METHOD AND SYSTEM FOR PROVIDING BACKWARD COMPATIBILITY FOR A NEW VERSION OF A PAGE DESCRIPTION LANGUAGE

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application claims the benefit under 35 U.S.C. 119(e) of U.S. Provisional Patent Application Ser. No. 60/945,547 filed on Jun. 21, 2007, which is herein incorporated by reference.

FIELD

[0002] The present invention is directed to methods, systems, and devices that can be used for providing backward compatibility to a printer or printer system for a new version of a page description language. The present invention is also directed to methods, systems, and devices that include an updated printer driver to provide the backward compatibility.

BACKGROUND

[0003] When a document or other graphical construct is printed, whether on a desktop printer or in the prepress department of a commercial printer, the application from which it is printed converts the data into what is called a spool file format. This is usually done in cooperation with the printer subsystem within the operating system of the computer.

[0004] When printing to the least sophisticated devices, the spool file format is then usually interpreted within the print subsystem, and converted into some form of raster, or simple page description language (PDL) before being passed on to the printer. For more sophisticated devices, the spool file format may be converted to a more complex PDL, or, in some cases, may be passed through in the original format to the printing device.

[0005] The communication between the print subsystem and the printing device may be via a number of methods, including over a network, a USB, firewire or parallel cable, or by writing to file and then onward transmission on floppy disk, CD, DVD, flash memory or by some other media, or by transmission using email, FTP, etc.

[0006] One part of these more sophisticated devices is a Raster Image Processor (RIP), which can interpret the PDL and can convert that into a form that other parts of the printing device can understand, and can actually mark onto the print medium.

[0007] There are a variety of commonly used page description languages, including Printer Control Language (PCL) defined by Hewlett-Packard, PostScript and the Portable Document Format (PDF) both defined by Adobe Systems, and the XML Paper Specification (XPS) defined by Microsoft. Of these, PostScript and PCL are older formats, while PDF and XPS are more recent. Note that these four specific PDLs are referred to throughout this document only as illustrations; there are many more PDLs in use.

[0008] The spool file format in use depends on the operating system and print subsystem from which a document is printed. When printing on an Apple Macintosh under Mac OS X, the spool file format is PDF. When printing from Microsoft Windows versions earlier than Windows Vista (with some minor exceptions), the spool file format will be the Graphics Device Interface (GDI). Microsoft Windows Vista continues to support a GDI-based print subsystem, but also includes a new print subsystem where the spool file format is XPS. Other operating systems are available with a variety of print subsystems and using a variety of spool file formats.

[0009] The examples above include two situations where the spool file format is a PDL that can be passed directly to a print device without the data being touched in any way: printing from Mac OS X to a device that includes a PDF RIP, and printing from Windows Vista through the XPS print subsystem to a device that includes an XPS RIP. In these, and similar cases under other operating systems, a very simple printer driver is used. Such drivers usually do nothing but pass the spool file format directly on to the component of the print subsystem that communicates with the printer over the network, USB cable etc (in Windows terminology this is known as the "port monitor").

[0010] New versions of spool file formats are released from time to time, and the manufacturers of printing devices often need to be able to respond to such changes. For instance, the current version of PDF is 1.7, which is the 8th version released over a period of just over a decade. The PDF variants implemented by Apple as spool file formats in successive versions of Mac OS X have usually been sub-sets of a version of PDF as specified by Adobe.

[0011] Whenever a new version of a spool file format is released and print subsystems start to create it, RIPs are typically upgraded to accept the new features of the new version. The upgrade falls into two parts; the manufacturer of the printer alters the software code in order to process the new version of the PDL, and then that amended version is installed in the field, for example, by the organizations and individuals who have purchased printers, to replace the older version.

[0012] For RIPs running on controllers embedded within printing devices, an upgrade can be complex. The RIP software may be installed as one or more files on a hard-disk within the device, or may be stored as "firmware" within a Read Only Memory (ROM) chip of some form. In some cases the ROM is an Electronically Erasable Programmable Read-Only Memory (EEPROM), which may be re-programmed to replace the previous version of code stored on it. In others, the firmware may only be upgradeable by physical replacement of a ROM chip.

[0013] Even where the software or firmware can be upgraded within an embedded controller it is likely to require the manufacturer to provide a specialized tool for the job, and many users are cautious about such upgrades because bugs in the process, or incorrectly following the upgrade instructions, may render the device permanently or semi-permanently inoperable. In some cases it may not even be possible to provide an upgrade in this way if the amended version is now significantly larger than the original, and will no longer fit into firmware that can be supported by the rest of the circuitry in a device.

[0014] Therefore a method of enabling older devices to accept a new version of the PDL for which they were designed, but without requiring software or firmware on embedded controller boards to be upgraded or replaced would be advantageous.

[0015] To reduce the cost and inconvenience of a new version of a spool file PDL, the organization that owns a spool file format (or a third party) may include at least some support for backwards compatibility in a new version. Thus two variants of spool file format code may be included within the same spool file instance; one using the structures from the new version, and the other using fall-back structures that can be represented in the older version of the spool file format. In many cases such fall-back structures within the spool file format specification may not provide the maximum quality of output that a device could otherwise produce. Depending on