

Electronic Acknowledgement Receipt

EFS ID:	24787792
Application Number:	14547148
International Application Number:	
Confirmation Number:	5188
Title of Invention:	OPTIMIZED IMAGE DELIVERY OVER LIMITED BANDWIDTH COMMUNICATION CHANNELS
First Named Inventor/Applicant Name:	Isaac Levanon
Customer Number:	35070
Filer:	Anatoly Weiser.
Filer Authorized By:	
Attorney Docket Number:	AP026CON1
Receipt Date:	01-FEB-2016
Filing Date:	19-NOV-2014
Time Stamp:	20:01:14
Application Type:	Utility under 35 USC 111(a)

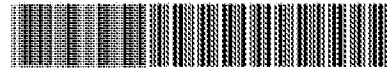
Payment information:

Submitted with Payment	no
------------------------	----

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Non Patent Literature	Doc03-MichalsonDecl_IPR15-1434-Pat343-Image-Part1.pdf	21736815 07e7c2bc559e51bd4483ed72794a834ed5f850bf	no	90

2	Non Patent Literature	Doc03- MichalsonDecl_IPR15-1434- Pat343-Image-Part2.pdf	10586890 e552b1506d980df8df60aa1461b84af8086f9477	no	42
Warnings:					
Information:					
3	Non Patent Literature	Doc04- MichalsonDecl_IPR15-1435- Pat506-Image-Part1.pdf	22761994 9024684e855dbb6a56aa0c20dc2a976474dd84cf	no	90
Warnings:					
Information:					
4	Non Patent Literature	Doc04- MichalsonDecl_IPR15-1435- Pat506-Image-Part2.pdf	10521129 ad8a60c7149bdd4c2e64e0158f249e64c5b1d184	no	40
Warnings:					
Information:					
Total Files Size (in bytes):				65606828	
<p>This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.</p> <p><u>New Applications Under 35 U.S.C. 111</u> If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.</p> <p><u>National Stage of an International Application under 35 U.S.C. 371</u> If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.</p> <p><u>New International Application Filed with the USPTO as a Receiving Office</u> If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.</p>					



(11) **EP 1 070 290 B1**

(12) **EUROPEAN PATENT SPECIFICATION**

(45) Date of publication and mention
of the grant of the patent:
07.01.2015 Bulletin 2015/02

(21) Application number: **98906484.5**

(22) Date of filing: **12.02.1998**

(51) Int Cl.:
G06F 17/30 (2006.01)

(86) International application number:
PCT/US1998/003017

(87) International publication number:
WO 1999/041675 (19.08.1999 Gazette 1999/33)

(54) **NETWORK IMAGE VIEW SERVER USING EFFICIENT CLIENT-SERVER, TILING AND CACHING ARCHITECTURE**

BILDBETRACHTUNGS-NETZWERKSERVER MIT EFFIZIENTEN KUNDENSERVEN, DATENSEITEN UND CACHEARCHITEKTUR

SERVEUR DE VISUALISATION D'IMAGES EN RESEAU UTILISANT UN SERVEUR CLIENT EFFICACE, UNE ARCHITECTURE EN MOSAIQUE ET A CONCEPT D'ANTEMEMOIRE

(84) Designated Contracting States:
**AT BE CH DE DK ES FI FR GB GR IE IT LI LU MC
NL PT SE**

(43) Date of publication of application:
24.01.2001 Bulletin 2001/04

(73) Proprietor: **E-Plus Capital Inc.**
Herndon VA 20170 (US)

(72) Inventors:
• **HORNBACKER, Cecil, V., III**
Apopka, FL 32712 (US)
• **CRONIN, John, C.**
Alexandria,
Virginia 22314 (US)

(74) Representative: **Hertz, Oliver et al**
v. Bezold & Partner
Patentanwälte
Akademiestrasse 7
80799 München (DE)

(56) References cited:
EP-A- 0 967 556 US-A- 5 555 101
US-A- 5 615 325 US-A- 5 666 490
US-A- 5 701 451 US-A- 5 708 825
US-A- 5 740 425 US-A- 5 745 109

- **MEYER E A ET AL: "Borealis Image Server"**
COMPUTER NETWORKS AND ISDN SYSTEMS,
NORTH HOLLAND PUBLISHING. AMSTERDAM,
NL, vol. 28, no. 11, May 1996 (1996-05), pages
1123-1137, XP004018214 ISSN: 0169-7552
- **CURRY C: "Making A Clickable Image Map" N.A.,**
May 1995 (1995-05), XP002235112
- **"VIRTUAL IMAGE EDITING" IBM TECHNICAL**
DISCLOSURE BULLETIN, IBM CORP. NEW
YORK, US, vol. 39, no. 8, August 1996 (1996-08),
pages 93-96, XP000638148 ISSN: 0018-8689

070 290 B1

Note: Within nine months of the publication of the mention of the grant of the European patent in the European Patent Bulletin, any person may give notice to the European Patent Office of opposition to that patent, in accordance with the

Description

1. Field of the Invention

[0001] This invention relates to workstation viewing images of digital documents stored on a network server and in particular to viewing large digital document images using a client-server architecture.

2. Description of the Prior Art

[0002] Current methods for viewing digital document images for workstations in a networked environment use proprietary workstation application software to access a network image file server. To view an image, the application software transfers a copy of the whole image file from the image file server to the networked client workstation. This method has a number of limitations including: inefficient use of the network; high software purchase cost per workstation; high software administrative cost per workstation; high computational demands on the workstation; proprietary software available only for limited workstation types. Some other network image viewers may provide viewing using more optimized image transmission protocols but only with proprietary protocols and proprietary workstation software.

[0003] CURRY C. "Making A Clickable Image Map" N.A., May 1995 (1995-05), XP002235112 presents a way to use a visual directory as a means for accessing underlying files or documents or images that relate to a place on the top level visual directory. The user is required to create a file that links areas on the initial image to the underlying files or documents. A clickable image map allows a user to click on any location of a graphic and receive more information in the form of an enlarged picture or a link to a uniform resource locator (URL). However, this prior art reference fails to disclose a grid of view tiles.

[0004] PERRY, H.: "Spaces between tiled gifs", retrieved from the Internet: URL: http://groups.google.com/groups/comp.infosystems.www.authoring.images/browse_thread/23b0ac047b8740e8/6cfcf0bc11b29e0b, 18 March 1997 discusses the so-called tiling of graphics files.

[0005] Further, the tiling of graphics files is also discussed in PERRY, H.: "Spaces between tiled gifs", retrieved from the Internet: URL: <http://groups.google.com/group/comp.infosystems.www.authoring.images/msg/c651277ebb96807?hl=en&dmode=source>, 18 March 1997.

[0006] RABINOVICH B. et al.: "Visualization of Large Terrains in Resource-Limited Computing Environments", Proceedings Visualization '97, 24 October 1997 discloses a software system supporting interactive visualization of large terrains in an environment comprising a low-end client computer accessing a large terrain database server through a low-bandwidth network. The large terrain scene is stored on disk in the form of geometry informa-

tion and texture tiles of fixed size. A low-end client computer loads only those texture tiles of the appropriate resolution which intersect the view footprint, if they are not yet loaded.

[0007] POTMESIL M.: "Maps Alive: viewing geospatial information on the WWW", Computer Networks and ISDN Systems 29 (1997) 1327-1342 discloses a WWW-based system for viewing geospatial information. The system comprises a 2D map browser capable of continuous scroll and zoom of an arbitrarily large sheet, which downloads and caches geographical information, geometrical models and URL anchors in small regions called tiles.

[0008] MEYER E. et al.: "Borealis Image Server" (COMPUTER NETWORKS AND ISDN SYSTEMS, NORTH HOLLAND PUBLISHING, AMSTERDAM, NL, vol. 26, no. 11, May 1996 (1996-05), pages 1123-1137, XP004018214 ISSN: 0169-7552.) discloses an image server for serving watermarked images to client web browsers. The server is programmed with web server software. The server receives requests from a client web browser in the form of an URL encoding an image name, output style such as thumb nail or full size, and optionally a graphic format. Upon receipt of a request, the server loads the file into memory, processes it, and delivers the resulting image to the browser. One of the output styles supported by the image server is the "info" output style. When an image is requested with output style "info", HTML code is returned to the browser defining a full HTML page consisting of the title of the image, an inlined thumbnail of the image which is a link to the full-sized image, and copyright and author/title information. However, the URL does not specify a view of the image file in terms of scale and region. Further, it is not disclosed that the web server determines an array of view tiles that corresponds to the requested view and creates the view tile images. Finally, it is not disclosed that the web server creates an HTML output file including appropriate formatting and references to the created view tile images.

[0009] Therefore, the system as disclosed in "Borealis Image Server" is not sufficiently efficient, which is especially important for viewing large images, i.e. images that cannot be displayed in full.

[0010] Therefore, it is an object of the invention to adapt the systems as disclosed in "Borealis Image Server" to allow efficient viewing of large images.

SUMMARY OF THE INVENTION

[0011] This object is achieved by a computer network server according to claim 1.

[0012] The invention comprises a computer network server adapted to store digital document image files, programmed to receive requests from a client Web browser in URL code, the URL specifying a view which identifies an image file and format, to compose the requested view, and to transmit HTML code for the resultant view to the client Web browser to display.

[0013] The accompanying drawings, which are incorporated in and constitute a part of the specification, illustrate an embodiment of the invention and together with the general description, serve to explain the principles of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

[0014]

FIG. 1 is a diagram of the system architecture showing the relationship of the components of the system and the image view server.

FIG. 2 is a flow diagram of the steps performed by the system to request, compose and display a view of an image.

FIGS. 3A and 3B are diagrams that show the view tile grid as determined by the view scale.

FIGS. 4A and 4B are diagrams that show the grid view tiles composed for an initial image view and then for a shifted view of the image.

FIGS. 5A and 5B are diagrams that show the web browser display of view tiles for an initial view and then for a shifted view of the image that correspond to FIGS. 4A and 4B.

FIGS. 6A and 6B are diagrams that show view tiles pre-computed by the background view composer.

FIG. 7 is a high-level flow diagram of the foreground view composer.

FIG. 8 is a flow diagram for the view generator component of the view composer.

FIG. 9 is a flow diagram for the data output component of the view composer.

FIGS. 10A, 10B, and 10C together constitute a flow diagram for the view tile cache garbage collector.

DETAILED DESCRIPTION OF THE INVENTION AND THE PREFERRED EMBODIMENTS

[0015] References will now be made in detail to the presently preferred embodiment of the invention, an example of which is illustrated in the accompanying drawings.

The preferred embodiment is a server PC consisting of an Intel Pentium Pro 200MHz processor, with at least 128MB of RAM, an Ultra-wide Fast SCSI disk controller with at least 4GB of hard disk space, and LAN/WAN/Internet network interface controllers. The server runs the Windows NT Server Version 4 operating system with NT File System, Microsoft Internet Information Server Version 3, and the network image server software. The server and client are configured with TCP/IP network protocols to support the HTTP (Web) protocol. No software other than a Web browser is required on the client. The preferred Web browser is Internet Explorer 3.0 or Netscape 3.0 or higher.

Referring first to FIG. 1, a network comprising client workstations 10 and 20 are connected through network con-

nections to a network image view server 100 comprising a network server interface, preferably a web server 30 which uses the Hypertext Transfer Protocol (HTTP), a request broker 40, a foreground view composer 50, a view tile cache 60, a background view composer 80, a garbage collector 70, and a document repository 90 having image files.

The network image view server, i.e., client workstation, or "workstation," 100 can be implemented on a computer, for example a personal computer configured with a processor, I/O, memory, disk storage, and a network interface. The network image view server 100 is configured with a network server operating system and Web server software 30 to provide the network HTTP protocol link with the client workstations 10 and 20. Typical networks include many workstations served by one, and sometimes more than one, network server, the server functioning as a library to maintain files which can be accessed by the workstations.

In operation according to an embodiment of the method of the invention, using the Web browser software on the client workstation, a user requests an image view 110 (FIG. 2) having a scale and region specified by means of a specially formatted Uniform Resource Locator (URL) code using HTTP language which the Web server can decode as a request to be passed to the image view composition software and that identifies the image file to be viewed, the scale of the view and the region of the image to view. The network image server sends HTML data to the client with pre-computed hyperlinks, such that following a hyperlink by clicking on an area of an image will send a specific request to the server to deliver a different area of the drawing or to change the resolution of the image. The resultant HTML from this request will also contain pre-computed hyperlinks for other options the user may exercise.

The code is sent over the network to the network server where the web server software interprets the request 120, passes the view request URL to the foreground view composer software through a common gateway interface (CGI) that is designed to allow processing of HTTP requests external to the Web server software, and thereby instructs the request broker 130 to get the particular requested view, having the scale and region called for by the URL.

The foreground view composer is initialized 140 and composes the requested view 150 after recovering it from memory on the network server. The foreground view composer software interprets the view request, computes which view tiles are needed for the view, creates the view tiles 160 needed for the view, and then creates Hypertext Markup Language (HTML) output file to describe the view composition to the Web browser, unless the necessary view tiles to fulfill the request are already computed and stored in cache memory of the workstation, in which case the already-computed tiles are recovered by the Web browser. In either case, the foreground view composer formats the output 170 and then initial-

Explore Litigation Insights

Docket Alarm provides insights to develop a more informed litigation strategy and the peace of mind of knowing you're on top of things.

Real-Time Litigation Alerts



Keep your litigation team up-to-date with **real-time alerts** and advanced team management tools built for the enterprise, all while greatly reducing PACER spend.

Our comprehensive service means we can handle Federal, State, and Administrative courts across the country.

Advanced Docket Research



With over 230 million records, Docket Alarm's cloud-native docket research platform finds what other services can't. Coverage includes Federal, State, plus PTAB, TTAB, ITC and NLRB decisions, all in one place.

Identify arguments that have been successful in the past with full text, pinpoint searching. Link to case law cited within any court document via Fastcase.

Analytics At Your Fingertips



Learn what happened the last time a particular judge, opposing counsel or company faced cases similar to yours.

Advanced out-of-the-box PTAB and TTAB analytics are always at your fingertips.

API

Docket Alarm offers a powerful API (application programming interface) to developers that want to integrate case filings into their apps.

LAW FIRMS

Build custom dashboards for your attorneys and clients with live data direct from the court.

Automate many repetitive legal tasks like conflict checks, document management, and marketing.

FINANCIAL INSTITUTIONS

Litigation and bankruptcy checks for companies and debtors.

E-DISCOVERY AND LEGAL VENDORS

Sync your system to PACER to automate legal marketing.