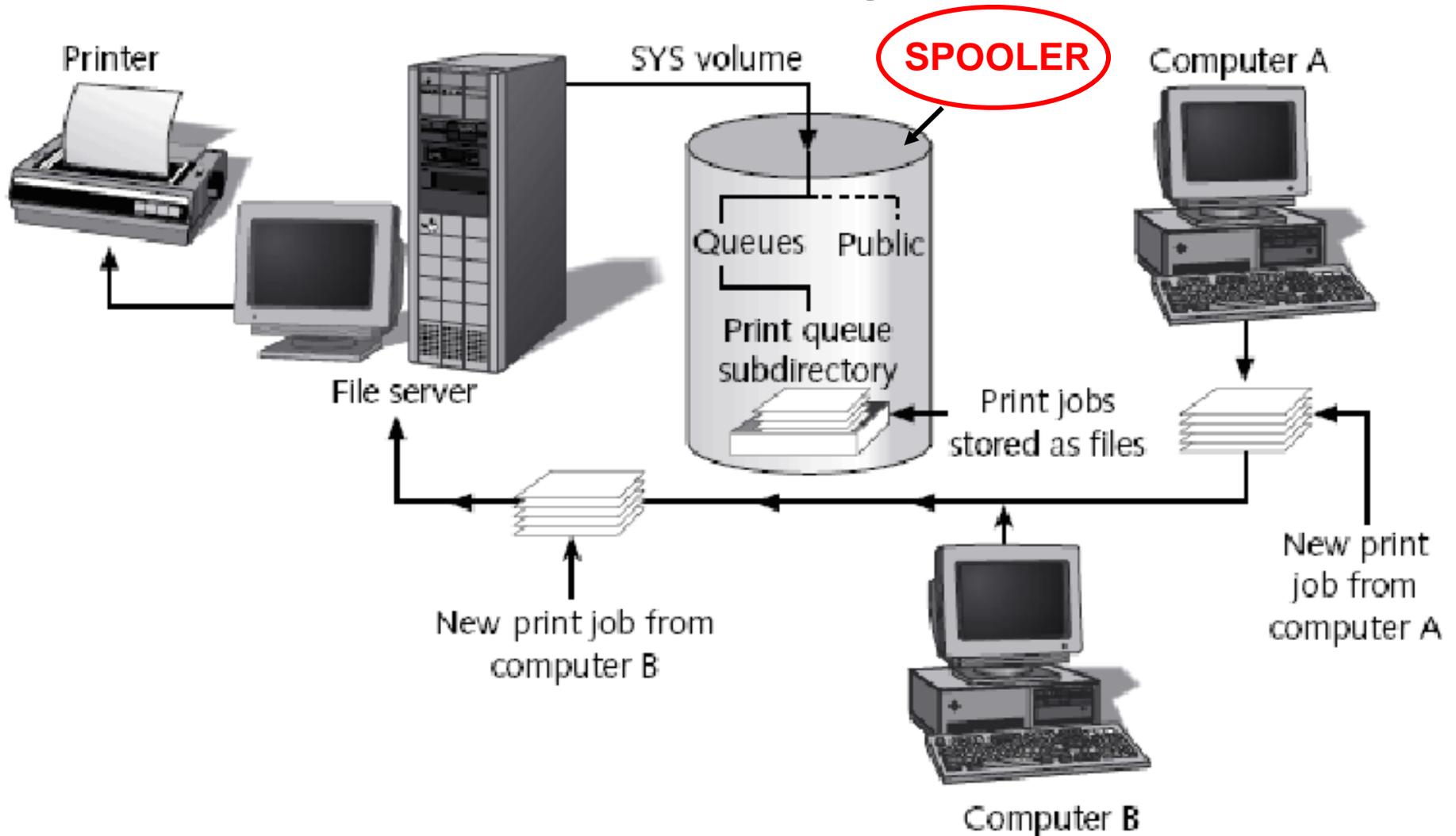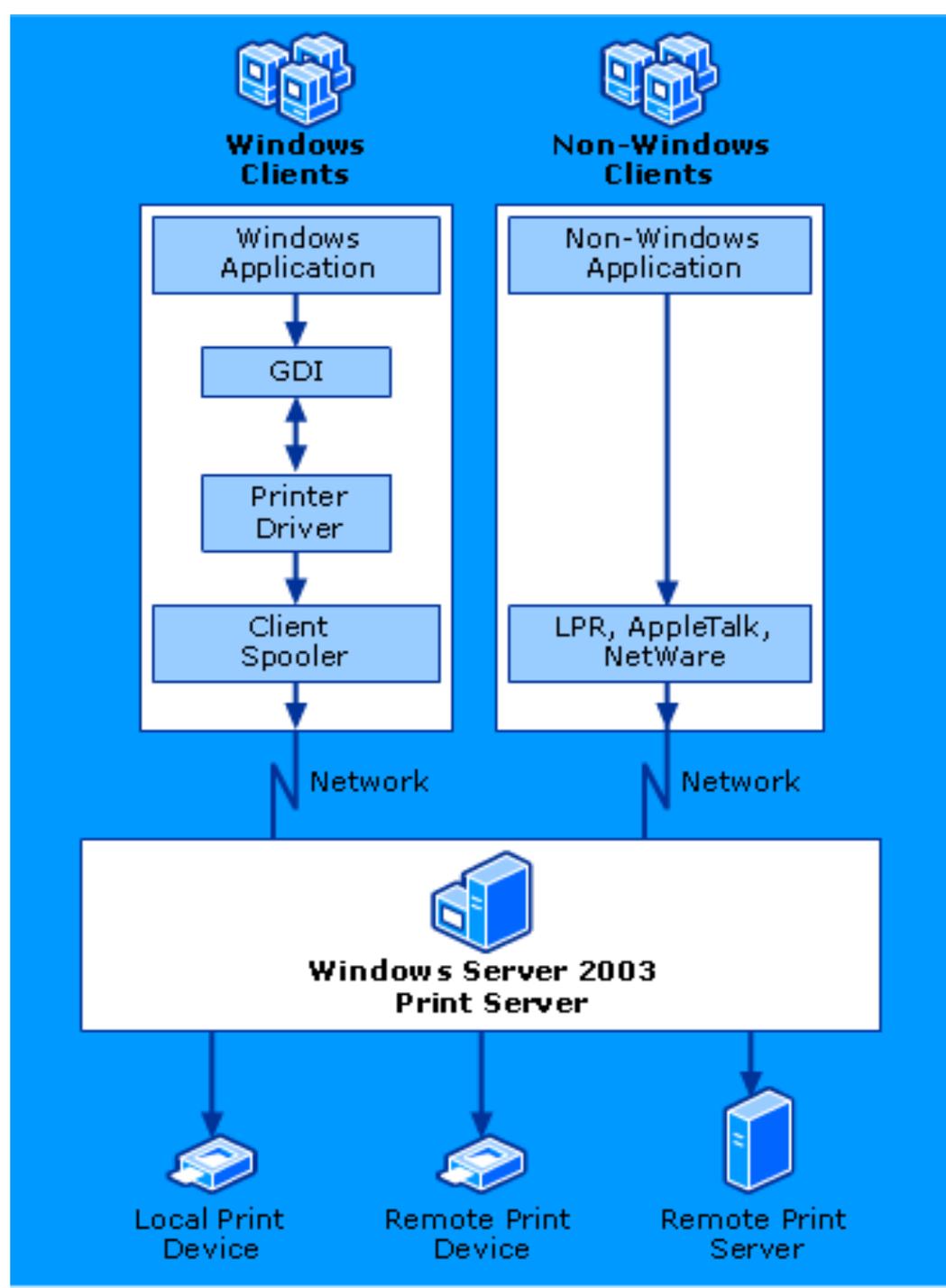# Printing

...in great quantities...

Printing: basic service

- The user needs it
  - Paperless office
  - sign: with ink
  - reading/modification
  - Printing is the 2nd most critical service (after e-mail!)
- Guiding principles
- Print server capablities
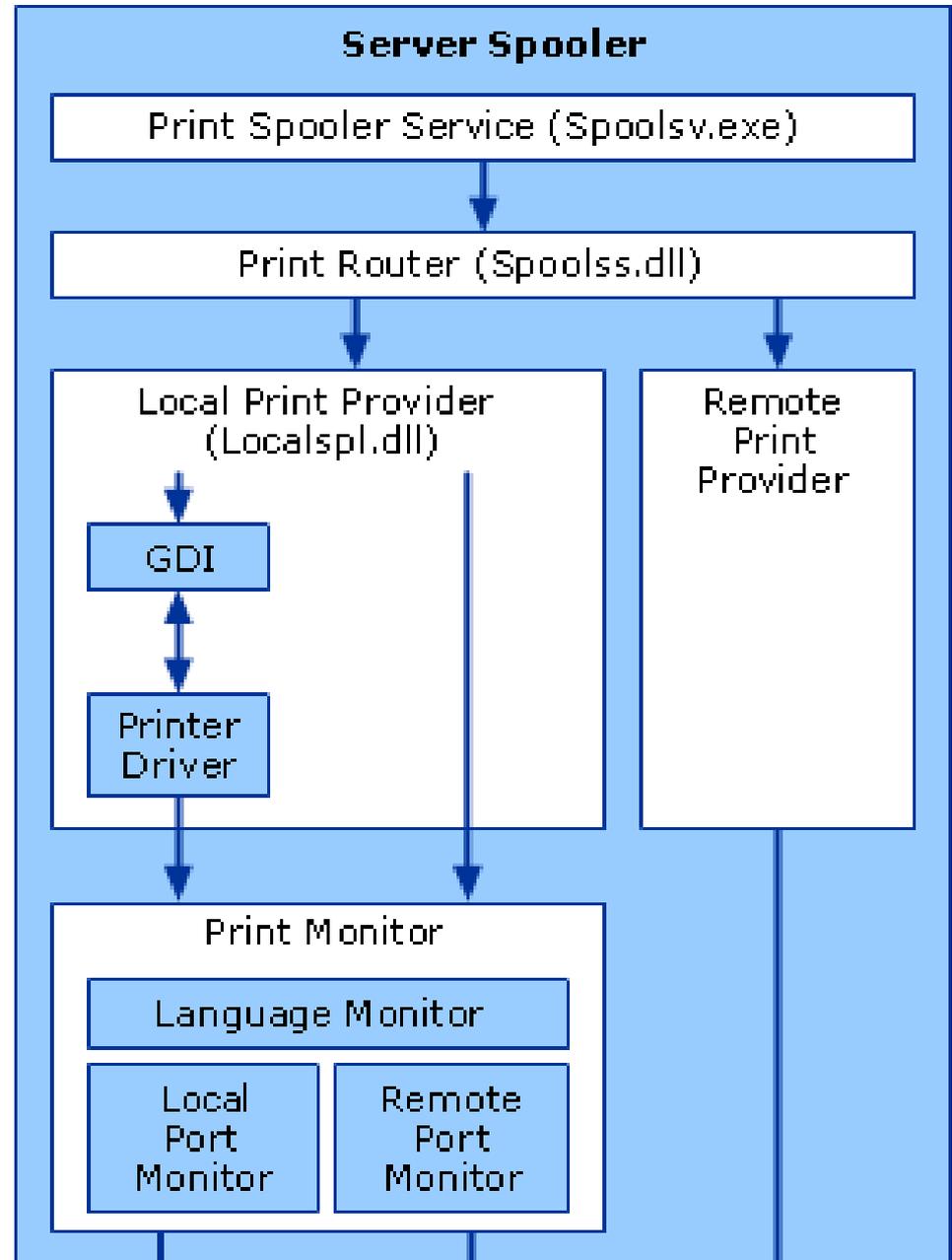- Environmental printer usage

Network Printing - Novell

Printing: Windows

Windows Print Server

**Windows Server 2003
Print Server**

Server Spooler

Print Spooler Service (Spoolsv.exe)

Print Router (Spoolss.dll)

Local Print Provider
(Localspl.dll)

Remote
Print
Provider

GDI

Printer
Driver

Print Monitor

Language Monitor

Local
Port
Monitor

Remote
Port
Monitor

Network printing - protocols

- **From client to server:**
  - **SMB** – Server Message Block (port 137-139)
  - **LPR (LPD)** - Line Printer Remote (-Daemon) Protocol (port 721-731, >1023)   (standard: RFC 1179)
  - **IPP** – Internetwork Printing Protocol /(HTTP, 80)
  - ...

- **From Server to printer:**
  - LPR
  - IPP
  - TCP app. socket (port 9100), RAW
  - ...

Network printing - formats

- RAW – „raw", printer format
  - **PCL** – Printer Command Language (HP)
  - **PostScript**
- EMF – Enhanced Metafile
  - Windows: GDI convert to RAW
- ANSI Text
- Other formats
  - GDI or Printer Driver converts to printable format

Centralization

- Extremes:
  - Own printer to everybody!
  - From anywhere to anywhere..!
- Other requirements for different task:
  - Quick
  - Good quality (dpi)
  - Color
  - These in combination…
- Many printers - a lot of money!!
- Solution:
  - Centralized printers and
  - Personal printers as well

Printing architecture

- How many people ...?
- Who is authorized for an own printer?
- How do the printers build into the network?
- How much *„printer spool"*? (centralized printing buffer)

- Who pays for...?
  - Buying
  - Maintenance
  - Supply (paper, toner)
    - Ordering through finance department
    - specialist allowed only to change the toner

Printing standards

If system manager plans with standard printing, later there will be less problems

- Postscript or PCL
- When does need a duplex-unit?
- Supported protocols
- Printer connections (USB, Eth, p.port)

- List: currently supported printers / drivers

Access policy

- Who has access to what?
- Who does give the authorization for this?
- Who is authorised for delete?
  - Cancel WAR

- Naming
  - Type (eg. duplex, color, high...)
  - Phisycal location identification

Who does reach what...?

- peer2peer (the users allowed to print directly to any printer spool)
- Centralized distribution
    - Big centralized spool
    - Can make intelligent decision
    - „Single point of failure!"
- spool by groups
- Multiplied redundant spools

Documentation

- How to use printing?
  - which menu
  - which button
  - where double click
- Has to list the printers
  - capabilities, locations, rules
- Label the printer
  - name on it,
  - If can print to trays separatly, than label them with name of tray/row!

Monitoring

- Spooling: the printer indicates, if there is a problem (eg. SNMP)
  - overloaded its queue
  - overloaded its disk
  - overloaded (CPU), etc.

- Printing: What about the spares?
  - toner
  - paper
  - paper in trays
  - get stucked

More tips…

- Automatic fail-over and loadsharing procedures
  - How do we detect the problem?
  - How do we switch over?
- Dedicated printer-maintenance staff
  - shredding
  - security…
- Printer Abuse
  - "You can't solve social problems using technology"
  - paying by slides
  - publish top 10 printing peoples