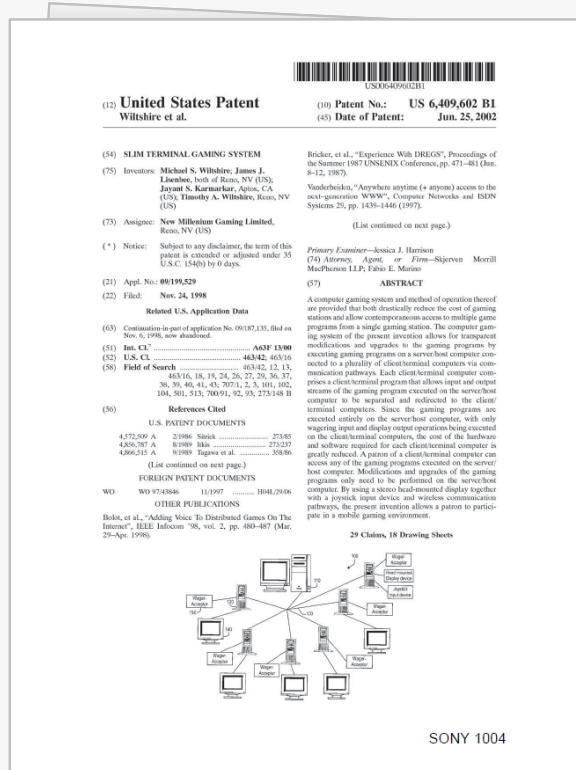


Fig. 4B

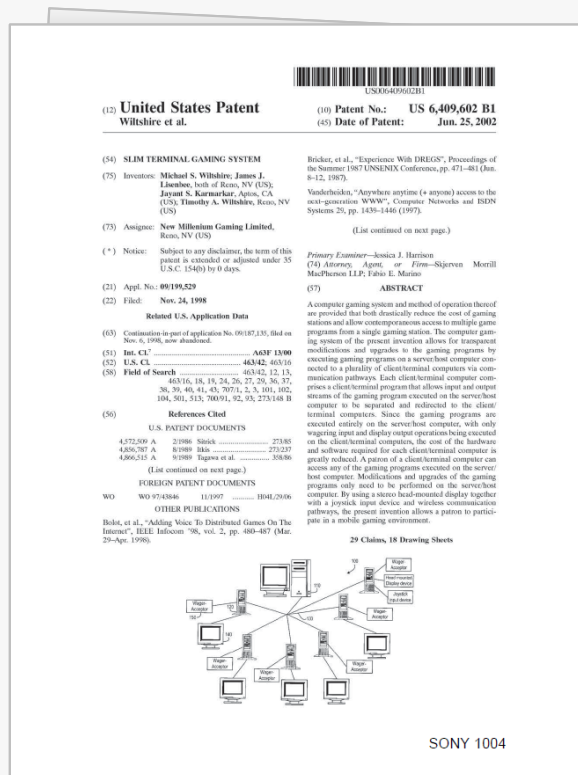
Ex. 1004 (Wiltshire) at Fig. 4B



SONY 1004

Reply at 19-20

Wiltshire and Saha Disclose “Compressed Frames” under Patent Owner’s Construction



computer gaming system 100. In some embodiments, to further reduce the amount of network bandwidth required for the operation of computer gaming system 100, image updates (once an image has been displayed) are limited to areas of the screen that are actually modified rather than full screen refreshes.

Ex. 1004 (Wiltshire) at 8:2-7

Reply at 19-20

Summary of Disputed Issues

Issue	Grounds	Addressed in Papers
I. Wiltshire and Saha disclose “compressing at least one updated image” (claims 1-12)	I	Pet. at 27-34, 44-45; Reply at 12-18
II. Wiltshire and Saha disclose a “[compressed] frame” (claims 1-12)	I	Pet. at 27-34, 44-45; Reply at 1-7, 18-20
III. Each of Wiltshire and PC Magazine discloses a “mobile device” (claims 6, 11, 12)	I, III	Pet. at 39-40, 50-51, 66-72; Reply at 7-12, 20-24
IV. A POSITA would have been motivated to combine PC Magazine with Wiltshire and Saha (claims 6, 11, 12)	III	Pet. at 66-72; Reply at 24-25
V. A POSITA would have been motivated to combine Chen with Wiltshire and Saha (claim 2)	II	Pet. at 58-65; Reply at 25-28

Patent Owner Improperly Seeks to Exclude a Laptop Through Its Construction of “Mobile Device”

PC Magazine Discloses an Apple iBook Laptop:



Ex. 1007 (PC Magazine) at 10

Patent Owner’s Proposed Construction of “Mobile Device”:

The proper construction of “mobile device” is “handheld computing device.”

There is no evidence in this record, intrinsic or extrinsic, from which the Board could conclude that a “mobile device” includes a portable laptop computer.

Reply at 7; Petition at 67

Paper 19 (Patent Owner Response) at 19, 21

Patent Owner's July 31, 2020 Original Complaint (Ex. 1031)

Case 8:20-cv-01422 Document 1 Filed 07/31/20 Page 1 of 38 Page ID #:1

1 Kalpana Srinivasan (CA SBN 237460)
2 ksrinivasan@susmangodfrey.com
3 Max L. Tribble, Jr. (CA SBN 326851)
4 mtribble@susmangodfrey.com
5 Krysta Kauble Pachman (CA SBN 280951)
6 kpachman@susmangodfrey.com
7 Jesse-Justin Cuevas (CA SBN 307611)
8 jcuevas@susmangodfrey.com
9 SUSMAN GODFREY L.L.P.
10 1900 Avenue of the Stars, 14th Floor
11 Los Angeles, CA 90067
12 Telephone: (310) 789-3100
13 Facsimile: (310) 789-3150

14 Michael F. Heim (TX SBN 9380923)
15 mheim@hpcclp.com
16 Eric Enger (TX SBN 24045833)
17 eenger@hpcclp.com
18 Blaine Larson (TX SBN 24083360)
19 blarson@hpcclp.com
20 HEIM, PAYNE & CHORUSH, LLP
21 1111 Bagby St., Suite 2100
22 Houston, Texas 77002
23 Telephone: (713) 221-2000
24 Facsimile: (713) 221-2021

25 Attorneys for Plaintiff Intellectual Pixels Limited

26 UNITED STATES DISTRICT COURT
27 CENTRAL DISTRICT OF CALIFORNIA
28 SOUTHERN DIVISION

INTELLECTUAL PIXELS LIMITED, Case No. 8:20-cv-01422
Plaintiff, COMPLAINT FOR PATENT
INFRINGEMENT
v.
SONY INTERACTIVE ENTERTAINMENT LLC, DEMAND FOR JURY TRIAL
Defendant.

COMPLAINT FOR PATENT INFRINGEMENT

7495284v1.016377

50. Claim 6 requires “the client device is a mobile device.”

- a. Sony PlayStation Now supports personal computers as client devices. The PC client devices that are supported include laptop computers, which are mobile devices.

Ex. 1031 at 20-21 (Patent Owner's Original Complaint in *Intellectual Pixels Ltd. v. Sony Interactive Entm't LLC*, Case No. 8:20-cv-01422-JVS-KES (C.D. Cal.))

Reply at 7-8

Patent Owner's October 9, 2020 Amended Complaint (Ex. 1032)

Case 8:20-cv-01422-JVS-KES Document 33 Filed 10/09/20 Page 1 of 41 Page ID #:149

1 Kalpana Srinivasan (CA SBN 237460)
2 ksrinivasan@susmangodfrey.com
3 Max L. Tribble, Jr. (CA SBN 326851)
4 mtribble@susmangodfrey.com
5 Krysta Kauble Pachman (CA SBN 280951)
6 kpachman@susmangodfrey.com
7 Jesse-Justin Cuevas (CA SBN 307611)
8 jcuevas@susmangodfrey.com
9 **SUSMAN GODFREY L.L.P.**
10 1900 Avenue of the Stars, 14th Floor
11 Los Angeles, CA 90067
12 Telephone: (310) 789-3100
13 Facsimile: (310) 789-3150
14 Michael F. Heim (TX SBN 9380923)
15 mheim@hpcclp.com
16 Eric Enger (TX SBN 24045833)
17 eenger@hpcclp.com
18 Blaine Larson (TX SBN 24083360)
19 blarson@hpcclp.com
20 **HEIM, PAYNE & CHORUSH, LLP**
21 1111 Bagby St., Suite 2100
22 Houston, Texas 77002
23 Telephone: (713) 221-2000
24 Facsimile: (713) 221-2021
25 Attorneys for Plaintiff Intellectual Pixels Limited
26
27 **UNITED STATES DISTRICT COURT**
28 **CENTRAL DISTRICT OF CALIFORNIA**
SOUTHERN DIVISION

INTELLECTUAL PIXELS LIMITED, Case No. 8:20-cv-01422
Plaintiff, **AMENDED COMPLAINT FOR**
PATENT INFRINGEMENT

v. **DEMAND FOR JURY TRIAL**
SONY INTERACTIVE
ENTERTAINMENT LLC,
Defendant.

AMENDED COMPLAINT FOR PATENT INFRINGEMENT

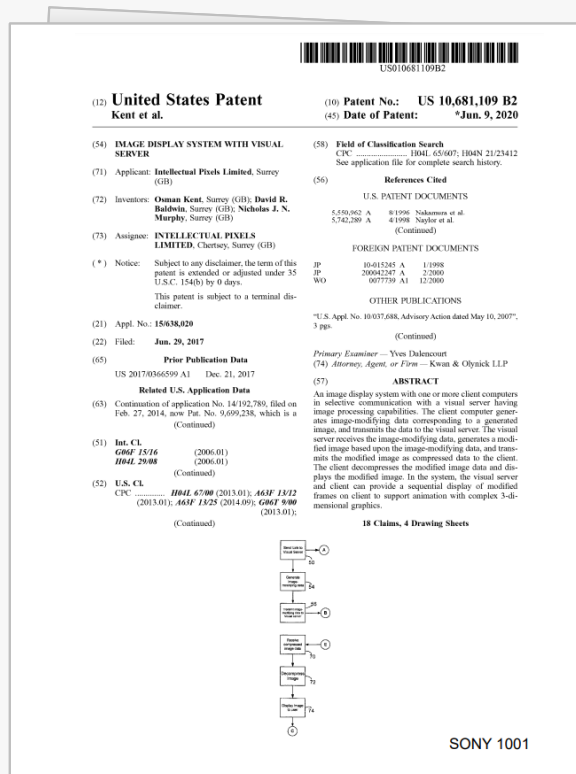
66. Claim 6 requires “the client device is a mobile device.”

- a. Remote Play satisfies this claim because Remote Play supports a variety of mobile client devices, including Android smartphones and tablets, iPhones and iPads, Sony Vita, Sony Xperia phones or tablets, and PC and Mac laptop computers, which are mobile devices.

Ex. 1032 at 30 (Patent Owner's Amended Complaint in *Intellectual Pixels Ltd. v. Sony Interactive Entm't LLC*, Case No. 8:20-cv-01422-JVS-KES (C.D. Cal.))

Reply at 7-8

Specification Broadly Refers to “Common Consumer Client Devices”



Therefore, for reasons of cost, size, and power consumption, sophisticated three dimensional graphics are not available on **common consumer client devices** such as personal digital assistants (PDAs) mobile telephones and set-top boxes used to decode cable and satellite television signals. Consequently, it would be advantageous to display complex three dimensional graphics, such as those used by games, on these consumer client devices.

Ex. 1001 ('109 Patent) at 3:26-33

present in any client device in order to have the advantages

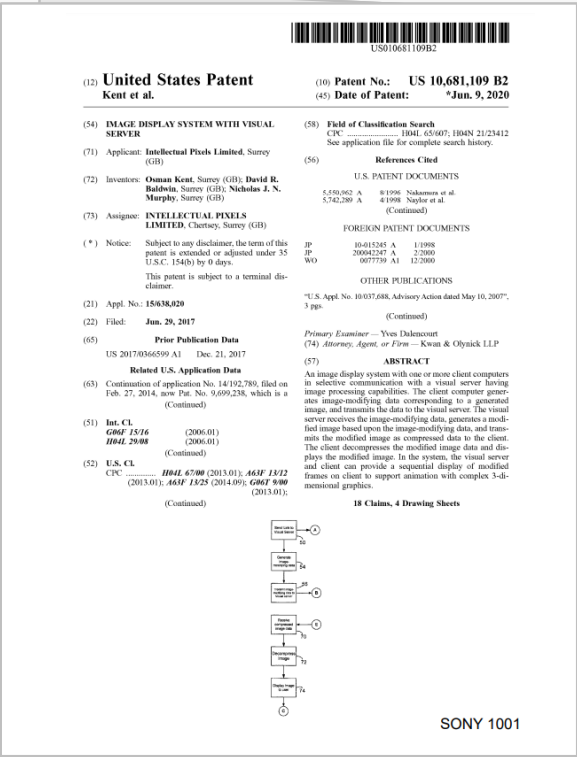
Ex. 1001 ('109 Patent) at 5:49

hence already follows the model of a client device supported

Ex. 1001 ('109 Patent) at 9:13

Reply at 8

Specification Examples Do Not Limit “Mobile Device”

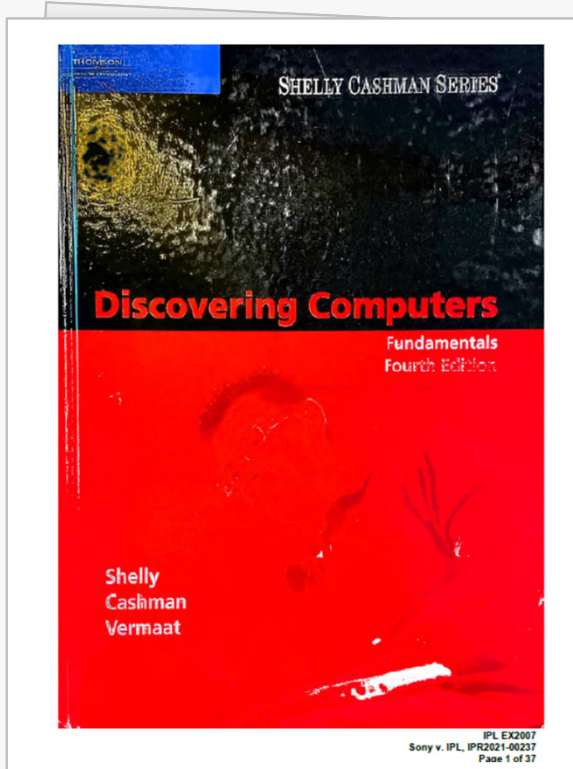


Another exemplary clients are PDA 18, such as a Palm Pilot or a Handspring Visor, which has a display screen 26, and cellular telephone 20, which includes a display screen 28.

Ex. 1001 ('109 Patent) at 5:51-53

Reply at 8-9

Patent Owner's Extrinsic Evidence—Ex. 2007



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Ex. 2007 (Discovery Computers, 2008) at 3

‘109 patent priority date: January 2001

Reply at 11

2000 Wang Reference—Ex. 1026

3. *It does not tolerate change or failure of computing resources.* The services available in an environment change in the presence of **mobile devices, such as laptops** and I/O devices. Software services can be installed or removed

Task-Driven Computing

Zhenyu Wang David Garlan
May 2000
CMU-CS-00-154

School of Computer Science
Carnegie Mellon University
Pittsburgh, PA 15213

Abstract

We are moving towards a world of pervasive computing in which we are anywhere at anytime. Computing devices and networks are becoming longer be referred to desktops; users will become increasingly mobile, have access to a dynamic range of computing devices and software perform computing tasks. Today's computing infrastructure does because computers interact with users in terms of low level abstractions a mobile user wants to use the computing resources of a new environment, he has to manually figure out how to perform a computing task using local resources and/or to migrate his computing context from another environment. Such manual operation is unacceptable in a pervasive computing world because it does not scale with the increasing amount of software services, user mobility and resource dynamism. It also demands that users spend too much time on non-task related configuration activities. This technical report describes an approach called task-driven computing that can be used to solve this problem. The approach is based on the insight that with appropriate system support it is possible to let users interact with these computing environments in terms of high level tasks and free them from low level configuration activities.

This research was sponsored in part by the Defense Advanced Research Projects Agency under agreement numbers F39602-97-2-0011 and N00011-99-2-0011. The U.S. Government is authorized to reproduce and distribute reprints for Governmental purposes notwithstanding any copyright notation thereon. The views and conclusions contained herein are those of the authors and should not be interpreted as necessarily representing the official policies or endorsements, either expressed or implied, of the Defense Advanced Research Projects Agency, Rome Laboratory or the U.S. Government.

SONY 1026
Sony v. IPL
IPR2021-00237

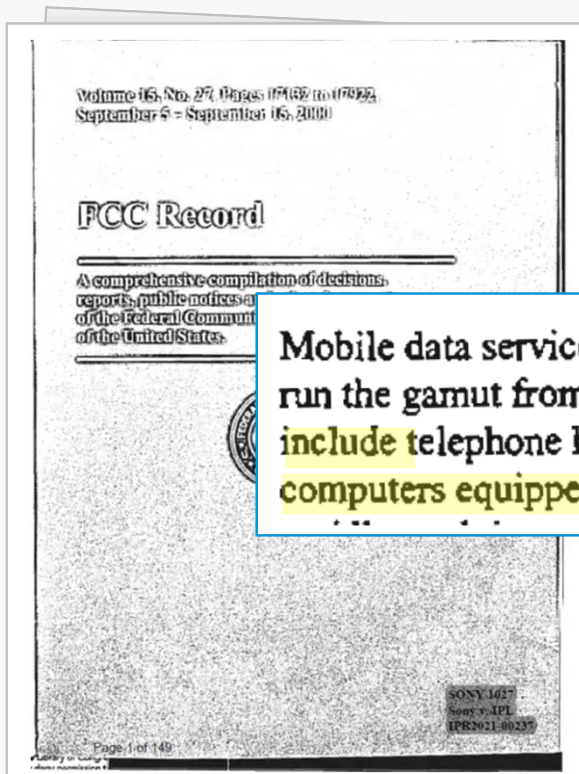
Ex. 1026 (Wang, *Task-Driven Computing*, 2000) at 4

- *Private device, private software.* Typically people own some stationary devices such as desktop workstations and a couple of **mobile devices (laptops, PDAs)**, and they do their computing primarily on those devices. People have

Ex. 1026 (Wang, *Task-Driven Computing*, 2000) at 4

Reply at 11

2000 FCC Report—Ex. 1027

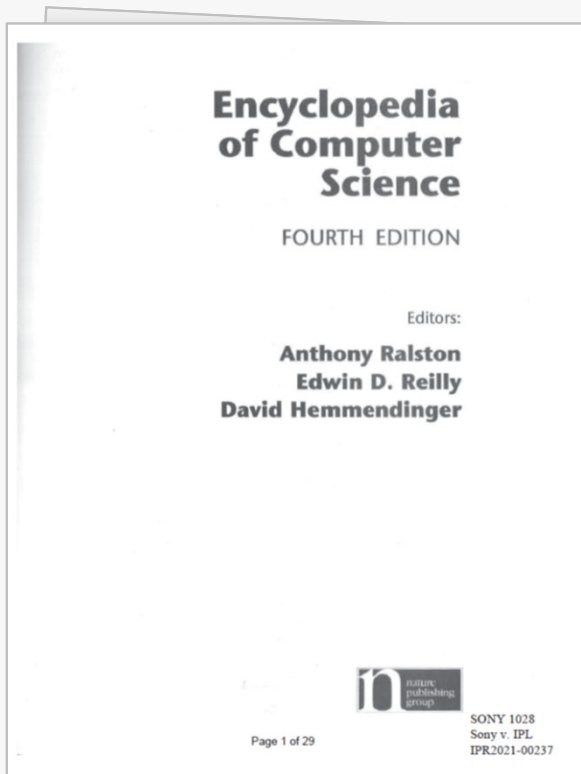


Mobile data service is the delivery of non-voice information to a mobile device.²¹² Mobile data services run the gamut from paging/messaging, to Internet access, to e-mail delivery.²¹³ Mobile data devices include telephone handsets, pagers, handheld computers, personal digital assistants (“PDAs”), and laptop computers equipped with wireless modems. A variety of wireless providers are involved with these

Ex. 1027 (FCC Report, August 2000) at 36

Reply at 11

2000 Encyclopedia of Computer Science—Ex. 1028

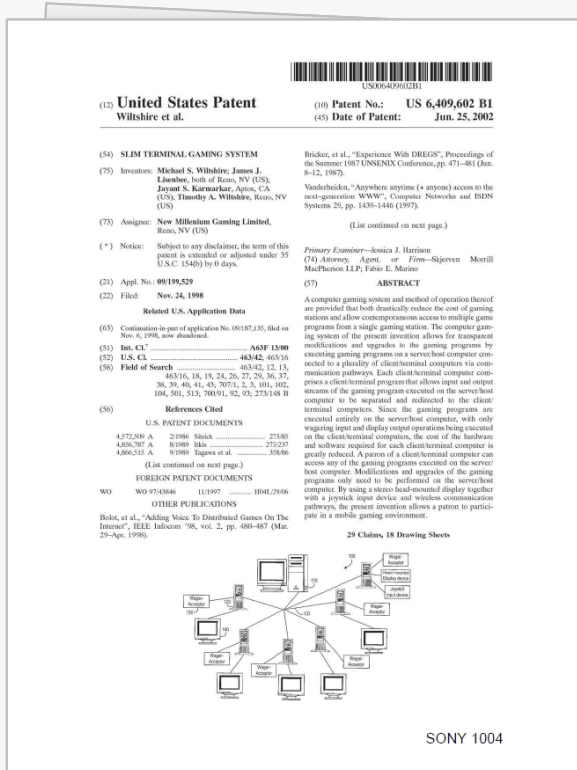


Display devices Mobile devices which provide interaction with people require some sort of display device for feedback. In laptop computers, the design goal is usually to have displays which can provide the same resolution, refresh rate, and color capabilities as the desktop version in a screen which is less than an inch thick. Color liquid crystal is the most popular for this use but requires about 50% of the power of the entire mobile. Other mobile devices, such as Apple's Newton, are experimenting with different types of display designed specifically for their applications.

Ex. 1028 (Encyclopedia of Computer Science, 2000) at 27

Reply at 11

Prior Art: Wiltshire (Ex. 1004) Discloses a Mobile Device



computer. By using a stereo head-mounted display together with a joystick input device and wireless communication pathways, the present invention allows a patron to participate in a mobile gaming environment.

Ex. 1004 (Wiltshire) at Abstract

11. The computer gaming system of claim 1, wherein at least one client/terminal computer further comprises:
a head-mounted display device;
a joystick input device; and
wireless communication pathways.

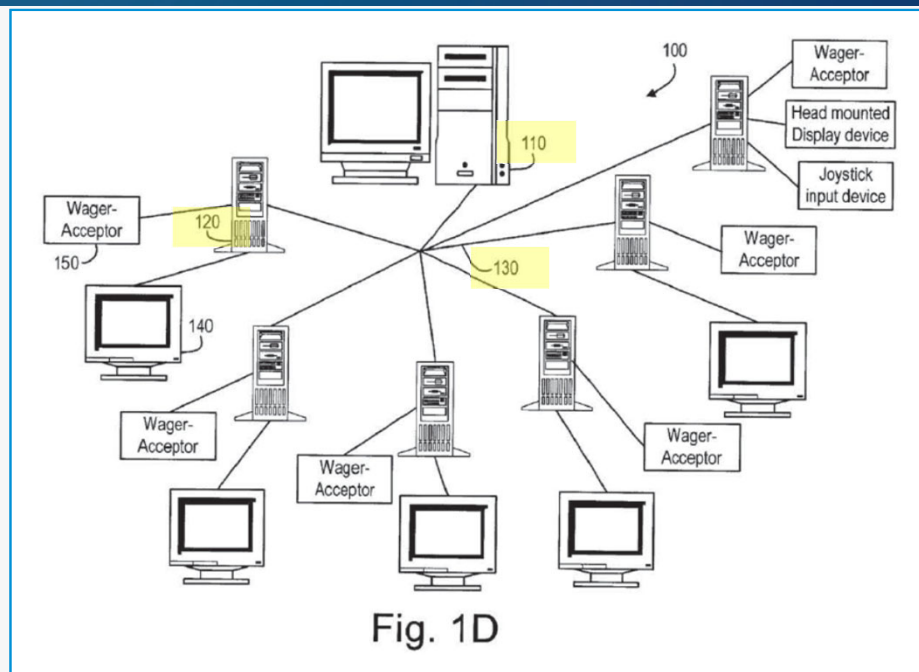
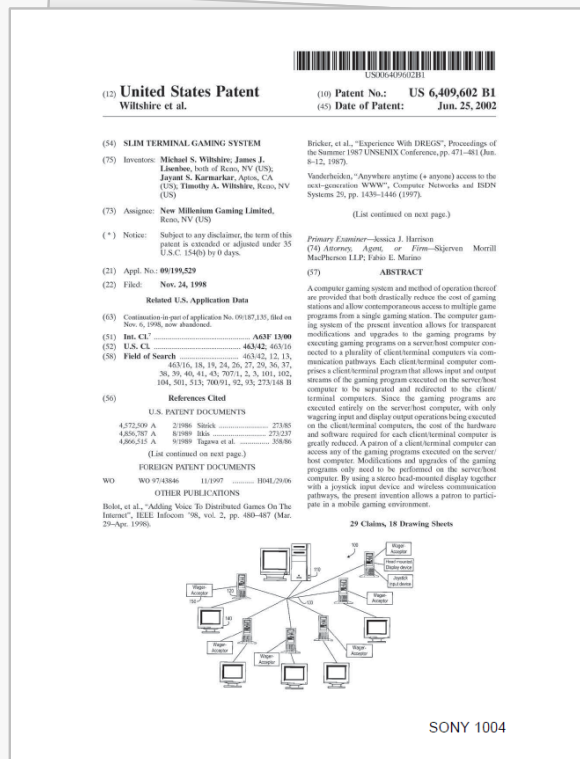
Ex. 1004 (Wiltshire) at 13:20-24

Client/terminal computers 120 can also be any type of cost effective special purpose or general purpose computer such as an Intel® x86 or Pentium® based computer, a Mac® PowerPC computer, a Sun® SPARC®, etc. However,

Ex. 1004 (Wiltshire) at 5:14-17

Petition at 40

Prior Art: Wiltshire (Ex. 1004) Discloses a “Mobile Device”



Communication pathways 130 are any communication pathways suitable for connecting server/host computer 110 to client/terminal computers 120 via network interface 115. In

Ex. 1004 (Wiltshire) at Fig. 1D, 5:38-40

Reply at 20-21

Prior Art: PC Magazine (Ex. 1007) Discloses a “Mobile Device”



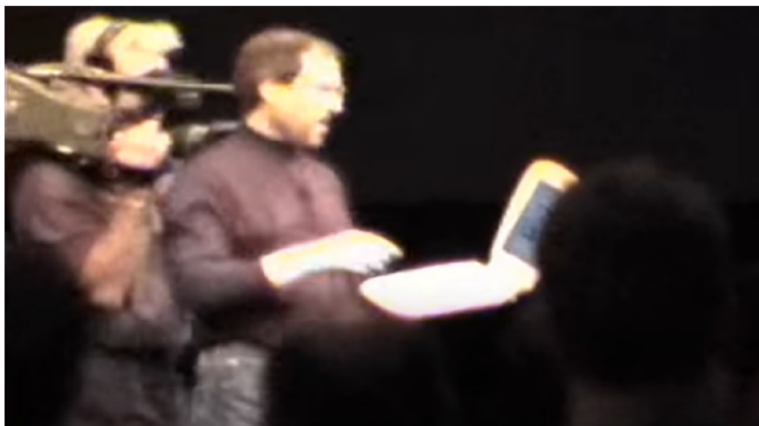
board. The operating system is Mac OS 8.6. Jobs touted the battery life as over 6 hours (Mac OS 8.6 includes advanced power-management schemes).

Just as many portable PCs are shipping with wireless technolo- gies, iBook users can roam up to 150 feet from \$299 base stations that plug into telephone jacks (users must also purchase \$100 cards for their iBooks to com- municate with the base sta- tions). Dubbed AirPort, the

Ex. 1007 (PC Magazine) at 10

Petition at 66-68; Reply at 22

The iBook Laptop Is a “Mobile Device” under PO’s Construction (Handheld)



Reply at 22-23 (citing <https://youtu.be/3iTNWZF2m3o?t=876> and <https://youtu.be/HFngngjy4fk?t=57> (video of MacWorld NY presentation referenced in Ex. 1007 at 9 (iBook introduced “[a]t New York’s recent MacWorld trade show”)))

Summary of Disputed Issues

Issue	Grounds	Addressed in Papers
I. Wiltshire and Saha disclose “compressing at least one updated image” (claims 1-12)	I	Pet. at 27-34, 44-45; Reply at 12-18
II. Wiltshire and Saha disclose a “[compressed] frame” (claims 1-12)	I	Pet. at 27-34, 44-45; Reply at 1-7, 18-20
III. Each of Wiltshire and PC Magazine discloses a “mobile device” (claims 6, 11, 12)	I, III	Pet. at 39-40, 50-51, 66-72; Reply at 7-12, 20-24
IV. A POSITA would have been motivated to combine PC Magazine with Wiltshire and Saha (claims 6, 11, 12)	III	Pet. at 66-72; Reply at 24-25
V. A POSITA would have been motivated to combine Chen with Wiltshire and Saha (claim 2)	II	Pet. at 58-65; Reply at 25-28

Wiltshire and PC Magazine Teach Toward One Another

Wiltshire

Client/terminal computers 120 can also be any type of cost effective special purpose or general purpose computer such as an Intel® x86 or Pentium® based computer, a Mac® PowerPC computer, a Sun® SPARC®, etc. However,

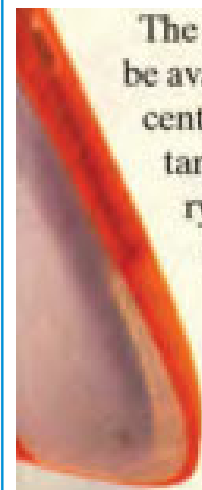
Ex. 1004 (Wiltshire) at 5:14-17

Esfahani

Microprocessor 10 may be any device capable of executing software instructions and controlling operation of the computer system, such as a “G3” PowerPC processor, for

Ex. 1021 (Esfahani) at 3:23-25

PC Magazine



The 6.6-pound iBook will be available in two translucent color schemes—tangerine and blueberry—and will have a 12.1-inch TFT display with a resolution of 800 by 600 pixels, an ATI Rage graphics chip, a 300-MHz G3 processor, a CD-ROM drive, 32MB of RAM (expandable to 160MB), a built-in modem, USB and 10/100 Ethernet ports, and a full-size keyboard. The operating system is Mac OS 8.6. Jobs touted the

Ex. 1007 (PC Magazine) at 10

Petition at 68-73; Reply at 24-25

iBook Supports Wireless Communications



Just as many portable PCs are shipping with wireless technologies, iBook users can roam up to 150 feet from \$299 base stations that plug into telephone jacks (users must also purchase \$100 cards for their iBooks to communicate with the base stations). Dubbed AirPort, the wireless technology is



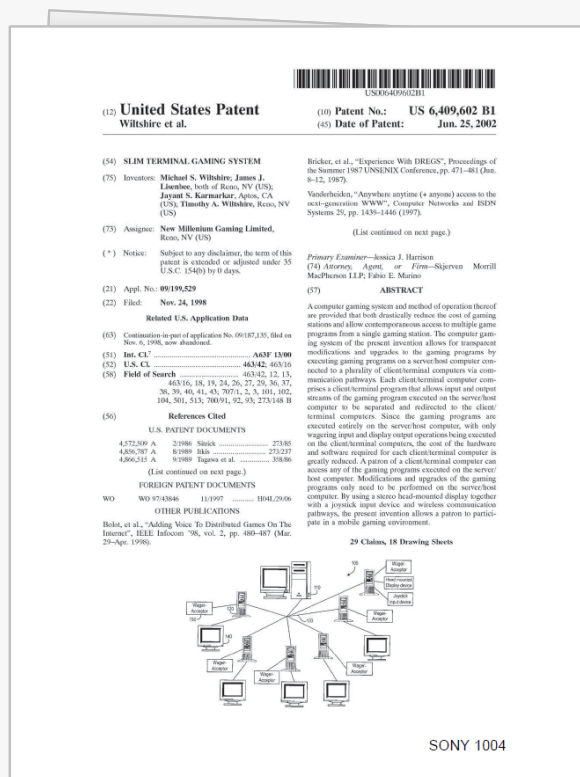
radio-based and has a data-transfer rate of 11 Mbps. Apple developed the wireless components in partnership with Lucent.

Wireless net - a shoestring.

Ex. 1007 (PC Magazine) at 10

Petition at 68-69; Reply at 24-25

Wiltshire's Client Computers Do Not Require Wager-Acceptors

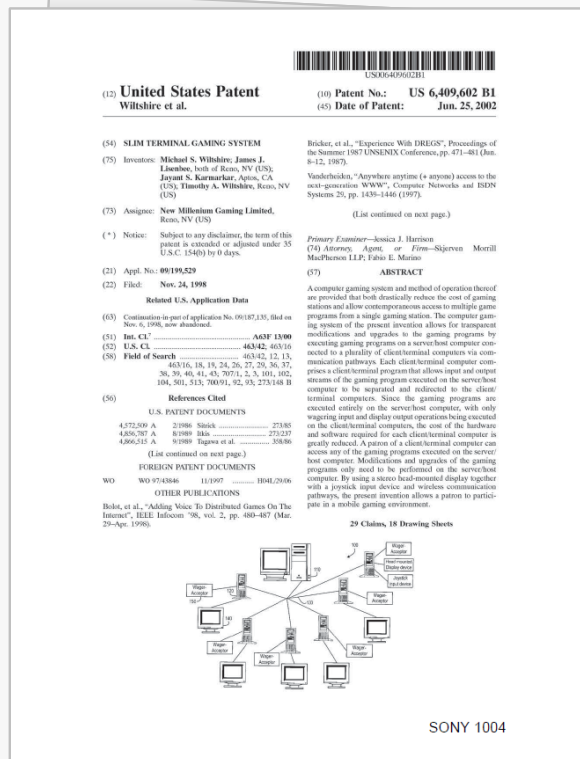


Furthermore, in some embodiments of the invention, each client/terminal computer 120 includes a wagering or bet-acceptor device 150 such as a coin collector, a bill collector, a smart-card reader, a credit-card reader, etc.

Ex. 1004 (Wiltshire) at 4:30-33

Reply at 24

Wiltshire Is Not Limited to a Casino Environment

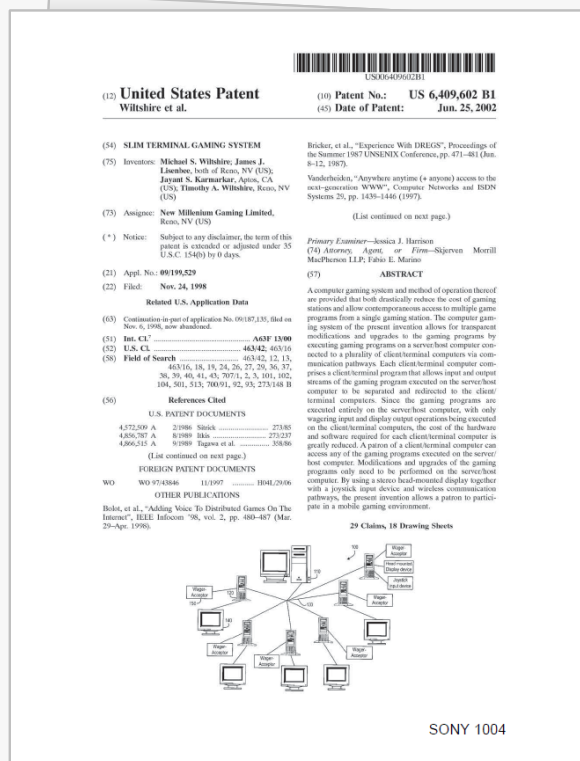


The terms "game" and "gaming," as used herein, include all types of electronic, electromechanical or mechanical gambling and casino game facsimiles (as defined in 15 U.S.C. 11719(a) (2) or (3), such as faro, monte, roulette, keno, bingo, fan-tan, twenty-one, blackjack, seven-and-a-half, big injun, klondike, craps, poker, chuck-a-luck, Chinese chuck-a-luck (dai shu), wheel of fortune, chemin de fir, baccarat, pai gow, beat the banker, panguingui, slot machines, video poker machines, etc.; lottery, sports betting and pari-mutuel wagering as well as games of skill and or strategy such as chess, checkers, backgammon, "board" games such as Monopoly and Scrabble, card games such as Pinochle, Hearts, Spades; video based games such as Doom, Pong, Packman, Myst; video games based on sports such as golf, baseball, football, basketball, soccer, rugby; arcade type games; non-house stake games between two or more players; games defined by IGRA (Indian Gaming Regulatory Act) as class II games.

Reply at 24-25

Ex. 1004 (Wiltshire) at 1:26-43

Wiltshire Is Not Limited to a Casino Environment



Reply at 24-25

invention. Other embodiments and varieties are within the scope of the invention, as defined by the following claims.

We claim:

1. A **computer gaming system** comprising:

one or more server/host computers;

one or more client/terminal computers for connection to the server/host computers via communication pathways;

one or more computer gaming programs executed on at least one server/host computer but not on any of the client/terminal computers;

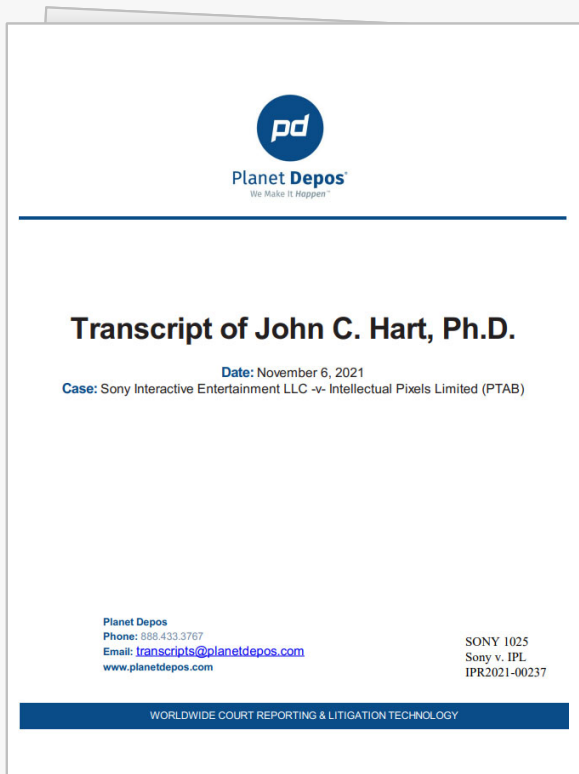
a server/host interface program executed on each server/host computer; and

a client/terminal program executed on each client/terminal computer;

wherein the computer gaming program executed on the server/host computer separates input and output streams at an application layer of a protocol stack, and redirects the input and output streams over the communication pathways to the client/terminal computers via the server/host interface program and the client/terminal program.

Ex. 1004 (Wiltshire) at 12:21-43

Wiltshire Is Not Limited to a Casino Environment



Q. And have you ever played Doom in a casino?

A. No, I have not.

Q. Have you ever played Doom in a commercial gaming establishment?

A. No, I have not.

Q. And are you aware of Myst being played on a desktop computer or laptop?

A. Yes.

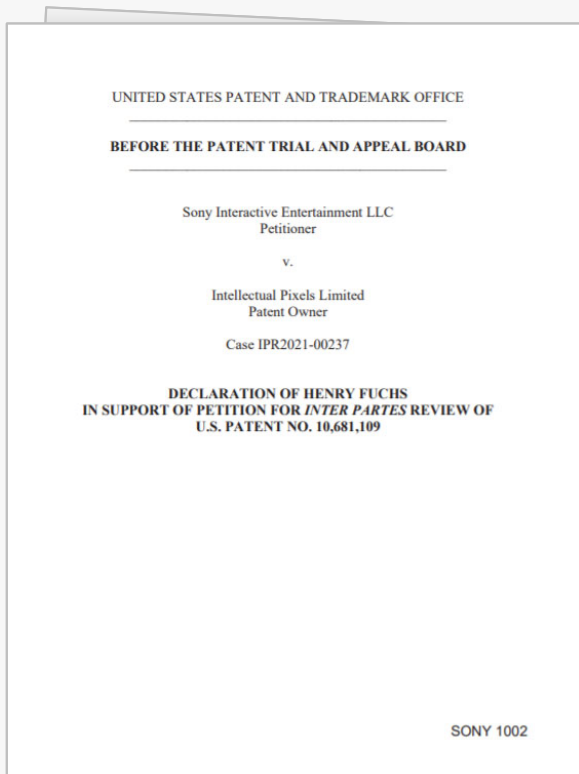
Q. Rougher aware of Myst being played in a casino?

A. No.

Ex. 1025 (Hart 11/06/21 Dep.) at 36:7-12, 20-25

Reply at 24-25

Dr. Fuchs' Opinion on the Industry Trend Toward Laptops Is Well Supported



mobile. As can be seen in commercial magazines such as PC Magazine, the personal computer industry had already begun shifting towards offering viable mobile laptop products to the general public. Ex. 1007 (PC Magazine), 9 (iBook targeted at students and consumers). Indeed, many businesses competed to offer their own laptop models to potential customers. *See generally*, Ex. 1007 (PC Magazine). Given that mobile devices like laptops were so well known at the time (as described in PC Magazine), using mobile devices would have been a predictable and identified option that was obvious to try.

Ex. 1002 (Fuchs Dec.) ¶ 220

Reply at 25

Summary of Disputed Issues

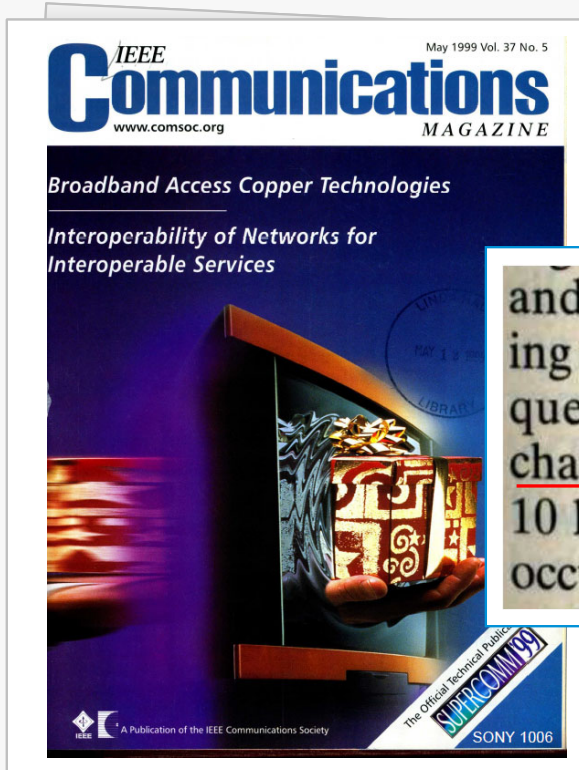
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V. A POSITA would have been motivated to combine Chen with Wiltshire and Saha (claim 2)	II	Pet. at 58-65; Reply at 25-28

Independent Claim 1 & Dependent Claim 2

Element	Claim Language
I [Preamble]	1. A method of hosting an interactive software application comprising:
I [a]	running at a server the interactive software application;
I [b]	receiving at the server user input signals from a client device, wherein the user input signals are used to control updating of the state of the interactive software application;
I [c]	generating at least one updated image at the server in response to updating the state of the interactive software application; and
I [d]	compressing the at least one updated image and transmitting the compressed updated image to the client device, wherein the server transmits the updated image as a compressed frame that can be decompressed and displayed as an updated image at the client device.
[2]	2. The method as recited in claim 1 wherein a first bandwidth for transmitting the user input data between the client device and the server and a second bandwidth for transmitting the compressed updated image from the server to the client device are asymmetric.

Petition at 59

Prior Art: Chen (Ex. 1006) Discloses “Asymmetric” Bandwidth

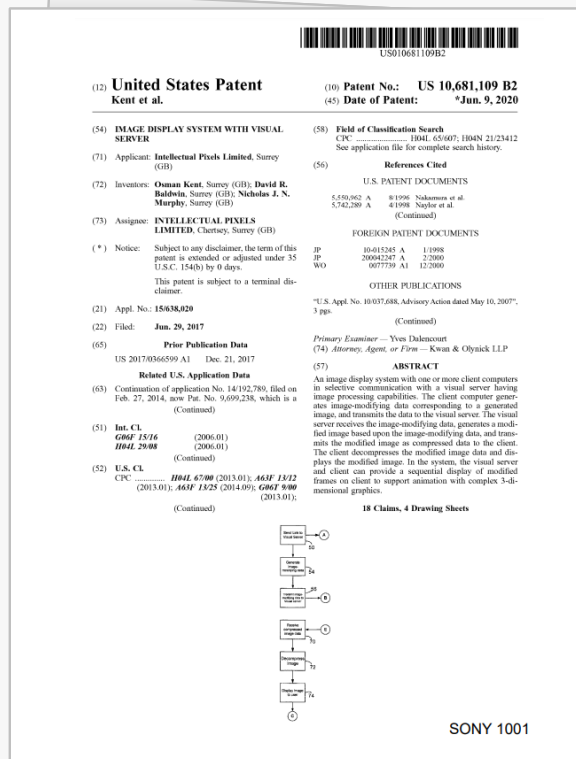


and academic DSL proponents, ADSL was proposed as having the traditional duplex POTS channels, occupying the frequency band between 300 Hz to 4 kHz, an upstream control channel of 16–64 kb/s, occupying the frequency band between 10 kHz to 50 kHz, and a downstream channel of 1.544 Mb/s, occupying the frequency band between 100 and 500 kHz.

Ex. 1006 (Chen) at 69 (page 5 of 8)

Petition at 59-60

'109 Patent Discloses Asymmetric DSL as an Example



network. However, the client bandwidth can be asymmetric, with the high-bandwidth reserved for visual server 12 to client 16,18,20 communication, an example being a DSL.

Ex. 1001 ('109 Patent) at 6:14-16

Petition at 60

Combination of Wiltshire, Chen, and Saha

The communication pathways 130 is any type of local area, wide area or global communication pathways, including the Internet and the World Wide Web. In some embodi-

Ex. 1004 (Wiltshire) at 5:30-32

interest. Most recently, ADSL has been considered as an ideal vehicle for Internet access and telecommuting applications.

Ex. 1006 (Chen) at 69 (page 5 of 8)

The capabilities of ADSL are well suited to the concept of a video-on-demand service provided through

vice, only a low transmission throughput upstream control channel is necessary to send back control signals for interactive commands such as pause, play, and so forth. The capabili-

Ex. 1006 (Chen) at 69 (page 5 of 8)

Petition at 61-63

Combination of Wiltshire, Chen, and Saha

The terms “game” and “gaming,” as used herein, include all types of electronic, electromechanical or mechanical

...

Pinochle, Hearts, Spades; video based games such as Doom, Pong, Packman, Myst; video games based on sports such as golf, baseball, football, basketball, soccer, rugby; arcade

Ex. 1004 (Wiltshire) at 1:26-43

any particular game. In fact, any casino game or other non-casino games where players play against each other for

Ex. 1004 (Wiltshire) at 12:11

tive commands such as pause, play, and so forth. The capabilities of ADSL are also well suited to applications such as network computing, where software and database records could be stored on network servers and retrieved at a speed equivalent to CD-ROM access, and tele-education, where a specialist can be shared with a large student population through downstream channels, and individual feedback can be provided through upstream channels.

Ex. 1006 (Chen) at 69 (page 5 of 8)

Reply at 26, 24-25

Combination of Wiltshire, Chen, and Saha: Ahamed (Ex. 1029) and Kompatsiaris (Ex. 1030)

Abstract— The fundamental limits of the outside loop plant to carry high-speed digital (bi-directional HDSL and ADSL) data are reported. The paper focuses on the copper wire pairs, drop lengths, and interconnects that convey data over the “last mile” to almost all businesses and residences in the US. The two major customers, businesses and households, are classified, characterized, and categorized by the distance to the central office or the remote terminal. Their spectral capabilities are computed

Ex. 1029 (Ahamed 1995) at Abstract

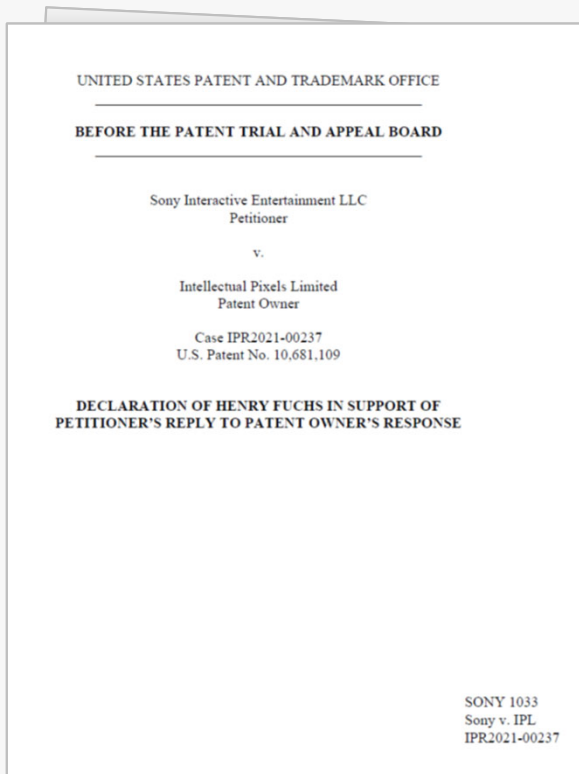
ABSTRACT

In this paper the design of an experimental ADSL network and the applications used are presented. Digital Subscriber Line (DSL) technologies enable the use of the twisted pair copper telephone lines, that reach practically every home and business (Public Switched Telephone Network) with very large bandwidth, typically from 1.5 - 6 Mbps downstream and 640 Kbps upstream, by placing a pair of modems at the user (home) and at the C.O. (PTT Central Office) side. After a small introduction on broadband

Ex. 1030 (Kompatsiaris 2000) at Abstract

Reply at 26

Combination of Wiltshire, Chen, and Saha



coupled to the server. In any event, a POSITA would understand that any given application in Wiltshire need not consume the entire 1.3 Mbps bandwidth used for MPEG's full motion video (over ADSL's 1.544 Mb/s downstream link). The fact that an MPEG stream may require rates of 1.3 Mb/s for "full motion video" using MPEG (Ex. 1006 (Chen), 69) does not mean that this full 1.3 Mb/s will be required for all uses or all applications. To the contrary, it was common, especially in 2001 and earlier, to use much lower transmission rates. For example, Wiltshire contemplates games like Pong or simpler games that could stream multiple concurrent MPEG videos that total much less than 1.3 Mbps. Pong's graphics were rudimentary and would have required a small fraction of the full 1.3Mbps bandwidth.

Reply at 26-27

Ex. 1033 (Fuchs Reply Decl.) ¶179

Petitioner's Demonstrative Exhibits
Case No. IPR2021-00237
Patent No. 10,681,109

Respectfully submitted,

Date: March 3, 2022

By: /Joseph F. Haag/
Joseph F. Haag
Reg. No. 42,612
Wilmer Cutler Pickering Hale and Dorr LLP
2600 El Camino Real, Suite 400
Palo Alto, CA 94306
650-858-6032
Joseph.Haag@wilmerHale.com

Certificate of Service

I hereby certify that on March 3, 2022, I caused a true and correct copy of the foregoing materials:

• **PETITIONER'S DEMONSTRATIVE EXHIBITS**

to be served via e-mail on the following attorneys for Patent Owner:

- doug.wilson@armondwilson.com
- michelle.armond@armondwilson.com
- forrest.mcclellen@armondwilson.com
- josepher.li@armondwilson.com
- litigation@armondwilson.com

/Joseph F. Haag/
Joseph F. Haag
Reg. 42,612
Wilmer Cutler Pickering Hale and Dorr LLP
2600 El Camino Real, Suite 400
Palo Alto, CA 94306
650-858-6032