CUPS Software Performance Specification

CUPS−SPS−1.2

Easy Software Products

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1 Scope

1.1 Identification

This software performance specification provides an analysis of the memory, disk, and processor utilitization of each program in the Common UNIX Printing System ("CUPS") Version 1.2.

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
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- A − Glossary

2 References

2.1 CUPS Documentation

The following CUPS documentation is referenced by this document:

- CUPS−CMP−1.2: CUPS Configuration Management Plan
- CUPS−IDD−1.2: CUPS System Interface Design Description
- CUPS−IPP−1.2: CUPS Implementation of IPP
- CUPS−SAM−1.2.x: CUPS Software Administrators Manual
- CUPS−SDD−1.2: CUPS Software Design Description
- CUPS−SPM−1.2.x: CUPS Software Programming Manual
- CUPS−SSR−1.2: CUPS Software Security Report
- CUPS−STP−1.2: CUPS Software Test Plan
- CUPS−SUM−1.2.x: CUPS Software Users Manual
- CUPS−SVD−1.2: 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: Job and Printer Set Operations
- IPP/1.1: Encoding and Transport
- IPP/1.1: Implementers Guide
- IPP/1.1: Model and Semantics
- RFC 1179, Line Printer Daemon Protocol
- 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

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

		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
imagetoraster	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

C
: A computer language.

parallel
: Sending or receiving data more than 1 bit at a time.

pipe
: A one−way communications channel between two programs.

serial
: Sending or receiving data 1 bit at a time.

socket
: A two−way network communications channel.

A.2 Acronyms

ASCII
: American Standard Code for Information Interchange

CUPS
: Common UNIX Printing System

ESC/P
: EPSON Standard Code for Printers

FTP
: File Transfer Protocol

HP−GL
: Hewlett−Packard Graphics Language

HP−PCL
: Hewlett−Packard Page Control Language

HP−PJL
: Hewlett−Packard Printer Job Language

IETF
: Internet Engineering Task Force

IPP
: Internet Printing Protocol

ISO
: International Standards Organization

LPD
: Line Printer Daemon

MIME
: Multimedia Internet Mail Exchange

PPD
: PostScript Printer Description

SMB
: Server Message Block

TFTP
: Trivial File Transfer Protocol