



CUPS Software Performance Specification

CUPS-SPS-1.1

Easy Software Products
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CUPS Software Performance Specification

1 Scope

1.1 Identification

This software performance specification provides an analysis of the memory, disk, and processor utilization of each program in the Common UNIX Printing System ("CUPS") Version 1.1.

For the purposes of comparison, all figures are for the Linux Intel platform. Memory utilization on other platforms should be similar.

1.2 System Overview

CUPS provides a portable printing layer for UNIX®-based operating systems. It has been developed by Easy Software Products to promote a standard printing solution for all UNIX vendors and users. CUPS provides the System V and Berkeley command-line interfaces.

CUPS uses the Internet Printing Protocol ("IPP") as the basis for managing print jobs and queues. The Line Printer Daemon ("LPD") Server Message Block ("SMB"), and AppSocket (a.k.a. JetDirect) protocols are also supported with reduced functionality. CUPS adds network printer browsing and PostScript Printer Description ("PPD") based printing options to support real-world printing under UNIX.

CUPS also includes a customized version of GNU Ghostscript (currently based off GNU Ghostscript 5.50) and an image file RIP that are used to support non-PostScript printers. Sample drivers for HP and EPSON printers are included that use these filters.

1.3 Document Overview

This software performance specification is organized into the following sections:

- 1 – Scope
- 2 – References
- 3 – Programs
- 4 – Scheduler Objects
- A – Glossary

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2 References

2.1 CUPS Documentation

The following CUPS documentation is referenced by this document:

- CUPS–CMP–1.1: CUPS Configuration Management Plan
- CUPS–IDD–1.1: CUPS System Interface Design Description
- CUPS–IPP–1.1: CUPS Implementation of IPP
- CUPS–SAM–1.1.x: CUPS Software Administrators Manual
- CUPS–SDD–1.1: CUPS Software Design Description
- CUPS–SPM–1.1.x: CUPS Software Programming Manual
- CUPS–SSR–1.1: CUPS Software Security Report
- CUPS–STP–1.1: CUPS Software Test Plan
- CUPS–SUM–1.1.x: CUPS Software Users Manual
- CUPS–SVD–1.1: CUPS Software Version Description

2.2 Other Documents

The following non–CUPS documents are referenced by this document:

- [Adobe PostScript Printer Description File Format Specification, Version 4.3.](#)
- [Adobe PostScript Language Reference, Third Edition.](#)
- [IPP/1.1: Implementers Guide](#)
- [RFC 1179, Line Printer Daemon Protocol](#)
- [RFC 2396, Uniform Resource Identifiers \(URI\): Generic Syntax](#)
- [RFC 2567, Design Goals for an Internet Printing Protocol](#)
- [RFC 2568, Rationale for the Structure of the Model and Protocol for the Internet Printing Protocol](#)
- [RFC 2569, Mapping between LPD and IPP Protocols](#)
- [RFC 2616, Hypertext Transfer Protocol — HTTP/1.1](#)
- [RFC 2617, HTTP Authentication: Basic and Digest Access Authentication](#)
- [RFC 2910, IPP/1.1: Encoding and Transport](#)
- [RFC 2911, IPP/1.1: Model and Semantics](#)
- [RFC 3380, IPP: Job and Printer Set Operations](#)

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3 Programs

The following table describes the average memory, disk, and CPU usage of each program in CUPS.

The base memory column shows the initial memory requirements for each program, including any shared libraries that are provided by CUPS.

The max memory column shows the maximum amount of memory that will be used by the program based upon the default configuration settings supplied with CUPS.

The temp files column indicates whether any temporary files are created.

The CPU usage column specifies a relative CPU usage by the program under normal conditions, either low, medium, or high. Low usage indicates that the program will never use more than 33% of the available CPU time. Medium usage indicates the program will use as much as 66% of the available CPU time. High usage indicates the program uses 66% or more of the available CPU time.

| Backends | | | | |
|------------------------------|--------------------|---------------------------------|--------------------------|------------------|
| Program | Base Memory | Max Memory | Temp Files | CPU Usage |
| ipp | 91k | 256k | Up to size of print file | Low |
| lpd | 89k | 89k | Up to size of print file | Low |
| parallel | 85k | 85k | Up to size of print file | Low |
| serial | 85k | 85k | Up to size of print file | Low |
| socket | 85k | 85k | Up to size of print file | Low |
| usb | 85k | 85k | Up to size of print file | Low |
| CGIs | | | | |
| Program | Base Memory | Max Memory | Temp Files | CPU Usage |
| admin.cgi | 107k | 256k | Up to size of PPD file | Medium |
| classes.cgi | 95k | Size of class objects | None | Medium |
| jobs.cgi | 93k | Size of job objects | None | Medium |
| printers.cgi | 95k | Size of printer objects | None | Medium |
| Command-Line Programs | | | | |
| Program | Base Memory | Max Memory | Temp Files | CPU Usage |
| accept | 88k | 128k | None | Low |
| cancel | 88k | 128k | None | Low |
| disable | 88k | 128k | None | Low |
| enable | 88k | 128k | None | Low |
| lp | 90k | 256k | None | Low |
| lpadmin | 148k | 256k | None | Low |
| lpc | 86k | Size of job and printer objects | None | Medium |
| lpinfo | 89k | | None | Medium |

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| | | Size of device and PPD objects | | |
|----------------|--------------------|---|---|------------------|
| lpmove | 88k | 128k | None | Low |
| lpoptions | 89k | 128k | None | Low |
| lppasswd | 90k | 90k | None | Low |
| lpq | 87k | Size of job objects | None | Medium |
| lpr | 87k | 256k | None | Low |
| lprm | 84k | 128k | None | Low |
| lpstat | 119k | Size of job, printer, and class objects | None | Medium |
| reject | 88k | 128k | None | Low |
| Daemons | | | | |
| Program | Base Memory | Max Memory | Temp Files | CPU Usage |
| cups-lpd | 92k | 256k | One file per control or data file from client | Low |
| cupsd | 308k | See Scheduler Requirements | See Scheduler Requirements | Medium |
| cups-polld | 84k | Size of printer and class objects | None | Low |
| Filters | | | | |
| Program | Base Memory | Max Memory | Temp Files | CPU Usage |
| hpgltops | 263k | 320k | None | Medium |
| imagetops | 628k | 10M | Swap file for uncompressed image data | Medium |
| imageraster | 652k | 10M | Swap file for uncompressed image data | High |
| pstops | 775k | 840k | Up to size of print file | Medium |
| pstoraster | 4M | 14M | Swap file for command lists | High |
| rastertoepson | 693k | 1M | None | Low |
| rastertohp | 690k | 1M | None | Low |
| texttops | 638k | 4*cols*rows | None | Low |

4 Scheduler Objects

The `cupsd` program is the CUPS scheduler process. It manages many interdependent server objects that are used to manage and print files to printers.

The following table provides the memory and disk cost associated with each server object.

| Object | Memory Per | Disk Per |
|---------------|-------------------|-----------------------------|
| Browse ACL | 1k | 120 |
| Browse Poll | 24 | 80 |
| Browse Relay | 28 | 80 |
| Certificate | 76 | 32 |
| Class | 9k | 200 |
| Client | 13k | – |
| Device | 256 | – |
| Job | 2k | 1k + size of document files |
| Location ACL | 1k | 120 |
| MIME Filter | 268 | 80 |
| MIME Type | 340 | 80 |
| PPD | 200 | 656 |
| Printer | 11k | 32k |

A Glossary

A.1 Terms

| | |
|-----------------|--|
| <i>C</i> | A computer language. |
| <i>parallel</i> | Sending or receiving data more than 1 bit at a time. |
| <i>pipe</i> | A one-way communications channel between two programs. |
| <i>serial</i> | Sending or receiving data 1 bit at a time. |
| <i>socket</i> | A two-way network communications channel. |

A.2 Acronyms

| | |
|---------------|--|
| <i>ASCII</i> | American Standard Code for Information Interchange |
| <i>CUPS</i> | Common UNIX Printing System |
| <i>ESC/P</i> | EPSON Standard Code for Printers |
| <i>FTP</i> | File Transfer Protocol |
| <i>HP-GL</i> | Hewlett-Packard Graphics Language |
| <i>HP-PCL</i> | Hewlett-Packard Page Control Language |
| <i>HP-PJL</i> | Hewlett-Packard Printer Job Language |
| <i>IETF</i> | Internet Engineering Task Force |
| <i>IPP</i> | Internet Printing Protocol |
| <i>ISO</i> | International Standards Organization |
| <i>LPD</i> | Line Printer Daemon |
| <i>MIME</i> | Multimedia Internet Mail Exchange |
| <i>PPD</i> | PostScript Printer Description |
| <i>SMB</i> | Server Message Block |
| <i>TFTP</i> | Trivial File Transfer Protocol |

