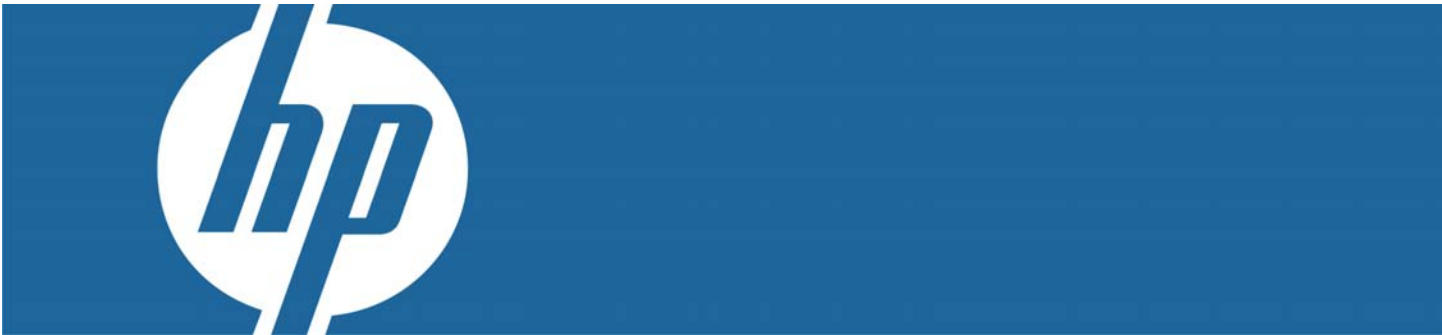


# Printing with an HP Output Management solution versus printing directly from SAP



- Executive summary..... 2
- The SAP print spooler ..... 3
- What can go wrong..... 4
- The HP Output Management process..... 5
- Benefits of the HP Output Management process ..... 5
- Comparing output management ..... 6
  - Resource management..... 6
  - Job and queue management..... 6
  - Job tracking..... 6
  - Event management..... 6
  - Privilege management ..... 7
  - File and destination combinations..... 7
  - Print attributes ..... 7
  - Destination support ..... 7
- Cost and productivity considerations..... 10
- Summary..... 10
- For more information..... 10

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## Executive summary

SAP environments can print to devices managed by UNIX®, Linux, and related operating systems by transferring the request to the host print spooling system (SAP access methods L and U). The host then manages the actual printing. Or it can transfer the request to an HP Output Management solution (SAP access method E) and let the HP system manage the printing.

These two methods provide significantly different capabilities and outcomes for:

- Delivery reliability
- Problem determination
- Event notification
- Automated recovery
- Resource management
- Management and control
- Job tracking and management
- Printer management

These differences arise from two factors:

1. The degree of intelligence that the recipient system (host spool system or HP Output Server) can apply to a request after receiving it.
2. The capabilities of the interfaces and data transfer protocols associated with the access methods. Printing through the host spool system (access methods L and U) uses the RFC 1179 (line printer daemon) lp/lpd protocol, originally written decades ago and barely touched since. This protocol has very limited capabilities. The interface between SAP and an HP Output Management solution is of much more recent vintage and can communicate a great deal more information about the print process.

This paper looks at the capabilities of the two approaches and explains how they originate from the fundamental design of the two systems.

We close by briefly looking at some of the cost savings that organizations can capture by switching to the HP Output Management solution.

# The SAP print spooler

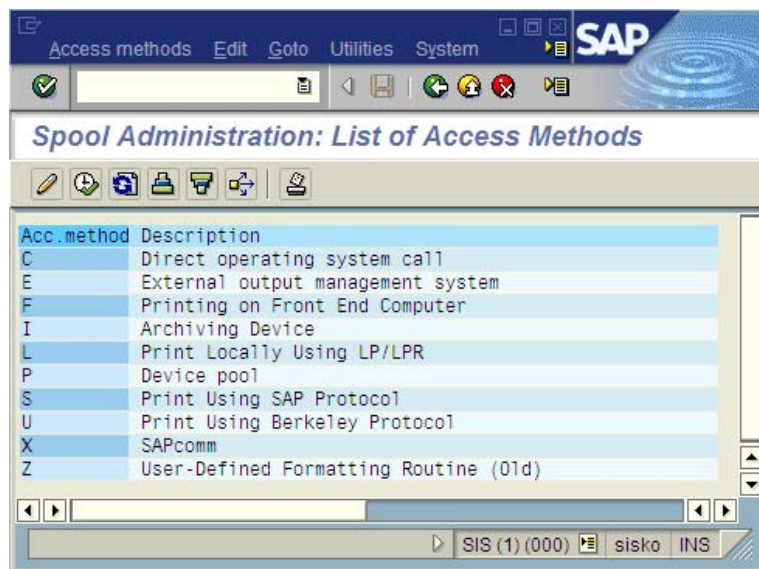
SAP has a spool work process whose function is to take raw data from inside the SAP environment, prepare it for printing using an SAP device driver, and transfer the prepared file to the host operating system for printing. It consists of two parts: a formatting system and an output system.

Once a user or an SAP process initiates a print request, the formatting system does the following (in this order):

1. Converts the raw data from the representation used inside SAP to a character set that the printer understands.
2. Inserts formatting information into the proper locations such as page start, page end, line start, and line end.
3. Inserts print controls such as font, font size, and bold/italic.

At this point the file is in a form that the designated printer can print.

The output system transmits the output request according to the access method appropriate for the designated output device.



The access method specifies the connection method and the information necessary to establish the connection. Methods L and U print to devices connected to a host running the UNIX, Linux, and related operating systems as the platform. These methods use the Line Printer Daemon (RFC 1179) protocol when making the connection. The SAP spool work process delivers the output request to the host spool system via the lp command set.

A note on nomenclature: The UNIX System V printing system is one of several architectures for printing on the UNIX platform. The commands for printing and querying for this architecture are lp and lpstat. The Berkeley Software Distribution (BSD), another architecture, uses the Line Printer Daemon/Line Printer Remote protocol (LPD, LPR). The commands here are lpr and lpq. The SAP interface remains essentially the same for all of these. For the sake of simplicity, this paper will use lpr and lpq to refer to the commands for all of the operating systems.

The host spooler acknowledges receipt of the output request, places the file into its print queue, and delivers the file to the designated printer when it comes to the top of the queue. The SAP spool work process can periodically poll the print queue to see if the file is still there.

The host does nothing to the file except print it as received.

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# What can go wrong

There are four major problems with the SAP print spool process:

1. **Limited bidirectional communication** between the SAP environment and the underlying operating system (UNIX, Linux, and related systems). After the file transfer to the host, the only information that passes between the two environments is whether the file still remains in the print queue (if the SAP environment is configured to enable polling).

If the file is no longer present in the host's print queue, the SAP environment assumes that the file has printed. If the file disappeared for any other reason, such as a reboot of the operating system or if the printer is turned off, the assumption is not correct. SAP proceeds to process the next output request and the file simply disappears, leaving no trace of the failure.

Most often, SAP sets the status flag to 'complete' after transferring the request to the host spool system. This action is a false positive because it actually indicates the handoff is complete, but not that the job is printed. It aggravates users and increases calls to the helpdesk.

2. **The lpr command passes only very specific instructions to the host spooler.** The host only attempts to deliver the file to the specified printer; it does not wait for the printer to confirm that the last pages printed. It does not perform transformations, repackage the data, or redirect the file to another printer. Nor does the host track the file and keep a record of what happens. The lpr command (in some of the UNIX-related distributions) does allow an option to send an e-mail at completion of a print job, but this option can quickly clog up the e-mail system and is rarely used.
3. **Users have to make all adjustments to data within SAP before initiating the print request** using the capabilities already programmed into the SAP environment. This limitation includes advanced print features such as staple, duplex, and resize, although administrators can enable the SAP spool work process to handle these types of functionality by creating a new print driver. Further extensions require additional programming within the environment.
4. **A relatively inflexible and unfriendly input process can cost money and slow business processes.** For example, reports often need to go to people in different offices or at different sites. Users must create multiple output requests in order to send the documents to multiple destinations, or users must send the report to a print center where someone (extra headcount) collects the multiple copies and mails them to the recipients (extra mailing costs and extra time). Sending reports by fax or e-mail require a different set of steps, which further burdens the user.

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## The HP Output Management process

The software components of the HP Output Management solution are HP Output Server (HPOS), the core of the solution, a selection of add-on modules to HPOS, and a database that holds descriptive information about output devices. The HP Output Manager for SAP module provides an interface between the SAP environment and HPOS that enables bidirectional communication. Information about the output devices includes the details of communicating with that device type. These communications enable HPOS to track and log device and delivery status directly and at a very detailed level.

The user or SAP process still initiates the output process by generating an output request within SAP. In many current SAP implementations, SAP SmartForms is available and does most of the required formatting. The request and the associated file(s) go through HP Output Manager for SAP to HPOS. HPOS immediately assigns a job number and stores key information along with the file in a non-perishable database. HPOS makes sure all necessary transformations are performed, provides additional formatting if required, delivers the reports to the designated output device(s), and collects information from the output devices about execution of the output command. HPOS tracks every request, logs key events during the delivery process, and generates notifications at key steps. Users can receive these real-time notifications by subscription—including users working within the SAP environment.

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## Benefits of the HP Output Management process

Let us look again at the four problems mentioned above and see what difference the HP Output Management solution makes:

1. **Reliability:** HPOS stores attributes immediately, tracks every request and logs key events. If there is a host server failure, HPOS can recreate the request and continue delivery from the point of interruption. If there is an output failure, HPOS knows immediately because it interacts with the output device in real time. HPOS notifies subscribers (including administrators) that a problem occurred, where it was, and how to initiate corrective action. Additionally, HPOS can automatically resubmit the report or reroute it to another device.

Most importantly, SAP reports and critical business documents don't simply disappear. A record and appropriate notices are always generated. Users are spared the time and money spent searching for missing documents, troubleshooting the process, and manually resubmitting the job.

2. **Easier output requests:** HPOS allows very complex requests. Users can send multiple files to multiple output devices in multiple locations—in any combination. You save time and money by avoiding multiple requests for different destinations such as print, fax, and e-mail—users can also choose to automatically burst reports into appropriate sections and bundle them with sections of other reports. HPOS can send reports in the manner most convenient for each recipient.
3. **Rich manipulation of files downstream:** HPOS is a fully functional stand-alone program with extensive capabilities to manipulate and manage reports after SAP transfers them to HPOS. Data can go into very complex forms; administrators can modify attributes; reports can go to fax devices, web, e-mail, FTP, and printers; reports can be burst and bundled into recipient-specific pieces; and more.

You control HPOS through one centralized location. This centralization gives you visibility and the ability to manage your entire output ecosystem. This is another factor that contributes to HPOS's reliability, and it leads to significant cost savings for IT as well.

HP Output Explorer, a module that connects to HP Output Server, provides helpdesk personnel and operators with tools to speed problem determination and recovery. The robust command line interface enables administrators to create programmatic recovery to business interruptions.

4. **Overall efficiency:** HPOS allows you to make the input process more efficient. Users can direct output to the most appropriate locations; you can eliminate many of the manual steps involved in mailing or in extracting and repackaging data from large reports; you can tighten up document-driven processes; you can automatically save fully formatted reports for a pre-specified time; you can cut down on calls to the helpdesk; and much more.
5. **Assured compliance and accountability:** HPOS creates a log of the events that occur during delivery of every print request. These logs provide a reviewable and auditable record of output deliveries that you can show to government inspectors, lawyers, and others.

HPOS can also save the document, along with its attributes, in permanent storage. This capability allows storage on a job-by-job basis or automatically for every job that fits certain criteria such as a department initiating the output request.

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## Comparing output management

### Resource management

An HP Output management solution unifies your output processes. You can think of it as an applications interface to HPOS on one side—and an output devices interface on the other. It is interoperable across Unix and the Microsoft Windows platforms. You can view, manage, and control output processes from a central location or a remote location using the HP Output Explorer graphical user interface GUI. Users can track their output requests on the web using a standard browser.

The tracking capabilities of HPOS enable you to follow asset usage by submitter or group or department so that you can chargeback to users if you wish.

The equivalent capability is not available in SAP/lpr printing.

### Job and queue management

Because HP Output Management solutions are complete and end-to-end, not just a single-function process, it allows you to manage jobs after they have completed printing. For example, you can define retention times and change attributes. Additionally, you can set up HPOS to do many things automatically such as to reroute jobs if there is a problem with an output device and to store jobs.

HPOS can automatically recover print queues after a server failure because HPOS stores its queues in a non-perishable database. Jobs don't disappear—they continue on their path to successful delivery. With the SAP/lpr process, jobs can disappear without printing, and administrators may never know until someone complains.

### Job tracking

HPOS automatically tracks every unique combination of output destination and file(s) separately. You can view jobs by job number, owner, destination, queue, and group membership. This detailed information improves efficiency by minimizing the impact of output-related errors and by enabling you to manage your output environment for maximum efficiency. It ensures an accurate understanding of the output process and can leave a permanent record for auditing or validating compliance to an operating procedure.

SAP/lpr can query the printer queue, but only to learn whether the job is still in the queue.

### Event management

HPOS tracks and logs key events that occur as part of the delivery process. Additionally, it creates messages for many of these events and can send notification to subscribers, including enterprise management systems like HP Software (formerly OpenView). This feedback provides real-time knowledge of output requests, server state, and any problems in delivery, including what, where, why, and when. Users can immediately start corrective action, minimize output-related calls to the

helpdesk, minimize productivity losses from undelivered output, and keep business processes running smoothly.

The equivalent capability is not available in SAP/lpr printing.

### **Privilege management**

HPOS simplifies the task of establishing and managing privileges because it provides a central layer that connects your enterprise applications to your output infrastructure, including print, fax, e-mail, web, and file. You can grant, remove, and manage privileges for individuals and user-groups quickly and uniformly from a single location. This not only ensures consistent application of policies across the organization, it also makes it easy to change policies, deal with mergers, and deploy new applications.

The equivalent capability is not available in SAP/lpr printing.

### **File and destination combinations**

Reports often go to multiple recipients or are meant to achieve multiple goals. The most efficient way to accomplish this may be to use multiple printers, a combination of print and fax, print and web, or other combinations. Combining output needs into one request is faster and likely to be less error-prone. It can also reduce manual handling steps, print center headcount, and mailing costs.

### **Print attributes**

HPOS interprets the attributes sent with the output request and actively manages the transformation of the data into the appropriate final format. The intelligence built into HPOS enables it to oversee complicated, multi-step transformations, including placing data into forms, adding headers and footers, converting into the PDL appropriate to the output device, selection of page ranges for printing from spreadsheets, and more.

You can enable SAP to do some of these capabilities by doing some programming, but others are not even possible.

### **Destination support**

HPOS enables users to output documents to print, fax, e-mail, web, file, and other output destinations from the same user-request screen in SAP and using the same steps. You don't need to maintain separate output processes for different types of output devices. This uniformity simplifies processes for your users and lowers the overhead needed to maintain your output system.

It also provides greater adaptability to your environment because HPOS shields the complexity of your output infrastructure from SAP and other enterprise applications. If you introduce a new output device type, you only need to update the templates that HPOS uses instead of updating each enterprise application package.

## Comparison of SAP with lpr and SAP with HP Output Server

Output management functionality	SAP with lpr	SAP with HPOS
<b>Resource management</b>		
GUI administrative tools for Windows	No	Yes
Centralized or remote configuration/administration	No	Yes
Interoperability across Unix and Windows	No	Yes
Accounting and inventory management	No	Yes
Distributed management from anywhere in the environment	No	Yes
Web-based delivery and tracking from desktop	No	Yes
<b>Jobs and queue management</b>		
Cancel jobs	Yes	Yes
Pause/resume jobs	Administrators of host system only	Yes
Move jobs within a queue	Administrators of host system only	Yes
Resubmit jobs	No	Yes
Resubmit jobs to a different destination	No	Yes
Automatic rerouting	No	Yes
Checkpointing	No	Yes
Flexible retention periods	No	Yes
Change attributes of jobs	No	Yes
Jobs stored in permanent files	No	Yes
Queue recovery after server failure	No	Yes
<b>Job tracking</b>		
Allow administrators and support users to track jobs	No	Yes
Allow users to track their own jobs	No	Yes
Track job by owner identifier or ID	No	Yes
Track job by job identifier or ID	No	Yes
Track by destination	No	Yes
Track by queue	No	Yes
Track by group membership	No	Yes
<b>Event management</b>		
Subscribe to classes of events	No	Yes
Subscribe to specific events	No	Yes
Route notices to e-mail, pagers, applications	No	Yes
Automatically inform others of delivery	No	Yes
Receive notices of server state changes, job status, and destination	No	Yes
Interface with HP Software (formerly HP OpenView)	Status only	Yes

<b>Privilege management</b>		
Authorize use of tool functions	No	Yes
Accounting service	No	Yes
Define who can use: servers, printers, fax, job, queues, attributes, etc.	Limited	Yes
Define user groups; add/remove users	No	Yes
<b>File and destination combinations</b>		
Control submission and delivery process based on job size, date, time, etc.	Only based on size	Yes
Multiple files of dissimilar type, single destination	No	Yes
Single file, multiple destinations of same type	No	Yes
Single file, multiple destinations of dissimilar types	No	Yes
Multiple files of same type, multiple destinations of same type	No	Yes
Multiple files of same type, multiple destinations of dissimilar type	No	Yes
Multiple files of dissimilar type multiple destinations of same type	No	Yes
Multiple files of dissimilar type multiple destinations of dissimilar type	No	Yes
<b>Print attributes</b>		
Scaling	No	Yes
Number-up	No	Yes
Imposition	No	Yes
Priority	No	Yes
Delivery time	No	Yes
Page ranges	No	Yes
Media used	No	Yes
Retention times, keep request for months, days, or hours	No	Yes
Headers and footers	Programming required	Yes
PDL translation	Programming required	Yes
Page numbering	Programming required	Yes
<b>Destination support</b>		
PostScript® printing	Yes	Yes
PCL printing	Yes	Yes
Text printing	Yes	Yes
Bursting and bundling	No	Yes
Facsimile	No	Yes
Pager	No	Yes
Web	No	Yes
FTP	Yes	Yes

E-mail	No	Yes
JES	No	Yes
Unicode support	No	Yes

## Cost and productivity considerations

The reliability, flexibility, and centralized management capabilities of an HP Output Management solution generate opportunities for enterprises to reduce their costs significantly versus SAP/lpr printing.

One of the larger savings comes from the reduction in “lost” documents. With SAP, companies report 0.5 – 3.0 percent of their output as “lost.” Assigning a cost of \$300 in productivity losses to identify a failure, correct it, and resubmit the job can easily add up to hundreds of thousands of dollars for a large enterprise. An HP Output Management solution can almost eliminate these losses.

HP customers report that the centralized management capabilities of HPOS have allowed them to reduce their printer administrative staffing by 34 percent, their printer supplies by 18 percent, and their service and support contracts by 10 percent. Other savings came from identifying and removing underused devices, upgrading overtaxed ones, and cutting telecom charges by redirecting output electronically to output devices that minimize the number of international calls. Further savings come from faster business processes, lower mailing costs, and fewer calls to the helpdesk for print-related issues.

Altogether, our customers report that they save more per year than it costs to implement and operate an HP Output Management solution. And besides these quantifiable benefits are the improvement in user satisfaction and the thousands of small productivity gains that come from users having cleaner, simpler processes within SAP for generating complex output requests.

## Summary

There are great differences between the SAP/lpr print process and an SAP/HP Output Management solution. These arise directly from the structural design of the two approaches and their respective intelligence and flexibility. In both inherent design and in real implementations, an HP Output Management solution provides greater reliability and flexibility than SAP/lpr printing. The reduction in operating costs customers experience with an HP Output Management solution speaks for itself.

## For more information

Please visit our HP Output Management website listed below or contact your HP sales representative.

<http://www.hp.com/go/outputmanagement>

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4AA1-5053ENW, 08/2007

