(54) Title: SYSTEM FOR STOCK IMAGES PEER-TO-PEER SERVICES OVER THE WORLD WIDE WEB

(57) Abstract: A method and system for distributed digital content trading over the Internet. The system comprises image publishers with an image repository and a publishing module; image buyers, with an image enhancement module, and a system service center, with a web server, an image attributes database, a search module, a billing module and a control module. Image suppliers publish in the service’s web-site thumbnails representing those images. The image buyer, searching for images, elects those thumbnails meeting her/his requirements, and gets from the service a temporary direct communication link to the image repository of the supplier. The buyer gets now the option to review, enhance and embed in page layout the low-resolution representation of the selected thumbnails, and quality check parts of the high-resolution images. The buyer pays via the service’s billing module. The buyer acquires the high-resolution image file directly from the supplier’s repository.
SYSTEM FOR STOCK IMAGES PEER-TO-PEER SERVICES OVER THE WORLD WIDE WEB

FIELD AND BACKGROUND OF THE INVENTION

The invention relates to the acquisition of digital stock images used in the graphic arts industry over Peer-to-Peer networks. In particular, obtaining selected digital stock images directly from their originators using the Internet services.

GLOSSARY

The following terms are defined in the web site: http://www.webopedia.com/

5 Color Space – A multi-dimensional geometric representation of the colors that can be seen and/or generated using a certain color model

Color Matching – The process of assuring that a color on one medium remains the same when converted to another medium. This is extremely difficult because different media use different color models. Color monitors, for example, use the RGB model, whereas process printing uses the CMYK model

Metadata – Data about data. Metadata describes how and when and by whom a particular set of data was collected, and how the data is formatted

IP Address - An identifier for a computer or device on a TCP/IP network

Web-server – A computer that delivers (serves up) Web pages. Every Web server has a fixed IP address and possibly a domain name

Peer-to-Peer network – A type of network in which each workstation has equivalent capabilities and responsibilities. In particular, each workstation has a temporary IP address through which it communicates.
The following terms were taken from:

http://graphicssoft.about.com/library/glossary/bldefresolution.htm

Thumbnail (or Icon) - a "Thumbnail" is a small graphic image that is usually used as a link to either a larger version of that image or to another web site. The image used for the Thumbnail needs to be reduced and resized to a smaller graphic for a quicker download of your web page. The viewer then has the option to click on the Thumbnail if they want to see the larger picture, which will take longer to download, or if they want to visit another site that it is linked to.

Resolution - resolution is a measurement of the output quality of an image, usually in terms of samples, pixels, dots, or lines per inch. The terminology varies according to the intended output device. PPI (pixels per inch) refers to screen resolution, DPI (dots per inch) refers to print resolution, SPI (samples per inch) refers to scanning resolution, and LPI (lines per inch) refers to halftone resolution.

Often images are referred to as high-resolution (hi-res) or low-resolution (low-res). High-resolution refers to an image intended for print, generally having 300 samples per inch or more. Low-resolution refers to images only intended for screen display, generally having 100 pixels per inch or less.

We have broadened the above definition:

Low-res Image - is a graphic image that is scaled down for various purposes; preview in an imaging application, hi-res representation for page layout applications or hi-res representation for web usages. It has 2 main forms:

1. An image scaled down to a fixed resolution, typically 72 or 144 dpi
2. An image scaled down to a specific screen size typically 600 X 800 or 768 X 1024.

*Hi-res Image* – a graphic image in a digital form that contains all the necessary data for its final use; appropriate resolution, color depth and input profile (color model), i.e. if additional transformations are required in order to convert the image to its final output form, then all necessary input for these transformation is stored within the image.

The following terms are defined for the purpose of this application (note Fig. 9):

10 *Link* (Fig. 9A) – at least two entities (for example site A and site B) connected (communication wise) by the Internet 50 or other communication link.

*Action* – an operation (e.g. searching data, transferring data, purchasing goods, paying for merchandise) executed via a *link*. *Actions* will be symbolized by numbers next to the specific *action*, for example “search 95”.

*Entity* (Fig. 9B) – an *entity* (for example: Image Bank) includes one or more operational units (for example: a PC, storage device). The interconnections and mode of operation of the *entity* are known in the art.

20 *Peer to Peer Link* (Fig. 9C) – An Internet 50 or other communication link connection between two or more Peers. Note also: *Peer-to-Peer network.*
Digital stock images are widely used over the Internet. A common use of these images in the Graphics Arts industry is described below:

Designers, who design a page, look for a specific image to be inserted in that page layout. This image can be specially originated for this occasion or can be searched for in repositories for stock images. These repositories, often called Image Banks, are widely used over the World Wide Web, for example, Getty Images of Seattle, Washington. The designer who looks for an image in an Image Bank can view a small representation of the image. If the designer is pleased with this image, he or she negotiates with the Image Bank the price of the full-resolution image. The price depends at least on two factors: the image attributes (how rare, how artistic, whether a celebrity, etc.) and the use of the image in the print (size, media type, media circulation, etc.).

The Image Bank service poses several problems:

- In most cases the stock images for use, reside within an Image Bank. Each image requires a large storage capacity, for example: a printed A4 color image in 300 dpi resolution requires about 35 Megabytes of storage. Therefore, such a bank needs to allocate many resources in order to store all these images (hardware, disk space, bandwidth). Thus, the price of the stock images for the consumers must be increased.

- Stock images are captured or digitized into the RGB color space and are transferred in this format to the users, but images are normally printed after conversion to the CMYK color space, (that is, the preparation for print is performed after the transaction was done). In many cases, the color match between the original image and the printed image is very poor.
Since the mediators (Image Banks) take a significant commission, the image originators get a small portion of the revenue for each image. Moreover, in many cases they do not get the publicity they may have gotten if they sold the images directly.

Presently, most of the stock image trading is performed via Image Banks. Figure 1 shows a typical layout and workflow of the current trading mode of stock images.

An Image Bank 10 purchases 11 the original media of an image, e.g. film, via from an Image Supplier 20. The Image Bank 10 then scans the film in-house, stores it in an Image Repository 30, and posts its low-resolution representation on the Image Bank’s web server 12 which is located on the Internet (50). Once an Image Consumer 40 is interested in stock images, he or she performs a search 14 in the Image Bank 10 web site. Upon location of an appropriate (low-resolution) image, the Image Consumer 40 initiates a purchasing transaction of the high-resolution image. The Image Bank’s Management Unit 17 concludes a transaction and uploads the image from the Image Repository 30, and transfers 15 it via the Internet 50 to the Image Consumer 40.

The main problems with this model are: the Image Consumer 40 pays more than necessary, the Image Supplier 20 does not get her/his fair share in the transaction, the images are not ready for print, and finally the images selected from the web-site are not in full-resolution and therefore the Image Consumer cannot evaluate the image quality before the transaction.

There are other means of stock image trading that are in use. For example, tools that enable the Image Supplier to publish her/his images directly on the Web.
Figure 2 shows this model of stock image trade, having the following typical workflow: The Image Supplier 20 (e.g. the Impressionist or Modern Art section of a museum), puts its images on the Image Repository 19 of the Stock Image Publisher 60 (e.g. the museum) and then publishes them on the museum’s web server 16 and the Web 50, using an Image Publishing Software tool 70, for example, FotoWeb by FotoWare of Norway. Once an Image Consumer 40 is interested in a (e.g. art) stock image, she/he performs a search 22 on the Web 50, using any standard search engine, e.g. Google. The Stock Images Publisher 60, is found in this search and the Image Consumer 40 can perform a particular search, negotiate price and retrieve 23 a specific image from the Stock Images Publisher 60 via the Web 50.

The main drawbacks of this model are: the Image Consumer 40 needs to perform a double search, first a search for one or more Stock Images Publisher 60, and a second search for the specific image within the Stock Images Publisher’s website. The Stock Images Publisher has a relatively small repository 19 of images and thus the consumer has fewer images to choose from.
OBJECTS AND BRIEF SUMMARY OF THE PRESENT INVENTION

The object of this invention is to provide a system and method for trading of digital content, particularly graphic arts images, between image publishers, image buyers and a control and coordination service, all communicating via the Internet or other communication means.

According to one aspect of the invention, there is provided a distributed trading system comprising of image publishers, each having a repository for high-resolution images and an image publishing module, image buyers each having an image enhancement module and a system service unit having an image attributes database, a search module, a billing module and a coordination and control unit. The image publishers, image buyers and the service unit communicate preferably via the Internet or by means of other communication methods including physical transfer of films and CD's.

In the preferred embodiments of the invention described below, the image publishing module comprises of an image metadata publishing module, an image high-resolution exporting module, and an image price negotiating module, each including further functional units serving the purpose of the system. This image publishing module is downloaded from the service unit to the image publisher upon the first registration of images by the publisher in the service.

In another preferred embodiments of the invention described below the image enhancement unit includes tools for importing low-resolution and high-resolution images, in partial or full format, from the image publisher; tools for evaluating, enhancing, quality checking and selected layout functions. These tools are functional for assisting the image buyer to conclude the purchase of a specific image, basically presented by the service unit as a thumbnail. This image enhancing module is
downloaded from the service unit to the image buyer upon the first search initiated by the buyer in the service.

In an alternative embodiment the system service unit includes also an image repository, enabling a different method of operation.

The preferred method of operation described in this invention for the direct purchase of high-resolution images by an image buyer from a specific image publisher comprises: accessing by the buyer the system service unit and searching for the required image by defining desired attributes. Upon location by the service of the attributes in its attributes database, a thumbnail is presented to the image buyer in the service’s web-site. A multitude of such thumbnails are pre registered by one or more image publishers in the service with their respective attributes. At the request of the image buyer, a temporary peer-to-peer network connection is established between the buyer and image supplier, and the buyer gets direct access to the low-resolution image file as well as to selected parts of the high-resolution image file.

The buyer has now the opportunity to verify and enhance the low-resolution image of each elected thumbnail, quality check selected parts of each respective high-resolution image file and embed the selected images in a page layout. Upon satisfactory termination of the enhancement and quality checks the buyer can purchase the high-resolution image, by negotiating directly with the image supplier the terms of purchase and mode of payment. The payment is done via the billing system of the system’s service unit, which can split the payment between eligible parties. The high-resolution image file is consequently transferred from the supplier’s repository to the buyer, by means of network downloading, physical transfer of a removable storage media or a transparency. The high-resolution image file is
automatically rendered by the buyer's enhancement module to be ready for print, based on the enhancement and quality factors performed at an earlier stage.

In another preferred embodiment the attribute database can be segmented according to known preference of buyers, such as saturated colors, skin tone or ultra high-resolution. These preference factors entail specific conversion of the low-resolution and high-resolution files representing the image.

Certain tools described in this invention are applicable both in the preferred embodiment of the peer-to-peer system or in the prior-art image bank trading method.
BRIEF DESCRIPTION OF THE DRAWINGS

The invention is herein described, by way of example only, with reference to the accompanying drawings, wherein:

Fig. 1 is a schematic drawing of a typical layout and workflow of the Image Bank trading mode of stock images.

Fig. 2 is a schematic drawing of a typical layout and workflow of the Stock Images Publisher trading mode of stock images.

Fig. 3 is a schematic drawing of a typical layout and inter-unit workflow of the Peer-to-Peer operation mode as described in this invention.

Fig. 4 is a schematic drawing of a typical layout and inter-unit workflow of the Peer-to-Peer Service unit and the Image Publisher unit of Fig.3.

Fig. 5 is a schematic drawing of a typical layout and inter-unit workflow of the Peer-to-Peer Service unit and the Image Buyer of Fig.3.

Fig. 6 is a schematic drawing of a typical layout and inter-unit workflow of the Peer-to-Peer Service unit, Image Publisher unit and Graphic Arts buyer unit of Fig.3.

Fig. 7A and Fig. 7B are a schematic block-diagram of a typical operational workflow of the Peer-to-Peer system, as described in this invention.

Fig. 8 is a schematic block-diagram of an alternative workflow of the Peer-to-Peer system, as described in this invention.

Fig. 9A, Fig. 9B, Fig. 9C are schematic representations of certain definitions used in this invention.
DESCRIPTION OF THE PREFERRED EMBODIMENT

The invented Peer-to-Peer system, as schematically described in Fig. 3 and detailed in Fig. 6, solves most of the above mentioned problems existing in the present known solutions while offering new features, which are of prime importance to the Graphic arts Buyer.

The Peer-to-Peer service 100 is a hub type unit located on a web-server 33, connected to the Internet 50, having adequate bandwidth for up-loading and down-loading metadata and Thumbnail images.

Image Publishers 110 (for example a museum) incorporate Image Suppliers 20 (for example, the museum’s different departments), an image repository and additional software modules to be further explained later. The Image Publishers 110 owns rights in proprietary hi-resolution images, which are registered as Thumbnails by action link 31 and published in the Peer-to-Peer service 100.

Graphic Arts Buyers 120 (for example, studios, ad-agencies, magazines) employ one or more Image Consumers 40 (for example designers) working for the same Buyer, equipped with additional software module to be further explained later. Graphic Arts Buyers 120 looking for stock images for their designs perform a search 32 for such images in the Peer-to-Peer service 100 web site. If, for example, Graphic Arts Buyer 120c finds a Thumbnail that meets her/his requirements, and which belongs to a certain Image Publisher 110b, an option is secured to buy rights in the chosen image and the Peer-to-Peer service 100 establishes 34 an ad-hoc Peer-to-Peer network connection 140 between the Image Publisher 110b and the Graphic Arts Buyer 120c. It assumed here that the ad-hoc network connection is physically feasible, the transmission quality is acceptable (including data transfer rate) and the security level is adequate.
The chosen hi-resolution image is transferred 36 via this connection to the Buyer, following Buyer’s image quality verification 35 of the low-res and partial hi-res image and a payment procedure.

The communication means between Graphic Arts Buyers 120, Image Publishers 110 and the Peer-to-Peer service 100 can be other than the Internet, for example Intranet, and combinations of Internet, Intranet, phone and mail services for delivery of CDs or film, including, for example, the high-resolution file of the image.

The invented method and system components will be further explained now in detail.

Fig. 4 is a schematic drawing of a typical layout and inter-unit workflow of the Peer-to-Peer Service unit 100 and the Image Publisher unit 110 of Fig.3.

The Peer-to-Peer service 100 comprises of 4 major units:

1. System Control & Logic unit 150, which can be a known in the art software component running on a computer server, controlling and executing all the networked and other system operations.

2. Image Attributes DB 160 – stores, in a known in the art data storage device, the following data:
   a. Attributes of the images including, for example, pointers (on the Web) to the hi-resolution images, Thumbnails of hi-resolution images, price information and other metadata.
   b. A list of Image Publishers 110 and their respective Internet addresses.
   c. A list of Graphic Arts Buyers 120 and their respective Internet addresses.

3. Billing System 170, which provides the billing mechanism for the stock image transactions. This system can be based on existing networked billing systems such as, for example, PayPal (eBay) from Mountain View, California.
4. Web Server 42 linking the Service to the Web 50.

    Image Publishers 110, having proprietary images in their own Repository 19, and who wish to sell rights in those images, register 31 these images by uploading the image Thumbnails into the Peer-to-Peer system. For each Thumbnail a form is submitted describing the image metadata, including, for example, physical attributes, content category, textual description of the content and pricing tables.

    The System Control & Logic unit 150 performs at least 3 operations:

1. Records the image attributes in the Image Attributes DB 160.

2. Records the Image Publisher's 110 network details into the Image attributes DB 160.

3. Records the Image Publisher's 110 necessary account details into the Billing System 170.

4. If the Image Publisher 110 is a new user of the system, the Image Publisher downloads the Image Publishing Module 180 into its own computer system (not shown). The function of the Image Publishing Module will be further explained later.

Fig. 5 is a schematic drawing of a typical layout and inter-unit workflow of the Peer-to-Peer Service unit and the Graphic Arts Buyer 120, which explains how an Image Consumer 40 finds a particular stock image in the system.

    Image Consumer 40, who looks for particular images, searches 32 for such images in the Peer-to-Peer Service's web site 33, which prompts the System Control & Logic unit 150 to look in the Image Attributes DB 160 for the particular image, according to search properties entered by the Image Consumer 40. If such
image/s are located, the Service 100 displays the respective Thumbnails to Image Consumer 40. If one or more of the Thumbnails are acceptable to the Consumer, a purchase option is opened, and the Service 100 establishes an ad-hoc peer-to-peer connection between the Image Buyer 120 and the Image Publisher 110 (as explained later in Fig.6) for the purpose of closer examination of the corresponding low-res files and quality evaluation of parts of the hi-res files. Upon successful conclusion of the procedure, to be further explained in Fig. 7, the transaction is concluded and the hi-res files are transferred to the Consumer.

If the Graphic Arts Buyer 120 is a new User of the system, the Image Consumer 40 downloads the Image Enhancement Module 190 into its own computer system (not shown). The function of the Image Enhancement Module will be further explained later.

For best understanding the typical Peer-to Peer system’s workflow, to be further explained in Fig. 7, some additional features and capabilities of specific modules will be discussed in Fig. 6, which is a schematic drawing of a typical layout and inter-unit workflow of the Peer-to-Peer Service unit, Image Publisher units and Graphic Arts Buyer units operating as a coherent system.

1. The Peer to Peer Service unit (100) offers several additional functions:

- Grading of images by the Graphic Arts Buyers (120), for example: image quality, communication quality, and the service quality.
- Grading of images by the System Control & Logic unit 150, for example: image quality as evaluated by an expert, and/or by scientific tools; statistical
and objective evaluation of the communication quality, and statistics on availability of images.

- Segmentation of the images in terms of preference of colors (for example, Japanese Consumers prefer saturated colors and specific skin tones).

Another segmentation factor is the output resolution needed by the image Consumer 40, for example: Consumer 40 prefers to output on wide-format printers, thus requiring ultra high-resolution images.

This segmentation is recorded in the Attributes DB160, and will eventually effect the low-resolution representation examined by the Consumer, as well as the resulting high-resolution file transferred from the Publisher to the Consumer.

2. The Billing System 170 includes, beyond the known in the art payment processing tools and transaction detail logging, the mechanism to split on-line payments by the Buyer 120 to the different eligible parties (for example: the image Publisher 110 and the service 100).

3. The Publisher's Image Repository 19 usually stores the low-resolution image of each proprietary image offered for sale, and one or more high-resolution files (for example having different resolutions).

4. The Image Publishing Module (180), is primarily responsible for the task of exporting the low-resolution and high-resolution image (or specific parts thereof) from the Publisher's repository 19 to the Buyer's Enhancement Module 190, using the ad-hoc peer-to peer link 140, but offers several additional functions:
- Scaling the image according to the Buyer's parameters, by known-in-the-
  graphics-arts methods.

- Cropping, by known-in-the-graphics-arts methods, the high-resolution image and transferring over the network connection 140 only the relevant parts of the image.

- Embossing or removing, by known in the art methods, an "Electronic Signature" or Watermark" to the images for copyright protection purposes.

- Compressing the original file using known-in-the-art methods for loss-less compression.

- Embedding metadata into the image file.

5. The Image Enhancement Module (190), is primarily responsible for the task of importing the low-resolution and high-resolution image (or specific parts thereof) from the Image Publishing Module 180, using the ad-hoc peer-to peer link 140, but offers several additional functions:

a) Enhancement and preparation of the image, for inclusion in the designed page; this is performed on the low-resolution representation of the image. This function includes, for example, known in the art tools for scaling and cropping the image. The same functions will be subsequently carried out, as further explained later, by the Publishing unit 180 on the hi-resolution image file, before delivery to the Consumer.

The enhancement function includes other known in the art tools such as, for example, toning, sharpening, color correction and color conversion. These tools help to prepare the image printing on a specific printer. The resulting enhancement details of the low-resolution image will, in case the transaction is
completed, be automatically performed, as further explained later, by the Image Enhancement unit 190 on the delivered high-resolution file.

b) Embedding the elected and enhanced low-resolution image/s in the layout of the job at hand without having the ready to print Hi-res image. The resulting embedding details of the low-resolution image/s will, in case the transaction is completed, be automatically performed (by the Image Enhancement unit 190) on the delivered raw high-resolution file/s, e.g. toning and color conversion. A similar DTI Workflow automatic feature was published on the Creo website:


c) Image quality verification, an essential phase in the entire workflow. The verification phase consists of 2 main operations:

- Maximum details: viewing high-resolution chosen parts of the image.
- Output simulation: viewing the image as if processed on the target output device (e.g. proofer, printer).

These two functions are further described hereby:

Maximum Details function

Every professional graphic arts application (for example: oXYgen by Creo IL Ltd. Herzelia, Israel) enables the user to view parts of a high-resolution image on the screen. The main difference here is that in this invention the operation is carried out over the network, a technology facilitated by, for example, Synapse Insite, another of Creo's applications.
Output Simulation function

This functionality enables a user to view an image as if it was printed on a specific output device. In particular, applications such as Creo's oXYgen, can simulate, for example, a RGB image (on a calibrated RGB monitor) as if was printed on a specific CMYK printer. This is achieved by using the appropriate ICC profiles in a proprietary color transformation method included in oXYgen. The same function will be subsequently carried out, as explained above, by the Image Enhancement unit 190 on the full hi-resolution image file, before delivery to the Consumer.

Fig. 7 is a block diagram of a typical operational workflow of the Peer-to-Peer system, schematically shown in Fig. 6, following the main steps of a transaction between the Image Publisher 110 and the Graphic Arts Buyer 120, who wishes to purchase a stock image from that Publisher.

In Fig. 7 numbers in parenthesis (XXX) stand for the corresponding related entity described in the task.

It is further assumed that one or more Image Publishers 110 have registered their proprietary images with the Peer-to-Peer Service 100, as explained above.

**Task 71.** Consumer 40 searches 32 a specific type of image in Service 100.

**Task 72.** Service 100 scans for the required type in Image Attributes DB 160.

**Task 73.** Assuming one or more images are located, Service 100 displays (Task 75) to Consumer 40 the Thumbnails corresponding to the located images.

**Task 77.** Consumer 40 evaluates the Thumbnails and notifies Service 100 about his interest to continue the transaction. In this stage the Consumer can consult available grading information available by the Service.
Task 79. If positive, Peer-to-Peer service 100 checks if Consumer 40 is a first time Buyer, and in such case downloads (Task 81) to Consumer 40 an Image Enhancement Module 190.

Task 83. The System Control & Logic unit 150 establishes an ad-hoc peer-to-peer link 140 between Buyer 120 and the specific Image Publisher 110, who owns the located images (of Task 73). In order to do so, the System Control & Logic 150 gets the Publisher's network details from the Images & Buyers DB 160 and the Graphic Arts Buyer 120 details from the current connection data.

Task 85. The Consumer 40 retrieves, via the ad-hoc peer-to-peer link 140, a low-resolution representation of the image using the Image Enhancement Module (190) in cooperation with the Image Publishing Module (180) to get the relevant data from the Image Repository 19.

Task 87. The Consumer 40 verifies and enhances the low-res file of the image, using the tools available in Module 190, as listed above, in cooperation with Module 180. In this stage the Consumer can, for example, make certain that the specific image fulfills her/his graphic layout requirements dictated by the job at hand. Additionally the Consumer can embed the elected image/s in the job layout, to evaluate the entire page/job.

Task 89. The Consumer 40 checks the quality of the image, using tools in the Image Enhancement Module (190) as listed above, in cooperation with Module 180. In this stage the Consumer can, for example, verify that the quality of the image fulfills her/his end-product appearance requirements as dictated by the job at hand.

Task 91. If the Consumer likes the selected and verified image, the transaction is confirmed, and
Task 93. The Graphic Arts Buyer 120 (of which Consumer 40 is part of) negotiates with the Image Publisher 110 the price of obtaining the (full hi-resolution) image for the planned use.

The negotiation is carried out directly on the ad-hoc peer-to-peer link 140, with collaboration of the Publishing Module 180 and Billing System 170.

The negotiation can include, for example, the type of use, the period of use, exclusivity to certain geographical areas or for defined market segments.

Task 95. If the Consumer does not like the selected and verified image, the transaction is aborted and the Consumer may ask the Service 100 to propose other images for examination (return to Task 71 or 73).

Task 97. Upon successful termination of the negotiation in Task 93 the Buyer 120 buys the image and pays the agreed price via the Billing System 170. In case the negotiation fails, the transaction is aborted and the Consumer 40 has the option to examine an alternative (Task 95).

Task 99. Once the purchase of the image (Task 97) is completed the high-resolution image is retrieved from the Image Publisher's Repository 19 in collaboration with the Image Publishing Module 180 and the Image Enhancement Module 190. At this stage the previous operations done by Consumer 40 on the low-resolution files of the selected image (Tasks 87) will be automatically implemented on the retrieved file, thus rendering the file ready for inclusion in the job and subsequently for print.

Fig. 8 is a schematic block-diagram of an alternative operational workflow of the Peer-to-Peer system, particularly useful where the direct ad-hoc peer-to-peer link 140 is impractical due to, for example, lack of adequate level of security, transmission quality or bandwidth. The alternative workflow is practical in the case
Service 100 has access to a Server 130, having adequate communication security and quality with both Publishers 110 and Buyers 120.

The workflow of Fig. 8 is identical to the one described for Fig. 6 Fig. 7A and Fig. 7B except that the ad-hoc peer-to-peer link 140 is replaced by a two stage network connection, namely Buyer 120 to Server 130 and Publisher 110 to Server 130. Server 130 is used for temporary storage of the low and high-resolution files transferred from Publisher 110 to Buyer 120.

The technologies and methods described in the preferred modes of this invention are known in the art of Graphic arts, Pre-Press and data communication over the Internet. Wherever specific technologies were employed, examples for such technologies were quoted.
WHAT IS CLAIMED IS:

1. A distributed image trading system comprising:
   a) at least one image publisher wherein said image publisher comprises at
      least one of a repository for high-resolution images and an image
      publishing module;
   b) at least one image buyer, wherein said image buyer comprises an image
      enhancement module; and
   c) a system service unit said system service unit comprises at least one
      image attributes database, a search module for searching said at least one
      image attributes database, a billing module, and a coordination and control
      module,

   Wherein said at least one image publisher, said at least one image buyer and
   the system service unit are in communication.

2. The system according to claim 1, wherein said image publishing module
   comprises at least one of
   a) an image metadata publishing module;
   b) an image high-resolution exporting module;
   c) an image price-negotiating module; and
   d) combinations thereof.

3. The system according to claim 2, wherein said metadata publishing module
   comprises a module for extracting metadata from high-resolution image files
   stored in said at least one repository.
4. The system according to claim 2, wherein said image high-resolution exporting module comprises at least one of:

a) a module for extracting a low-resolution image file from said high-resolution image file stored in said at least one repository;

b) a module for scaling and cropping said low-resolution image according to instructions received from said image buyer;

c) a module for embossing or removing an electronic signature on/from said low-resolution image file;

d) compressing said high-resolution image file, and

e) embedding metadata into said low-resolution image file.

5. The system according to claim 2, wherein said image price negotiating module, comprises at least one of pricing templates, a module for defining a pricing policy, and combinations thereof.

6. The system according to claim 1, wherein said image publishing module is provided by said system service unit to said image publisher upon registering with said system service unit.

7. The system according to claim 1, wherein said image enhancement module comprises at least one of

a) tools for importing a low-resolution representation of an elected thumbnail from said image publisher;

b) tools for evaluating said low-resolution representation;

c) tools for cropping and scaling said low-resolution representation;

d) tools for enhancing said low-resolution representation comprising at least one of toning, sharpening, color correction and color conversion;
e) tools for embedding the elected and enhanced low-resolution image in a page layout;

f) tools for obtaining from said high-resolution image file, a defined partial image in maximum resolution;

g) tools for obtaining from said high-resolution image file, a defined partial image simulated to match the output of said file on said buyer’s defined particular output device;

h) tools for negotiating the price of the high-resolution image, said price defined by said publisher;

i) tools for importing the high-resolution representation of said low-resolution file from said image publisher;

j) tools for automatically performing the operations in b) to e) on said imported high-resolution file to render the file ready for print,

k) combinations thereof.

8. The system according to claim 1, wherein said image attributes comprises at least one of thumbnails representing said publishers high-resolution images, description of said image, and combinations thereof.

9. The system according to claim 8, wherein said image description comprises at least one of the publisher’s identity, the actual location of said image in said publisher’s repository, physical attributes of said image, content category to which said image belongs, textual description of the content, pricing tables, image grading and preference segmentation information and combinations thereof.
10. The system according to claim 1, wherein said billing module comprises at least one of a means for transaction detail logging, means for payment processing, means for splitting on-line payments to eligible parties, and combinations thereof.

11. The system according to claim 1, wherein said communication is at least one of Internet, Intranet, telephone, mail services and combinations thereof.

12. The system according to claim 1, wherein said system service unit includes also a repository for high and low-resolution images.

13. A method of locating and purchasing high-resolution images directly from the publisher of said images, the method comprising:
   a) accessing a system service unit through a network connection;
   b) searching image attributes in said service data base and selecting desired thumbnails;
   c) enhancing and verifying the quality of the high-resolution files and their low-resolution representation corresponding to said selected thumbnail by controlled accessing of said publisher’s computer via a network connection;
   d) purchasing from said system service unit and paying for a permission to download said selected high-resolution images;
   e) acquiring from said publisher’s image repository, said selected image in high-resolution format directly to a buyer’s computer, and
f) automatically rendering said selected image in high-resolution format ready for print by applying step c.

14. The method of claim 13, wherein said verifying and enhancing step comprises at least one of
   a) evaluating the low-resolution representation of a selected thumbnail;
   b) cropping and scaling said low-resolution representation;
   c) enhancing said low-resolution representation including at least one of toning, sharpening, color correction and color conversion;
   d) embedding the selected and enhanced low-resolution image in a page layout;
   e) obtaining from said high-resolution image file, a defined partial image in maximum resolution, and
   f) obtaining from said high-resolution image file, a defined partial image simulated to match the output of said file on said buyer's defined particular output device.

15. The method of claim 13, wherein said purchasing step comprises at least one of
   a) negotiating a price, of the high-resolution image by said buyer, by accessing said publisher's price negotiating module;
   b) paying the negotiated price; and
   c) combinations thereof.

16. The method of claim 15, wherein said paying to is at least to one of said image publisher, the service unit, or split between eligible parties.
17. The method of claim 13, wherein said acquiring comprises at least one of:
   a) downloading via said network connection;
   b) receiving a removable storage device including said high-resolution image
   5 file, and
   c) receiving a transparency representing said high-resolution image.

18. A graphic arts buyer’s method of locating and purchasing high-resolution images from a publisher of said images, the method comprising:
   a) accessing a system service unit through a network connection;
   b) searching an image attributes data-base to select desired thumbnails;
   c) uploading the low-resolution and high-resolution images corresponding to
   the selected thumbnail from the image repository of the publisher of said
   image to a temporary storage location in said system control unit;
   d) enhancing and verifying the quality of the low and high-resolution files
   corresponding to said selected thumbnail by controlled accessing of said
   temporary storage location via a network connection;
   e) purchasing from the system control unit permission to acquire said
   selected high-resolution image directly from the image publisher;
   f) acquiring from said temporary storage location said selected image in
   high-resolution format, and
   g) automatically rendering at the buyer’s computer said acquired image in
   high-resolution format ready for print by applying step d.
19. The method of claim 18, wherein said verifying and enhancing step comprises at least one of

   a) evaluating the low-resolution representation of a selected thumbnail;
   b) cropping and scaling said low-resolution representation;
   c) enhancing said low-resolution representation including at least one of toning, sharpening, color correction and color conversion;
   d) embedding the selected and enhanced low-resolution image in a page layout;
   e) obtaining from said high-resolution image file, a defined partial image in maximum resolution, and
   d) obtaining from said high-resolution image file, a defined partial image simulated to match the output of said file on said buyer's defined particular output device.

20. The method of claim 18, wherein said purchasing includes at least one of:

   a) negotiating a price, of the high-resolution image as defined by said buyer, by accessing said publisher's price negotiating unit, and
   b) paying the negotiated price.

21. The method of claim 20, wherein said paying to is at least to one of said image publisher, the service unit, or split between eligible parties.

22. The method of claim 18, wherein said acquiring comprises at least one of:

   a) downloading via said network connection;
b) receiving a removable storage device including said high-resolution image file;

c) receiving a transparency representing said high-resolution image.

23. A method of image presentation by preference segmentation in transactions controlled by an image-bank or peer-to-peer service, the method including:

a) characterizing preferred unique features;

b) defining in the attributes record of the service unit of said image-bank or peer-to-peer service the preference and unique features, representing the high-resolution representation of the image;

c) performing, at the image buyer's computer, the required transformations to obtain said unique features on a low-resolution representation of said image, and

d) following a purchase decision, performing, at the image buyer's computer, the required transformations to obtain said unique features on the purchased high-resolution representation of the image.

24. The method of claim 23, wherein said unique features include at least one of saturated colors, skin tone, a filter for ultra high-resolution.

25. A method of embedding images, elected from an image-bank or a peer-to-peer service, in a graphic-arts buyer's page layout, the method including:

electing at least one thumbnail available from said service to be embedded in said layout;
obtaining the low-resolution images, each corresponding to said elected thumbnails;

fitting said low-resolution images in said buyer's page layout;

enhancing the low-resolution representation of each of said images including at least one of toning, sharpening, color correction and color conversion;

closing the page layout file comprising the enhanced low-resolution representations of the images;

purchasing the relevant high-resolution images from said image-bank or peer-to-peer service;

acquiring said high-resolution image from an image publisher's repository to the buyer's computer; and

automatically embedding and enhancing said high-resolution images in said layout.

26. The method of claim 25, wherein said obtaining includes at least one of obtaining the low-resolution file from the image-bank repository or the image publisher's repository.

27. The method of claim 25, wherein said purchasing includes at least one of:

   a) negotiating a price, of the high-resolution image as defined by said buyer, by accessing said publisher's price negotiating unit, and

   b) paying the negotiated price.

28. The method of claim 27, wherein said paying to is at least to one of said image publisher, the service unit, or split between eligible parties.
29. The method of claim 25, wherein said acquiring comprises at least one of:
   a) downloading via a network connection;
   b) receiving a removable storage device including said high-resolution image file;
   c) receiving a transparency representing said high-resolution image.
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START

(40) SEARCHES A SPECIFIC TYPE OF IMAGE IN SERVICE (100)

(100) SCANS (160) FOR THE REQUIRED ATTRIBUTES

ONE OR MORE IMAGES ARE LOCATED IN (160)

(100) DOWNLOADS THE CORRESPONDING THUMBNAILS TO (40)

(40) EVALUATES THUMBNAILS AND NOTIFIES SERVICE 100 ON THE CONTINUATION OF THE TRANSACTION

ABORT OPERATION

CONTINUE TRANSACTION ?

YES

DOWNLOAD MODULE (190) YES

IS (40) A FIRST TIME USER?

79

NO

TO FIG. 7B

FIG.7A
8/10

FROM FIG. 7A

(150) ESTABLISHES A TEMPORARY LINK (140) BETWEEN (120) AND (110)

(40) RETRIEVES A LOW-RESOLUTION REPRESENTATION OF THE IMAGE USING (190) VIA (140) WHICH INVOKES (180) TO GET THE RELEVANT DATA FROM (110)

(40) VERIFIES AND ENHANCES THE LOW-RES IMAGE USING TOOLS IN (190) IN COOPERATION WITH (180)

(40) CHECK QUALITY OF THE IMAGE BY USING TOOLS IN (190) IN COOPERATION WITH (180)

LOOK FOR ANOTHER IMAGE

NO

40 LIKES THE IMAGE?

YES

(120) NEGOTIATES THE PRICE WITH (110) USING (170) OVER (140)

(120) RETRIEVES THE FULL-RESOLUTION IMAGE VIA (140) AND IN COLLABORATION OF MODULES (180) & (190)

FIG.7B
FIG. 8

PEER-TO-PEER SERVICE

BILLING SYSTEM 170

SYSTEM CONTROL & LOGIC 150

WEB SERVER

IMAGE ATTRIBUTES DB 160

SERVER 130

WWW

GRAPHIC ARTS BUYER

WEB SERVER 33

IMAGE CONSUMER 32

IMAGE ENHANCEMENT MODULE 31

WEB SERVER 37

IMAGE SUPPLIER 20

IMAGE PUBLISHING MODULE 180

IMAGE REPOSITORY 190

WEB SERVER 16

TABLE 9/10
# INTERNATIONAL SEARCH REPORT

**INTERNATIONAL APPLICATION NO.** PCT/IL 03/00674

**A. CLASSIFICATION OF SUBJECT MATTER**

**IPC** 7 G06F17/60

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

**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 G06F

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

Electronic database consulted during the International search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, PAJ

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

<table>
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<tr>
<th>Category</th>
<th>Citation of document, with indication, where appropriate, of the relevant passages</th>
<th>Relevant to claim No.</th>
</tr>
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<tbody>
<tr>
<td>X</td>
<td>EP 1 158 461 A (RICOH KK) 28 November 2001 (2001-11-28) paragraphs '0021!, '0104!, '0105!, '0109!- '0119!, '0154!- '0160!, '0165!, '0172! figures 9,12,15</td>
<td>1-29</td>
</tr>
<tr>
<td>X</td>
<td>EP 1 139 244 A (HITACHI LTD) 4 October 2001 (2001-10-04) paragraphs '0001!, '0008!, '0010!, '0013!, '0015!, '0025!, '0026!, '0028!, '0029!; figures 1-4,10</td>
<td>1-29</td>
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<tr>
<td>A</td>
<td>page 2, line 49 -page 3, line 19 page 3, line 53 - line 56; claim 1</td>
<td>1-22, 25-29</td>
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Further documents are listed in the continuation of box C. Patent family members are listed in annex.

* Special categories of cited documents:
  * "A" document defining the general state of the art which is not considered to be of particular relevance
  * "E" earlier document but published on or after the international filing date
  * "L" document which may throw doubts on priority claim(s) or is cited to establish the publication date of another document or to solve other special problems
  * "O" document referring to an oral disclosure, use, exhibition or other means
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  * "Z" document member of the same patent family

**Date of the actual completion of the international search**

27 January 2004

**Date of mailing of the international search report**

09/02/2004

**Name and mailing address of the ISA**

European Patent Office, P.B. 5816 Patentlaan 2 NL - 2280 HV Rijswijk, Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax (+31-70) 340-3016

**Authorized officer**

Kling, J
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<th>Relevant to claim No.</th>
</tr>
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<tr>
<td>A</td>
<td>US 2002/019743 A1 (NAKAMURA SHUNSUKE) 14 February 2002 (2002-02-14) abstract; figure 1</td>
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</tr>
<tr>
<td>A</td>
<td>EP 0 982 668 A (IBM) 1 March 2000 (2000-03-01) abstract paragraph '0014!; figures 1,2</td>
<td>1-29</td>
</tr>
<tr>
<td>A</td>
<td>WO 01 41018 A (IBOOKS COM) 7 June 2001 (2001-06-07) abstract page 14, line 9 - page 17, line 10</td>
<td>1-29</td>
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<td>EP 0982668 A2</td>
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<td>IL 131213 A</td>
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<tr>
<td>WO 0141018 A</td>
<td>07-06-2001</td>
<td>AU 1810601 A</td>
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<td>WO 0141018 A2</td>
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