tages, may be best understood from the following detailed description taken in conjunction with the accompanying drawings of which:

FIG. **1**A is a block schematic diagram illustrating a first exemplary system infrastructure in accordance with the present invention in which content translation services are performed by a third-party proxy service that translates content requested from a client that is retrieved from one or more network resources into a scalable vector representation and delivers the translated content to the client;

FIG. **1**B is a block schematic diagram illustrating a second exemplary system infrastructure in which the translation of content is performed at a content provider's web site and delivered directly to the requesting client;

FIG. **1**C is a block schematic diagram illustrating a third exemplary system infrastructure in which content received from one or more network sources is translated into a scalable vector representation at the client;

FIG. **2**A is a flowchart illustrating how data is retrieved, processed and transferred in accordance with the system infrastructure of FIG. **1**A;

FIG. **2**B is a flowchart illustrating how data is retrieved, processed and transferred in accordance with the system infrastructure of FIG. **1**B;

FIG. **2**C is a flowchart illustrating how data is retrieved, processed and transferred in accordance with the system infrastructure of FIG. **1**C;

FIG. **3** is a block schematic diagram illustrating an exemplary architecture corresponding to the proxy server of FIG. **1**A;

FIG. **4**A is a representation of an exemplary web page has displayed on a conventional browser;

FIG. **4**B is a schematic diagram illustrates various objects that are generated based on the HTML code of the web page of FIG. **4**A;

FIG. **4**C is a schematic diagram illustrating a set of vectors and bounding boxes corresponding to the objects generated in FIG. **4**B;

FIG. **4**D is a schematic diagram illustrating how various vectors and bounding boxes may be defined in accordance with the invention;

FIG. **4**E is a representation of the web page of FIG. **4**A after it has been offset and scaled in accordance with the invention;

FIG. **4**F is a schematic diagram illustrating new datum points and bounding boxes corresponding to the scaled and offset web page;

FIG. **4**G is a schematic diagram illustrating new vectors and bounding box parameters for a pair of objects in the scaled and offset web page;

FIG. **5** is a flowchart illustrating the logic used by the invention when translating content into a scalable vector representation of that content;

FIG. **6** is a flowchart illustrating client-side operations that are performed to create a rendered display page based on the translated content the client receives and user-input;

FIGS. **7**A and **7**B are representations of a nominal and a zoomed in column view of an exemplary web page as they might appear on a Palm device;

FIGS. **8**A and **8**B are representation of nominal and zoomed in view of an exemplary graphic image as they might appear on the Palm device;

FIGS. **9**A and **9**B are representations of a nominal and zoomed in view of a text portion of a web page as they might appear on the Palm device; and

FIG. **10** illustrates an exemplary computer system that may be used for implementing various aspects of embodiments of the invention.

DETAILED DESCRIPTION OF THE INVENTION

Apparatus and methods are described for creating resolution independent vector display of Internet content to allow it to be scaled (zoomed) larger and smaller for better viewing or to fit any resolution or screen size. In addition, infrastructure and methods are provided for delivering such content to clients.

In the following description, for the purposes of explanation, numerous specific details are set forth in order to provide a thorough understanding of the present invention. It will be apparent, however, to one skilled in the art that the present invention may be practiced without some of these specific details. In other instances, well-known structures and devices are shown in block diagram form.

The present invention includes various operations, which will be described below. The operations of the present invention may be performed by hardware components or may be embodied in machine-executable instructions, which may be used to cause a general-purpose or special-purpose processor or logic circuits programmed with the instructions to perform the operations. Alternatively, the operations may be performed by a combination of hardware and software.

The present invention may be provided as a computer program product that may include one or more machine-readable mediums having stored thereon instructions, which may be used to program a computer (or other electronic devices) to perform a process according to the present invention. The machine-readable medium may include, but is not limited to, floppy diskettes, optical disks, CD-ROMs, and magneto-optical disks, ROMs, RAMs, EPROMs, EEPROMs, magnetic or optical cards, flash memory, or other type of media/machine-readable medium suitable for storing electronic instructions. Moreover, the present invention may also be downloaded as a computer program product, wherein the program may be transferred from a remote computer (e.g., a server) to a requesting computer (e.g., a client) by way of data signals embodied in a carrier wave or other propagation medium via a communication link (e.g., a modem or network connection). Accordingly, herein, a carrier wave shall be regarded as comprising a machine-readable medium.

Client Overview

According to one embodiment, an ultra-thin client-side viewer provides the graphics, linking, caching, and function handling capabilities necessary for extending the web to almost any platform. It is designed as a lightweight browser (micro-browser) running directly on device operating systems. In alternative embodiments, the client-side viewer may be deployed as a standard browser plug-in, or Java applet for extending browser functionality. In one embodiment, the client-side viewer attains its small size and efficiency by taking advantage of the power of SVF (Simple Vector Format) to describe almost any current web content. SVF files can be handled with a tiny fraction of the client code required by normal web browsers because current browsers must interpret a large and growing number of file types and their idiosyncrasies. SVF was originally designed to handle a superset of the most commonly used file formats in the complex world of CAD. It can accommodate not only new graphical functions, but the storage and transfer of almost any foreseeable new functional capability. SVF has been under consideration by the W3C (World Wide Web Consortium) for adoption as a standard for vector content on the World Wide Web.

By working tightly with a server-side content translator, web content and functionality can be passed seamlessly to the end user platform without any degradation in the look or feel of the output. In addition, because the resulting file graphics