Improved Internet Printing

IPP for iSeries eases the headaches of Internet printing

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I f your Internet-based printing to the iSeries is going smoothly or if you don't need to submit print jobs from an Internet-connected client or browser to an iSeries-attached printer, then you probably don't need to read about Internet printing protocol (IPP). If, however, you need to submit print jobs from an Internet-connected client or browser to an iSeries-attached printer, then you may be interested in IPP, which enables print jobs to be submitted and tracked via a URL.

One of the many new functions delivered with OS/400* V5R1, IPP allows you to submit and control jobs from a client or browser directly to an IPP-enabled printer or an IPP-enabled print server. iSeries servers also can act as IPP-enabled print servers. This means that you can submit print jobs from any Internet-attached IPP client (i.e., Windows* 2000) to an iSeries-attached (but not necessarily network-attached) output device.

A new standard, IPP is expected to replace the current standard for Internet (TCP/IP-based) printing—line printer requester/line printer daemon (LPR/LPD). LPR/LPD, a file transfer protocol that was adapted to the transmission of print data, was designed in the early days of the Internet, before its emergence as a personal and business technology. It has been part of OS/400 since TCP/IP was integrated at V3R1.

LPR provides the capability to send print files outbound. It is automated using remote output queues. LPD is the inbound function, routing print files to the iSeries as a print server. The sending client or server uses the LPD command along with the TCP/IP address of the iSeries and an output queue name. The attached print file is routed to the output queue and, from there, to an output device.

Neither provides visibility to the printer or print server nor visibility to the job. You are sending the print job to what you presume is a print device with what you hope is the right set of features to print the file once received. Most importantly, there is no feedback on the status of the submitted print operation.

What is IPP?

IPP was developed by a consortium of print and operating system vendors (including IBM, Novell* Inc., Adobe* Systems Inc., Xerox* Corp., Hewlett-Packard Company, Microsoft* Corp., Sun* Microsystems and Lexmark* International, Inc.) to address the limitations of LPR/LPD while leveraging the existing HTTP infrastructure. To be successful, this new standard needed to understand the capabilities of the target output device and provide more reliable delivery and print status feedback. And because IPP printers and IPP print servers now were exposed as URLs, it needed to provide authentication and security.

IPP is a client/server protocol. The IPP client submits a print request to the IPP server, which is either an IPP-capable printer or a print server with IPP capability. This client/server exchange uses the HTTP application layer as opposed to the lower-level TCP/IP layer used by LPR/LPD. IPP printers or print servers can be defined by URL, TCP/IP address or a directory that provides mapping to a URL or TCP/IP address. IPP printers have an embedded HTTP server that provides the IPP server support. Examples of IPP clients, servers and printers are shown in Table 1 (page 62).

Depending on the level of implementation, an IPP process can inquire about target-printer capabilities, submit print jobs, specify job-printing characteristics (for example, copies) and inquire about job status. IPP is not designed as a replacement for Intelligent Printer Data Stream* (IPDS) or Advanced Function Presentation*
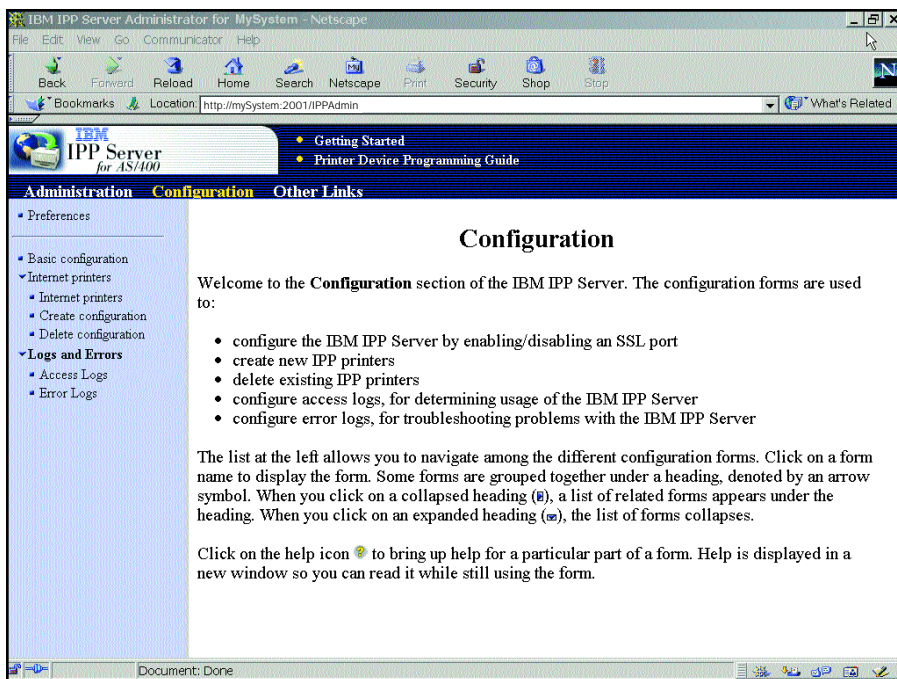

Figure 1

Figure 2

(AFP) print-management architecture, which are geared toward printing at higher speeds, with higher reliability, page-level error recovery and system-controlled resource management.

IPP on the iSeries

IPP Server for iSeries appears to an IPP client as an output device. It uses the iSeries as a print server and provides an abstraction layer between the IPP client and the real printer or output device. This means that any printer or output device that is defined to OS/400 can be addressed as an IPP printer. The printer itself does not need to be Internet-attached, just iSeries-attached.

How can you use this new support? From an Internet-attached IPP client, define an IPP output device with a URL that maps to an iSeries-attached printer or output device. You can select either AFP or ASCII printer drivers on the IPP client. If you select the AFP printer driver, the job can be directed at an IPDS printer attached to the iSeries. If you select an ASCII printer driver (i.e., PCL or Postscript), then the job would end up on the iSeries output queue as USERASCII and flow to an iSeries-attached ASCII output device. In either case, you can inquire about job status.

Configuring the IPP Server

The IPP Server for iSeries is configured and managed from the iSeries Tasks page, which is a Web browser interface presented by the Administration instance of the HTTP Server for iSeries. Enabling the iSeries Tasks page requires that the HTTP Server for iSeries (5722-DG1) and the IBM Developer Kit for Java (5722-JV1) be installed on your system.

The HTTP Administration instance can be started through Operations Navigator or the iSeries STRTCPSVR command:

1. From Operations Navigator— Navigate to HTTP Administration by selecting Network>Servers>TCP/IP Servers>HTTP Administration. Right-click on "HTTP Administration" and select "Start."

2. From the command line—Enter

```
STRTCPSVR SERVER(*HTTP)  +
  HTTPSVR(*ADMIN).
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Once the HTTP Administration instance has started, enter the following URL in your Web browser to access the iSeries Tasks page: http://your-system-name:2001. To configure the IPP server, your Web browser should support frames and JavaScript, and your iSeries user profile should have special authority *IOSYSCFG.

From the iSeries Tasks page, select the "IBM IPP Server for AS400" link to start the IPP Server Administrator (see Figure 1, page 60, top left).

The "Getting Started" link explains how to navigate and use the IPP Server Administrator. When you're ready,

IPP Clients	IPP Servers	IPP Printers
Windows 95	OS/400 V5R1	IBM Infoprint 21
Windows 98	OS/390 V2R8	IBM Infoprint 70
Windows 2000	Infoprint Manager for NT	IBM Infoprint Color 8
OS/390 V2R8	Infoprint Manager for AIX	
Infoprint Manager for NT		
Infoprint Manager for AIX		

Table 1

select the Configuration link (see Figure 2, page 60, bottom right).

The IPP Server Administrator divides your Web browser window into two main sections: a navigation frame on the left and a form frame on the right. The form frame can consist of a form content frame, button frame and message frame. Most of the configuration forms have additional information that is shown when the verbose check box is selected in the button frame.

The Preferences menu option provides a form that allows you to customize the IPP Server Administrator. The size of the navigation, button and message frames are adjustable. The first form displayed when the IPP Server Administrator is started also is configurable. For example, you could have the IPP Server Administrator start with the Manage IBM IPP Server form.

The Basic Configuration menu option provides a form that allows you to enable SSL connections, which is necessary if you want your print data transmitted over a secure connection. Before configuring SSL connections for the IPP Server, the IBM Cryptographic Access Provider (5722-AC2 or 5722-AC3) and the Digital Certificate Manager (DCM) option 34 OS400 (5722-SS1) should be installed on your system.

You must select a port for secure connections. This port cannot be used by other applications on your system. Port 6310 is a good choice. To check for possible port conflicts, use the iSeries NETSTAT OPTION(*CNN) command or Operations Navigator to navigate to Network>TCP/IP Configuration>Connections.

When SSL connections are enabled, the IPP Server Administrator registers the IPP server with the DCM. The registered application name is QIBM_IPP_QIPPSVR. Using the DCM, associate a system digital certifi-cate with the QIBM_IPP_QIPPSVR application.

The Internet Printers menu option contains several forms to create, delete or list IPP printer configurations. Creating a configuration provides information that the IPP server uses to process IPP client requests. The IPP server uses iSeries system objects like output queues, spooled files and printer files to perform the request.

The Internet Printers form provides a list of IPP printer configurations that have been added already. The URLs to access these IPP printer configurations also are displayed. You need to know

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the IPP printer configuration's URL when you configure the IPP client.

The Create Configuration form is actually a wizard, or series of forms, that walks you through the process of creating an IPP printer configuration. You can select either an iSeries printer device or output queue to be used for IPP client requests. If you select a printer, the output queue with the same name will be used to spool the IPP print data. The ability to select an output queue is provided to support printers attached using a remote writer.

An iSeries printer file can be specified for this IPP printer configuration. It usually isn't necessary to specify a printer file; the default printer file will work. However, if your IPP client is not setting a particular printer option, it may be possible to set the printer option using the printer file.

If SSL connections were enabled for the IPP Server using the Basic Configuration form, you now can specify that this IPP printer configuration uses SSL.

It's recommended that you require the IPP client to authenticate to the IPP server. Basic authentication prompts the IPP client for a user ID and password. Basic authentication should be used with an SSL connection because the HTTP authorization header uses a simple and well-known algorithm to encrypt the user ID and password. A digital client certificate can also be used by the IPP client to authenticate. Using a client certificate requires you to enable SSL connections.

When the Create Configuration Wizard finishes, the URL of the IPP printer configuration is displayed in

the message frame (for example, http://your-system-name: 631/ipp/printers/your-ipp-printer-configuration-name). You must know the URL when you're configuring your IPP client.

The IPP server uses iSeries system security when accessing output queues, printer devices or printer files. The security of these objects can be configured using Operations Navigator or iSeries commands.

The Delete Configuration form is used to delete an existing IPP printer configuration.

The Logs and Errors menu option contains several forms to control the information that is logged by the IPP server.

The Access Logs form enables the IPP server to log requests by IPP clients.

The Error Logs form enables the IPP server to log errors that occur while trying to start the server and when IPP clients try to connect to the server. If you are having trouble getting the IPP server to start, an error log should be configured.

When you have finished your configuration, select the Administration link to start the IPP server. The Manage IBM IPP Server menu option provides a form to start and stop the IPP server. Remember that the IPP server should be stopped and started whenever configuration changes are made.

Once the IPP server has started, you can configure an IPP client. Windows 2000 supports IPP and you can use the Add Printer Wizard to make a printer connection to the IPP Server for iSeries.

To start the Windows 2000 Add Printer Wizard, navigate from the Windows 2000 start button to

Settings>Printers>Add printer. Select "Network Printer," and then select "Connect to a printer on the Internet or on your intranet." Enter the URL of your IPP printer configuration. If the IPP printer configuration requires authentication, you will be prompted for a user name and password, or to select a certificate to use when connecting. At this point, you'll receive a Connect to Printer warning message about an unknown printer. Select "OK." Because IPP does not provide for printer data stream transformations, it is important to select the correct printer driver for the iSeries printer that will be accessed using the IPP printer configuration.

When the Add Printer Wizard finishes, you are ready to print to iSeries-attached printers using IPP.

To Learn More

For details on IPP, refer to Chapter 18 of the "Printer Device Programming Guide" (SC41-5713), which is available on the iSeries Information Center Web site (www.iseries.ibm.com/infocenter). 🛈

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