

Linux Printing & Imaging

A Presentation

to

BLU

By

Vince McHugh

NECS \ Canon

Two Parts of this presentation

- ◆ **Printing**
- ◆ **CUPS**

- ◆ **Imaging**
- ◆ **Scanning**

*Documents output from your Linux Computer in the format You actually want!!!
Double-sided & Stapled
Landscape or Portrait*

*Taking "hard copy" documents and scanning them to your Linux computer
as
Tiff, Mtiff or PDFs*

Part One: Linux Printing

"Unix Printing has been a mess for the last thirty years"

Most Unix/Linux Users and Admins have been satisfied with lp and lpr **IF** it prints.

Unix Sys Admins have often felt that **Printing is too much trouble.**

The attitude is usually **"just be thankful that you can print at all".**

Q. What do you think of when you hear
Unix/Linux Printing?

If it's *noisy* impact printers
and
Green Bar Paper
it's time to take a look at
modern Linux / Unix Printing!

Why CUPS ???

With the CUPS printing system Linux users can have all the Printing functions that their Windows peers have.

The ability to do:

- Double Sided Printing
- To choose Landscape or Portrait
- Staple in multiple positions
- choose paper size and/or tray
- even* make booklets
- High speed B&W printing (20-105+ppm)
- High end Color Printing

You can even *pre-define* virtual printers with specific printing characteristics and have all these features from
The Command Line!

What Is CUPS ?

The **C**ommon **U**nix **P**rinting **S**ystem

www.cups.org

GPL Software developed by
Easy **S**oftware **P**roducts
Included in many Linux Distros
based on the IPP print standard

CUPS works with PPDs

PPDs = Printer page descriptions
A PPD tells CUPS what abilities your printer has.
Double Sided? Staple? Reduce / Enlarge?

Q. Where do I find a PPD for my printer?

PPDs installed alongside your CUPS installation:

These will enable you to print to several hundred different printer models, **but will not give you** access to specific capacities of the models (duplex, input tray selection, smaller margins,...)

PPDs from a Printer Manufacturer:

Those are distributed alongside a PostScript capable printer. Originally they were intended for MacOS or MS Windows platforms only. CUPS can use them without a change.

Normally, the Windows NT versions work flawlessly with CUPS.

You get them from **the manufacturer's website** or from a MS Windows PC **PostScript driver disk** for your printer.

Put a copy into your **/usr/share/cups/model/** directory to make it available for installation through the web interface.

PPDs from Easy Software Products: the creators of CUPS

Those are commercially sold and supported drivers that are supplied (and only work for) ESP PrintPro

<http://www.easysw.com/printpro/>



PPDs from Linuxprinting.org:

<http://www.linuxprinting.org/>

PPDs from the Gimp-Print project:

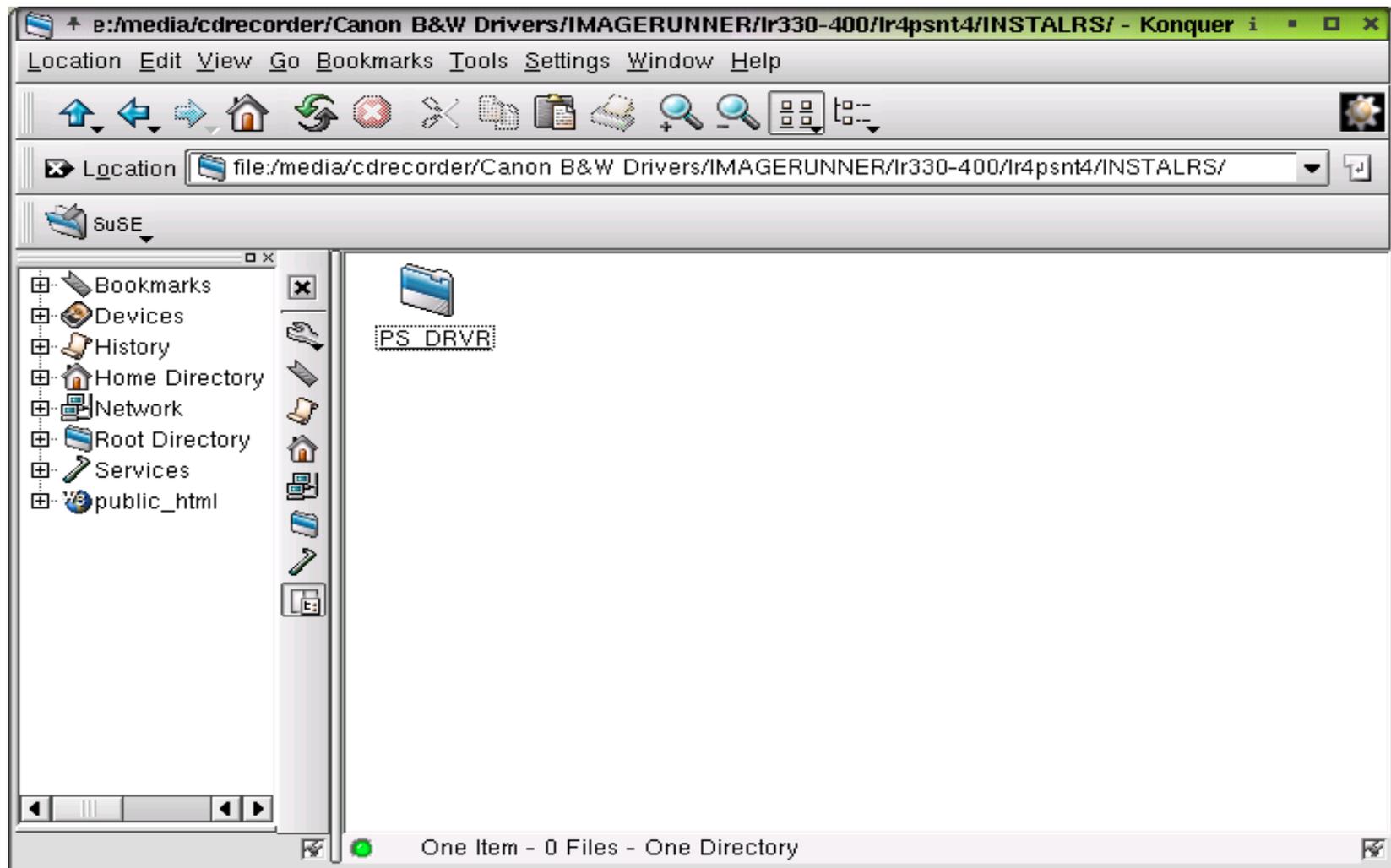
Specific PPDs for around 120 different models of Canon, Epson, HP and Lexmark color printers. The creators of CUPS are founders and still part of the development team of gimp-print project.

Recommendation:

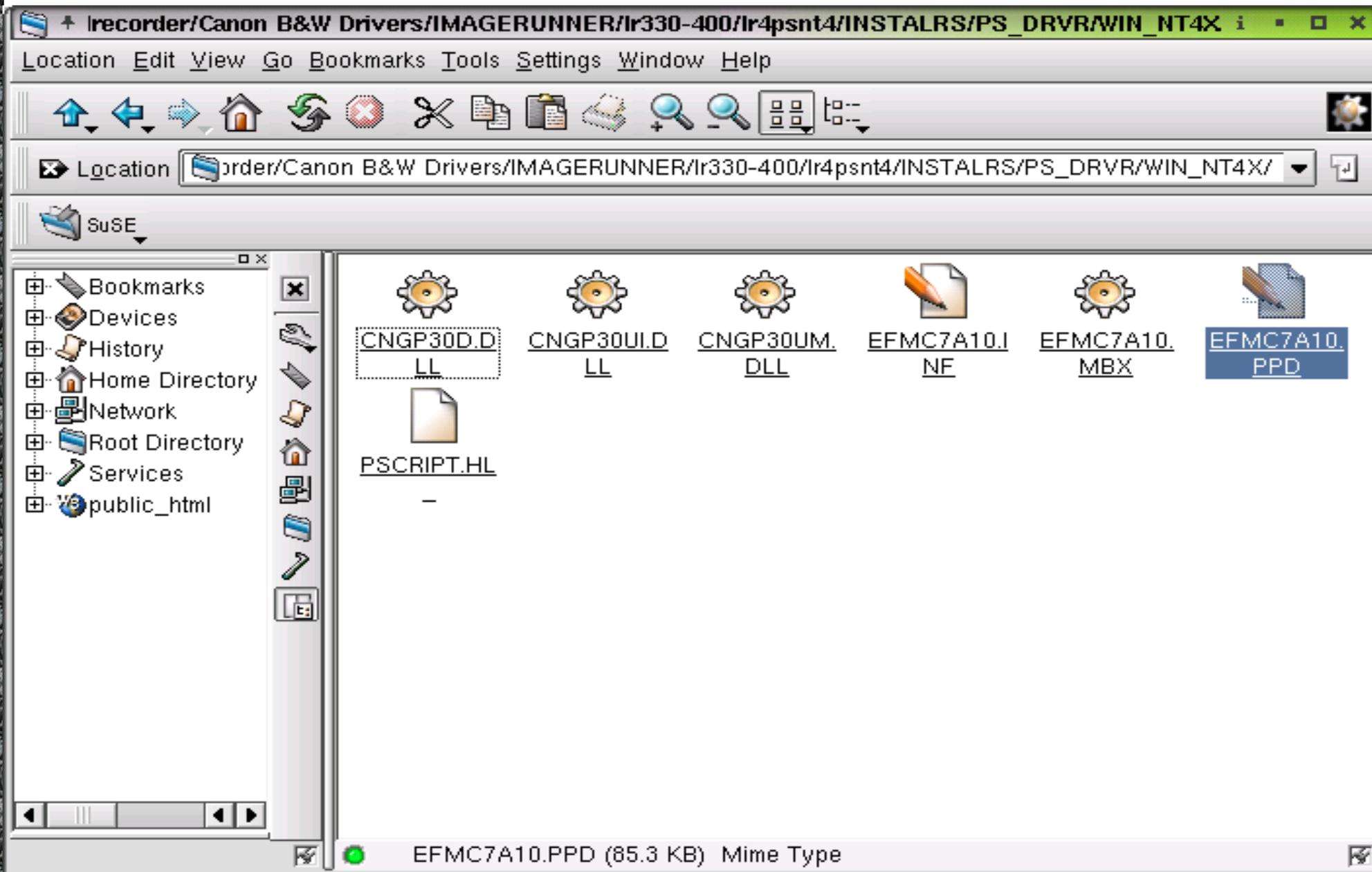
PostScript printers should be installed using the vendor PPD for that model (best to use the one targeted for Windows NT).

How to get a PPD

Browse your Windows Postscript Printer driver CD ROM

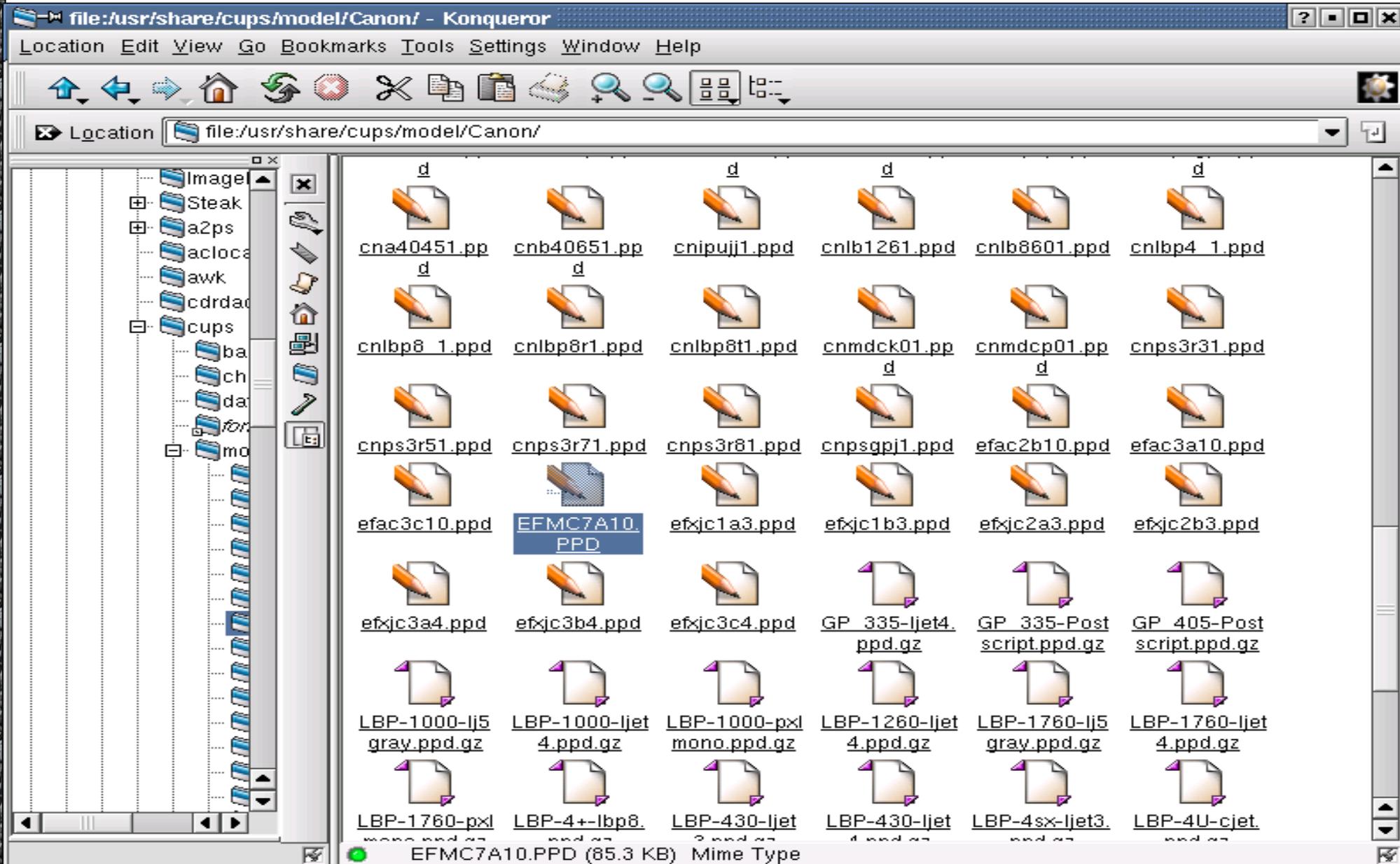


You may need to "**drill down**" or **search** the Windows Print driver CD for a ppd file. Once you have it copy and paste it to [**/usr/share/cups/model/**](#)



You want to put the new PPD in the specific manufactures directory (ie: Canon, HP, Lexmark)

Note: You will need to **re-start the CUPS daemon** after you add PPDs or you will **NOT** see them when you go to the WEB admin tool.



Restarting the CUPS Server

Once you have made a change to a configuration file you need to restart the CUPS server by **sending it a HUP signal** or using the supplied **initialization script**.

The CUPS distributions install the script in the `init.d` directory with the name `cups`. The location varies based upon the operating system:

```
/etc/rc.d/init.d/cups restart ENTER
```

```
/etc/init.d/cups restart ENTER
```

```
/sbin/init.d/cups restart ENTER
```

Now start your favorite web browser and go to **127.0.0.1:631**

**There are other front end managers for CUPS,
but for this presentation we will focus on the WEB tool**

The screenshot shows a web browser window titled "Printer on linux - CUPS v1.1.10 - Konqueror". The address bar contains the URL "http://127.0.0.1:631/admin/?op=add-printer". The main content area features a navigation bar with "ESP" and menu items: "Administration", "Classes", "Help", "Jobs", "Printers", and "Software". Below this, the "Printer" section displays "No printers" and an "Add Printer" button. A copyright notice at the bottom of the page reads: "Copyright 1993-2001 Easy Software Products, All Rights Reserved. The Common UNIX Printing System, CUPS, and the CUPS logo are the trademark property of [Easy Software Products](#). All other trademarks are the property of their respective owners."

An "Authorization Dialog" box is overlaid on the page. It contains the text: "You need to supply a username and a password to access this site." The "Site:" field is labeled "CUPS at 127.0.0.1". The "Username:" field contains the text "root". The "Password:" field contains a series of asterisks "*****". There are "OK" and "Cancel" buttons at the bottom of the dialog.



Admin

Add New Printer

Name:

Location:

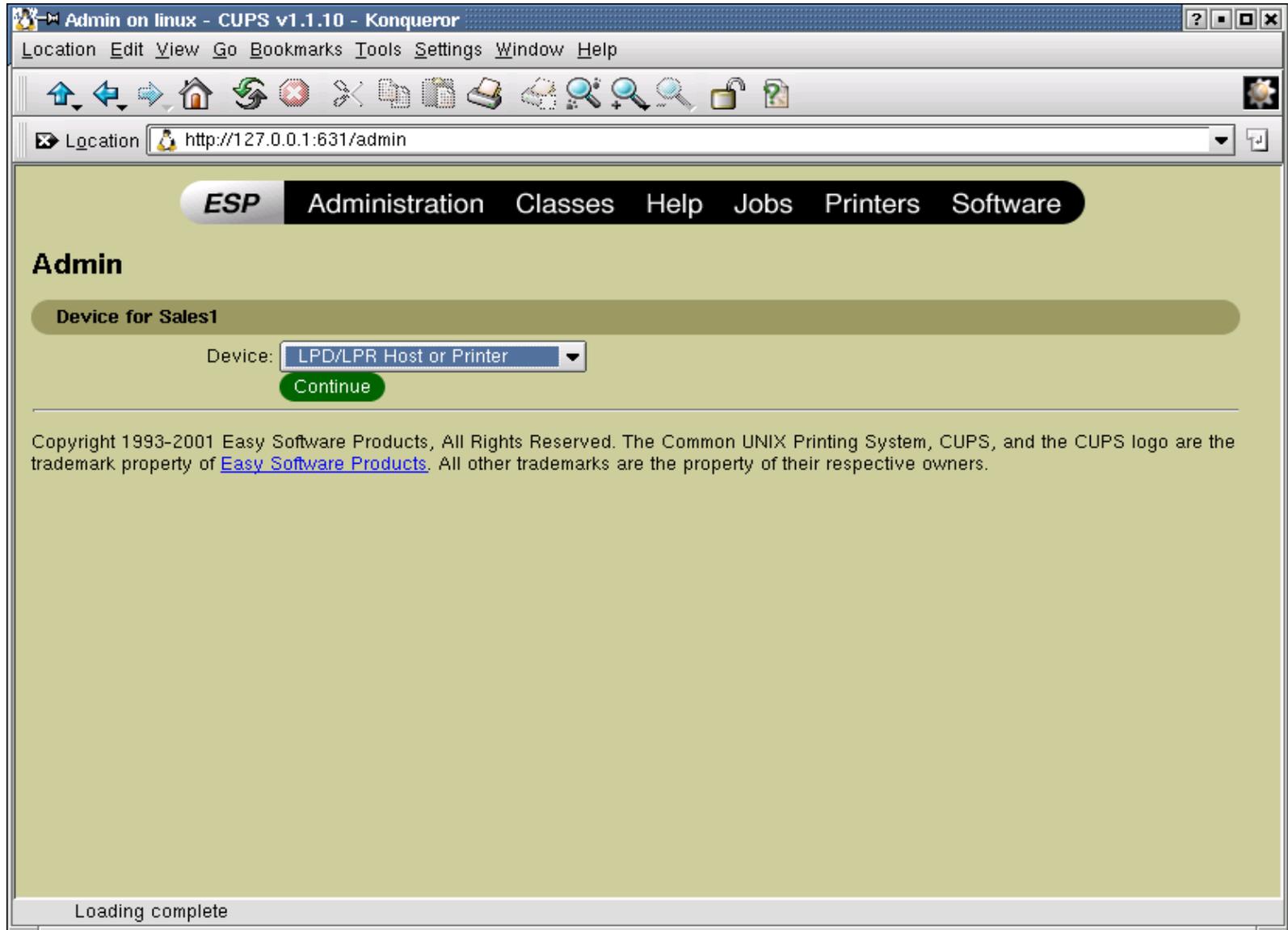
Description:

Continue

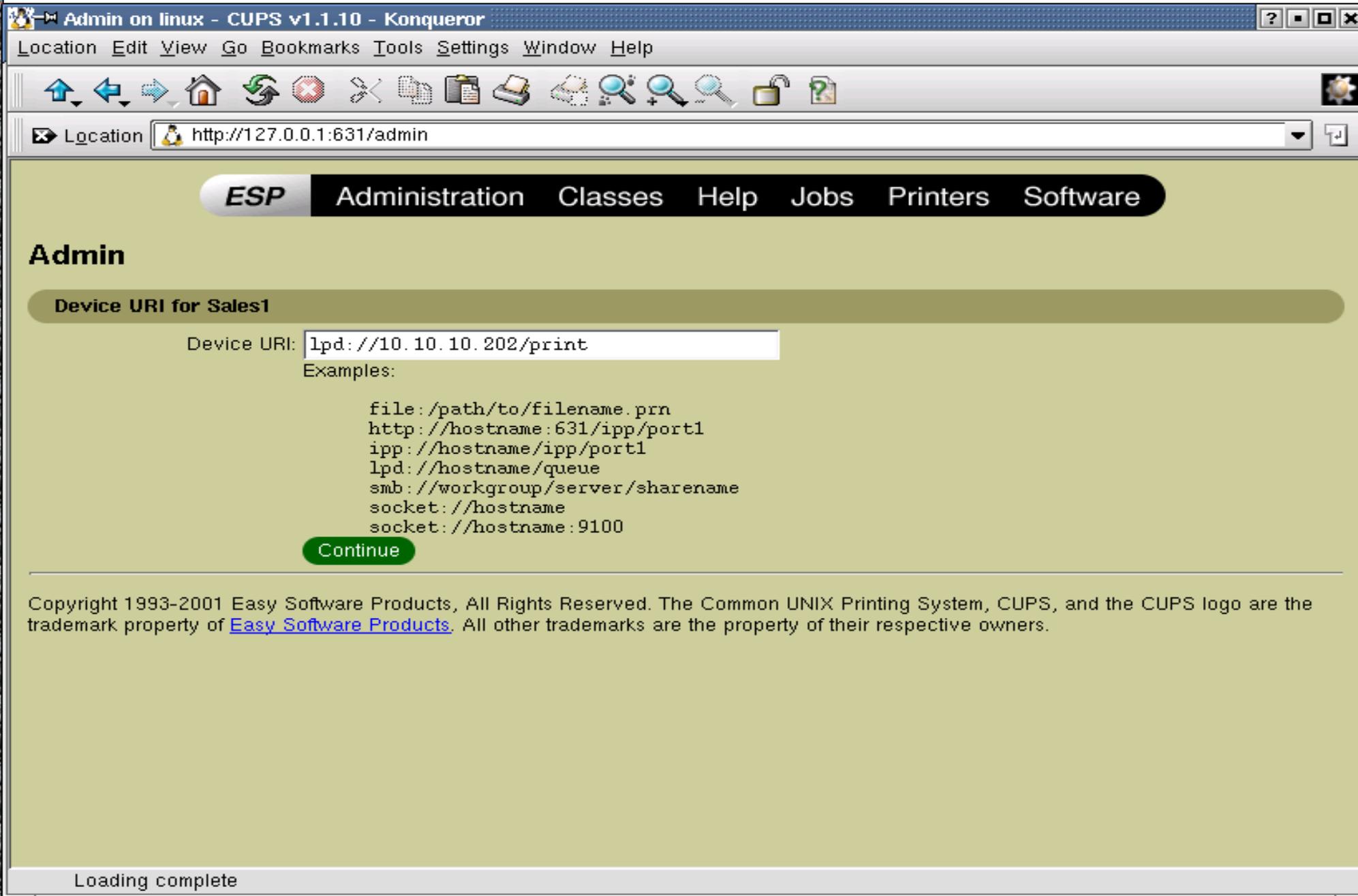
Copyright 1993-2001 Easy Software Products, All Rights Reserved. The Common UNIX Printing System, CUPS, and the CUPS logo are the trademark property of [Easy Software Products](#). All other trademarks are the property of their respective owners.

Here is where you set up the "**port**" or type of printing.

You can choose LPR, IPP, SMB, HP JetDirect, Parallel, or Serial printing.



There are even examples of the syntax for different types of printing ports



The screenshot shows a web browser window titled "Admin on linux - CUPS v1.1.10 - Konqueror". The address bar contains "http://127.0.0.1:631/admin". The page has a navigation menu with "ESP" and "Administration", "Classes", "Help", "Jobs", "Printers", and "Software". The main content area is titled "Admin" and shows a form for "Device URI for Sales1". The "Device URI:" label is followed by a text input field containing "lpd://10.10.10.202/print". Below the input field, the text "Examples:" is followed by a list of URI examples: "file:/path/to/filename.prn", "http://hostname:631/ipp/port1", "ipp://hostname/ipp/port1", "lpd://hostname/queue", "smb://workgroup/server/sharename", "socket://hostname", and "socket://hostname:9100". A green "Continue" button is located below the examples. At the bottom of the page, there is a copyright notice: "Copyright 1993-2001 Easy Software Products, All Rights Reserved. The Common UNIX Printing System, CUPS, and the CUPS logo are the trademark property of [Easy Software Products](#). All other trademarks are the property of their respective owners." The status bar at the bottom of the browser window says "Loading complete".

Admin on linux - CUPS v1.1.10 - Konqueror

Location Edit View Go Bookmarks Tools Settings Window Help

Location http://127.0.0.1:631/admin

ESP Administration Classes Help Jobs Printers Software

Admin

Device URI for Sales1

Device URI:

Examples:

- file:/path/to/filename.prn
- http://hostname:631/ipp/port1
- ipp://hostname/ipp/port1
- lpd://hostname/queue
- smb://workgroup/server/sharename
- socket://hostname
- socket://hostname:9100

Continue

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Loading complete



Admin

Model/Driver for Sales1

Make:

- Raw
- ALPS
- APOLLO
- APPLE
- AVERY
- BROTHER
- C.ITOH
- CANON**
- CITIZEN
- COMPAQ

Continue

Copyright 1993-2001 Easy Software Products, All Rights Reserved. The Common UNIX Printing System, CUPS, and the CUPS logo are the trademark property of [Easy Software Products](#). All other trademarks are the property of their respective owners.

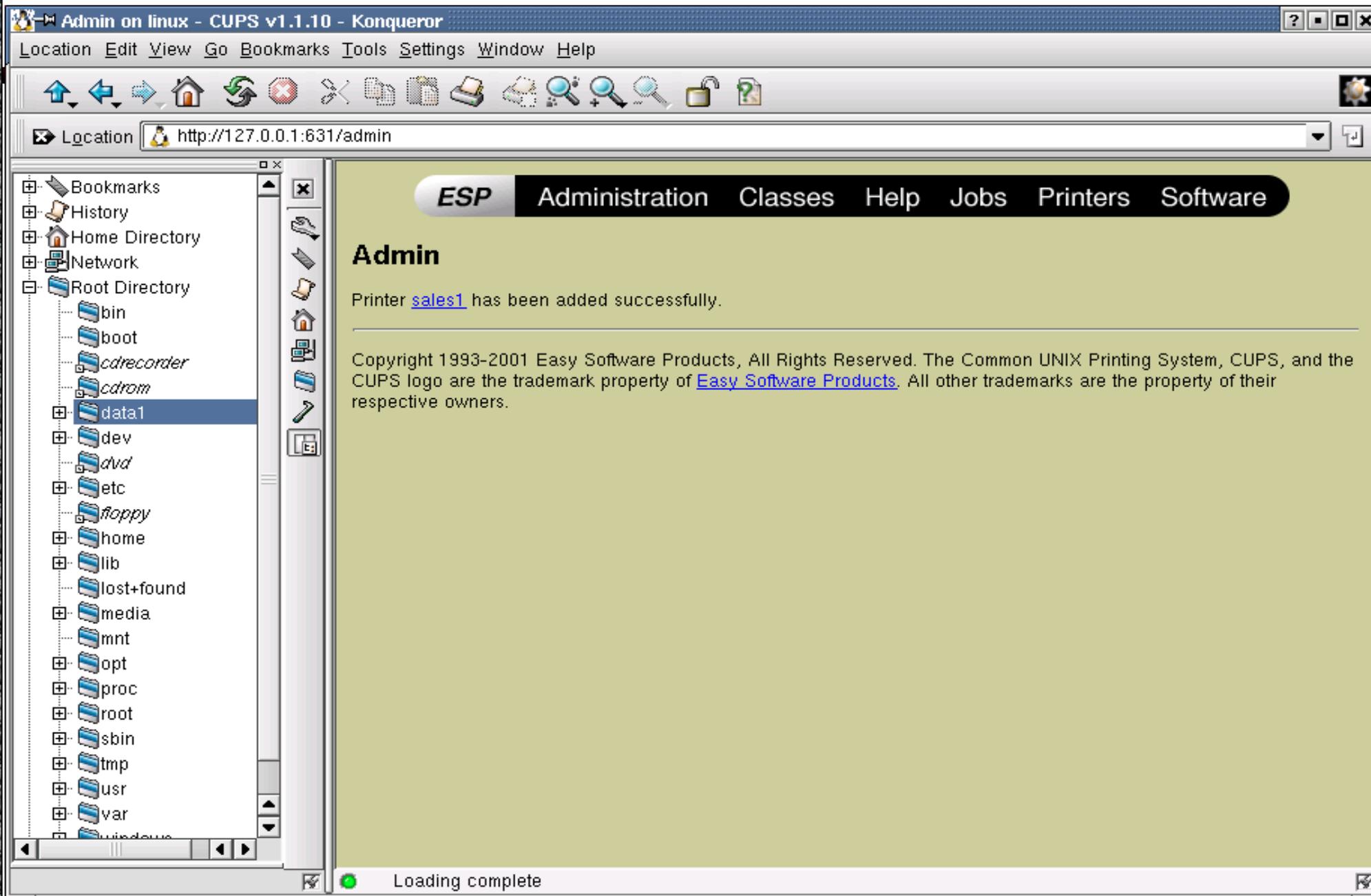
This is where we find the Manufacturers PPD that we added earlier

Note: If you don't see your PPD that you added you probably forgot to re-start CUPS

The screenshot shows a web browser window titled "Admin on linux - CUPS v1.1.10 - Konqueror". The address bar shows "http://127.0.0.1:631/admin". The browser interface includes a menu bar (Location, Edit, View, Go, Bookmarks, Tools, Settings, Window, Help) and a toolbar with navigation icons. On the left, a sidebar shows a file system tree with "data1" selected. The main content area has a navigation bar with "ESP", "Administration", "Classes", "Help", "Jobs", "Printers", and "Software". Below this is the "Admin" section, which includes a "Model/Driver for sales1" dropdown menu. The dropdown is open, showing a list of printer models and drivers, with "Canon iR330-400 PS Print Server Ver 1.0 (en)" selected. A "Continue" button is visible below the dropdown. At the bottom of the page, there is a copyright notice: "Copyright 1993-2001 Easy Software Products, All Rights Reserved. The Common UNIX Printing System, CUPS, and the CUPS logo are the trademark property of Easy Software Products. All other trademarks are the property of their respective owners."

The WEB tool is very intuitive

You could even have your "less technical" people manage your printers



Easy Printer Set up & Management

Printer on vmchugh-lnx - CUPS v1.1.10 - Konqueror

Location Edit View Go Bookmarks Tools Settings Window Help

Location <http://127.0.0.1:631/printers>

Color650 **ColorPASS-Z650 Color Server**

Description: Canon ColorPass 650 CLC1180
Location: Demo Room
Printer State: idle, accepting jobs.
Device URI: http://CP_Z650:631/ipp/print

Print Test Page **Stop Printer** Reject Jobs Modify Printer Configure Printer Delete Printer

ir105 **Canon iR105-M1 PS Ver 1.1**

Description: Canon iR105 High speed B&W Copier printer
Location: Demo Room
Printer State: idle, accepting jobs.
Device URI: smb://WORKGROUP_DR/IMAGEPASS-M1/print

Print Test Page **Stop Printer** Reject Jobs Modify Printer Configure Printer Delete Printer

irC2050 **Canon iR C2000 series PS**

Description: Canon Color/B&W Copier Printer
Location: Demo Room
Printer State: idle, accepting jobs.
Device URI: lpd:10.10.5.167/print

Print Test Page **Stop Printer** Reject Jobs Modify Printer Configure Printer Delete Printer

sales1 **Canon iR330-400 PS Print Server Ver 1.0**

Description: Canon iR400 Copier Printer
Location: 1st Floor Sales Office
Printer State: stopped, accepting jobs.
"Paused"
Device URI: lpd://10.10.10.202/print

Print Test Page **Start Printer** Reject Jobs Modify Printer Configure Printer Delete Printer

(xconsole) (Konsole)
(StarOffice 5.2 - [Introducing the Co... Konqueror

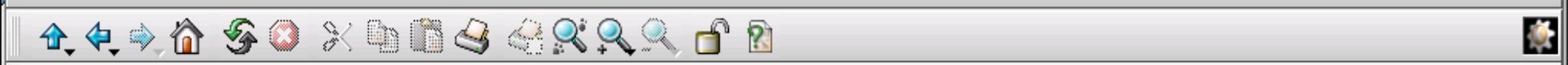
2 4

21:14
2002-07-16

Now we are ready to configure the printer and take advantage of our PPDs features.

Select **"Configure Printer"** to access the PPDs Features

The screenshot shows a web browser window titled "Printer on linux - CUPS v1.1.10 - Konqueror". The address bar shows the URL "http://127.0.0.1:631/printers". The browser interface includes a menu bar (Location, Edit, View, Go, Bookmarks, Tools, Settings, Window, Help) and a toolbar with various navigation icons. On the left side, there is a sidebar with a file system tree showing directories like "bin", "boot", "data1", "dev", etc. The main content area displays the printer configuration page for "sales1". At the top of the page, there is a navigation bar with links: "ESP", "Administration", "Classes", "Help", "Jobs", "Printers", and "Software". The page title is "Printer". Below the title, it shows "Default Destination: sales1". The printer name "sales1" is highlighted in a green bar, followed by "Canon iR330-400 PS Print Server Ver 1.0". Below this, there is a printer icon and a description: "Description: Canon iR400 Copier Printer", "Location: 1st Floor Sales Office", "Printer State: idle, accepting jobs.", and "Device URI: lpd://10.10.10.202/print". A row of buttons is visible: "Print Test Page", "Stop Printer" (highlighted in red), "Reject Jobs", "Modify Printer", and "Configure Printer". Below these buttons is a "Delete Printer" button. At the bottom of the printer configuration section, there is an "Add Printer" button. The footer of the page contains copyright information: "Copyright 1993-2001 Easy Software Products, All Rights Reserved. The Common UNIX Printing System, CUPS, and the CUPS logo are the trademark property of Easy Software Products. All other trademarks are the property of their respective owners." The browser's status bar at the bottom shows the URL "http://www.easysw.com".



Choose default options for sales1.

Extra

2-Sided Printing : Long Edge Binding ▾
Booklet : Off ▾
Density : 5 ▾
Destination : Printer ▾
First Page Source : Job's Source ▾
Landscape : Printer's default ▾
Refine : On ▾
Resolution : 600 DPI ▾
Rotate 180 : Printer's default ▾
Sorter Mode : 1-Staple [Upper Left-L] ▾
Toner Reduction : Off On
[Continue](#)

General

Media Type : Plain Paper ▾
Page Size : Letter ▾
Paper Source : Auto ▾
[Continue](#)

Options Installed

Cassette Feeding Unit : Not Installed ▾
Finisher : Finisher-C1 ▾
Mail Box : Enabled ▾
Side Paper Deck : Installed Not Installed
[Continue](#)

Banners

We looked at a simple set up of CUPS as the Printing System of a single Linux PC

Advanced Cups features

- ◆ CUPS can be set up in a **Server \ Client** environment (one or more print servers)
- ◆ CUPS offers "**Printer Classes**" - the ability to cluster several like printers together
- ◆ CUPS will accept LPR jobs (you do lose most of your PPD features) Still supports "printer classes"

Cluster Like Type Printers with Printer "Classes"

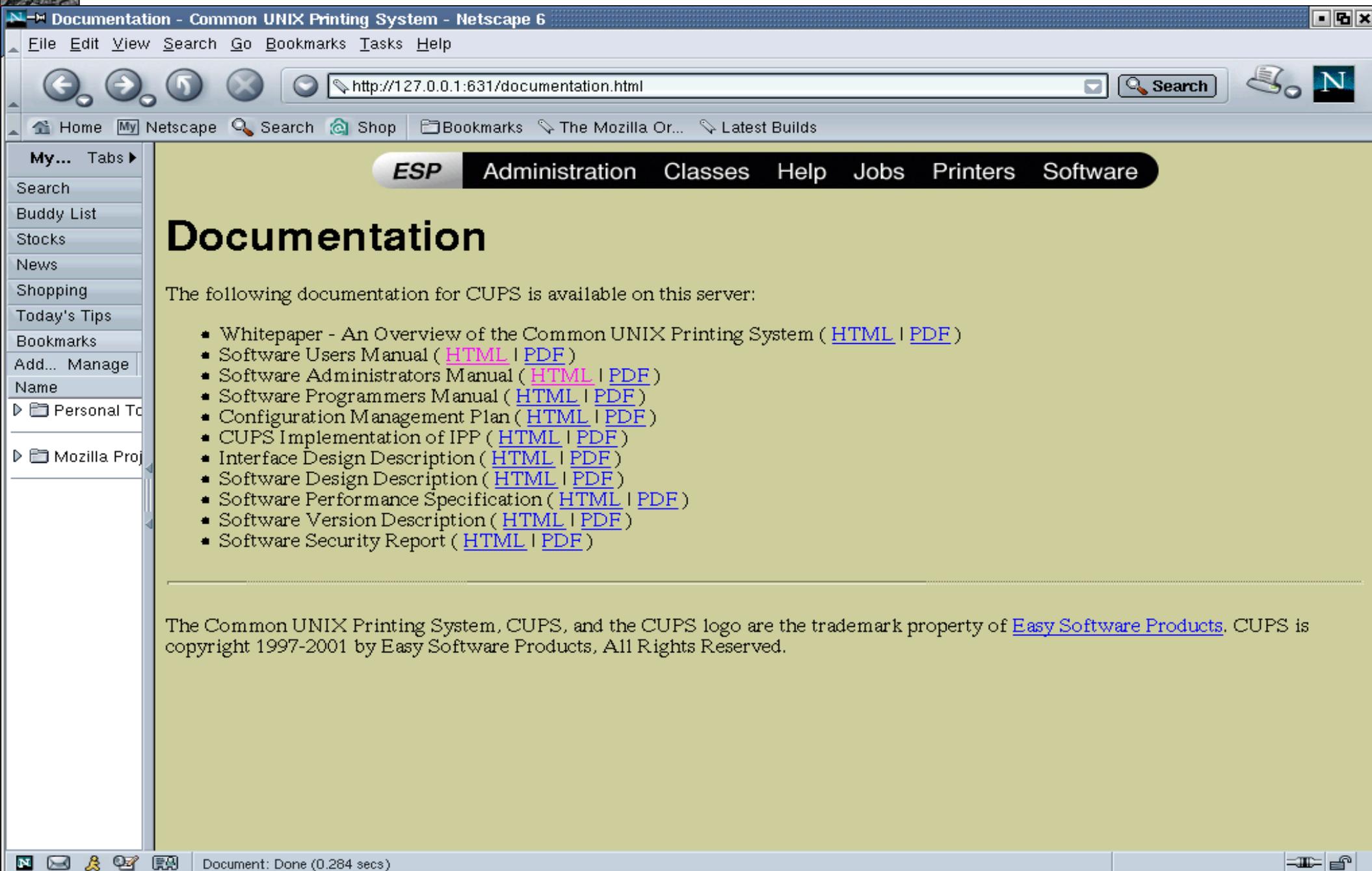
The screenshot displays the CUPS web interface in a Konqueror browser window. The window title is "Class on vmchugh-lnx - CUPS v1.1.10 - Konqueror". The address bar shows "http://127.0.0.1:631/classes". The main navigation bar includes "ESP", "Administration", "Classes", "Help", "Jobs", "Printers", and "Software".

The "Class" section is active, showing two printer classes:

- cluster** (Printer Class):
 - Description: High Speed B&W Cluster (2 105s & 1 8500)
 - Location: Production
 - Class State: idle, accepting jobs.
 - Members: ir105,ir105b,ir8500
 - Buttons: Print Test Page, Stop Class, Reject Jobs, Modify Class, Delete Class
- ColorCluster** (Printer Class):
 - Description: CP650 & irC2050
 - Location: Graphics Arts Dept
 - Class State: idle, accepting jobs.
 - Members: Color650,irC2050
 - Buttons: Print Test Page, Stop Class, Reject Jobs, Modify Class, Delete Class

At the bottom of the class list, there is an "Add Class" button. The footer contains the copyright notice: "Copyright 1993-2001 Easy Software Products, All Rights Reserved. The Common UNIX Printing System, CUPS, and the CUPS logo are the trademark property of Easy Software Products. All other trademarks are the property of their respective owners."

Where to find help - CUPS Documentation "Help"



The screenshot shows a Netscape 6 browser window with the title "Documentation - Common UNIX Printing System - Netscape 6". The address bar contains the URL "http://127.0.0.1:631/documentation.html". The browser's menu bar includes "File", "Edit", "View", "Search", "Go", "Bookmarks", "Tasks", and "Help". The toolbar features navigation buttons (back, forward, home, stop) and a search box. The browser's sidebar on the left shows a "My... Tabs" menu with options like "Search", "Buddy List", "Stocks", "News", "Shopping", "Today's Tips", "Bookmarks", "Add... Manage", and "Name". Below this are folders for "Personal To" and "Mozilla Proj".

The main content area of the browser displays the CUPS documentation page. At the top, there is a navigation bar with the following links: **ESP**, Administration, Classes, Help, Jobs, Printers, and Software. The main heading is "Documentation". Below the heading, the text reads: "The following documentation for CUPS is available on this server:".

- Whitepaper - An Overview of the Common UNIX Printing System ([HTML](#) | [PDF](#))
- Software Users Manual ([HTML](#) | [PDF](#))
- Software Administrators Manual ([HTML](#) | [PDF](#))
- Software Programmers Manual ([HTML](#) | [PDF](#))
- Configuration Management Plan ([HTML](#) | [PDF](#))
- CUPS Implementation of IPP ([HTML](#) | [PDF](#))
- Interface Design Description ([HTML](#) | [PDF](#))
- Software Design Description ([HTML](#) | [PDF](#))
- Software Performance Specification ([HTML](#) | [PDF](#))
- Software Version Description ([HTML](#) | [PDF](#))
- Software Security Report ([HTML](#) | [PDF](#))

At the bottom of the page, the text reads: "The Common UNIX Printing System, CUPS, and the CUPS logo are the trademark property of [Easy Software Products](#). CUPS is copyright 1997-2001 by Easy Software Products. All Rights Reserved."

The browser's status bar at the bottom shows "Document: Done (0.284 secs)". The system tray at the very bottom includes icons for network, volume, and power, along with a taskbar showing open windows: "(xconsole)", "StarOffice 5.2 - [Introducing t", and "(Konsole)". The system clock shows "20 49".

Here is the Help section for Printing via the Command Line

CUPS Software Users Manual - Konqueror

Location Edit View Go Bookmarks Tools Settings Window Help

Location: http://127.0.0.1:631/sum.html#3_1

Common UNIX Printing System

Submitting Files for Printing

CUPS provides both the System V (`lp(1)`) and Berkeley (`lpr(1)`) printing commands. Type the following command to print a file to the default (or only) printer on the system:

```
lp filename ENTER
```

or:

```
lpr filename ENTER
```

CUPS understands many different types of files directly, including PostScript and image files. This allows you to print from inside your applications or at the command-line, whichever is most convenient!

Choosing a Printer

Many systems will have more than one printer available to the user. These printers can be attached to the local system via a parallel, serial, or USB port, or available over the network.

Use the `lpstat(1)` command to see a list of available printers:

```
lpstat -p -d ENTER
```

The `-p` option specifies that you want to see a list of printers, and the `-d` option reports the current system default printer or class.

Use the `-d` option with the `lp` command to print to a specific printer:

```
lp -d printer filename ENTER
```

or the `-P` option with the `lpr` command:

```
lpr -P printer filename ENTER
```

Setting Printer Options

For many types of files, the default printer options may be sufficient for your needs. However, there may be times when you need to change the options for a particular file you are printing.

The `lp` and `lpr` commands allow you to pass printer options using the `-o` option:

```
lp -o landscape -o scaling=75 -o media=A4 filename.jpg  
lpr -o landscape -o scaling=75 -o media=A4 filename.jpg
```

The available printer options vary depending on the printer. The standard options are described in [Chapter 3, "Standard Printing Options"](#).

Printing Multiple Copies

Both the `lp` and `lpr` commands have options for printing more than one copy of a file:

```
lp -n num-copies filename ENTER  
lpr -num-copies filename ENTER
```

Copies are normally *not* collated for you. Use the `-o Collate=True` option to get collated copies :

```
lp -n num-copies -o Collate=True filename ENTER  
lpr -num-copies -o Collate=True filename ENTER
```

Checking the Printer Status from the Command-Line

The `lpstat` command can be used to check for jobs that you have submitted for printing:

PART TWO: IMAGING & SCANNING

Why is **Scanning** and **Imaging** important to **Linux Users**?

Q. Have you ever heard of the "**Paperless Office**" ?

There were **4 trillion** pieces of paper created in this country last year

Increasing at **22% a year**

Currently **90%** of Corporate America's memory is on paper

93% of documents created this year will be digitally stored

We need to Re-define what a "paperless office" means!

ReDefining the "Paperless Office"

It obviously **doesn't mean** getting rid of all paper in the office.
(I have more paper on my desk than ever before)

Today it means **separating information from paper.**

Giving your users the ability to **EASILY** go from

An electronic document to a paper document AND THEN

To just as **EASILY** go back from a paper document to an electronic one

This part of the Presentation will focus on what We (NECS) have done to integrate **Canon** Scanning to Linux Desktops

The reason we can do this is because
Canon chose to use accepted standards like:

SMB

Email

FTP



PDF,

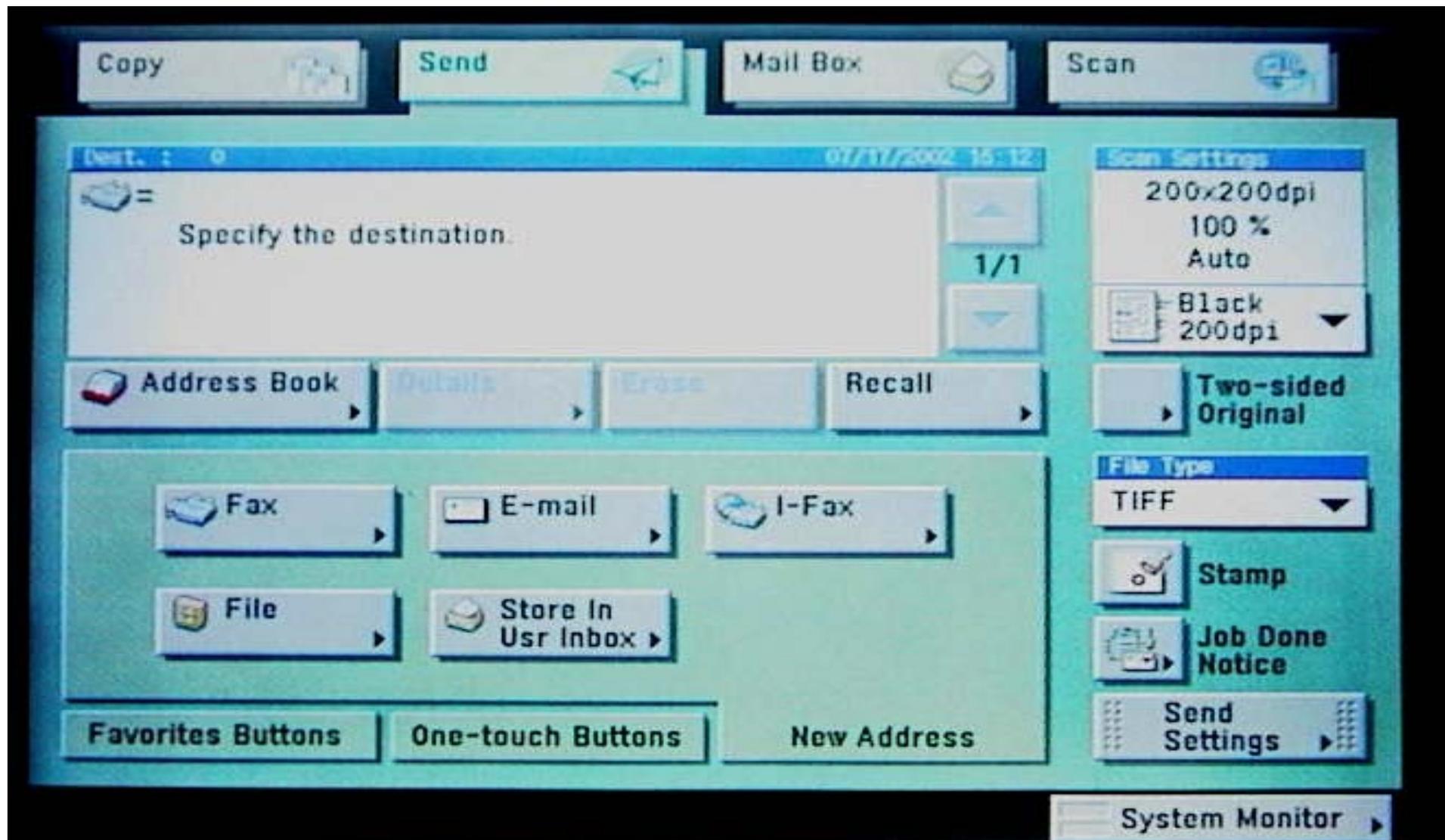
Tiff,

Mtiff

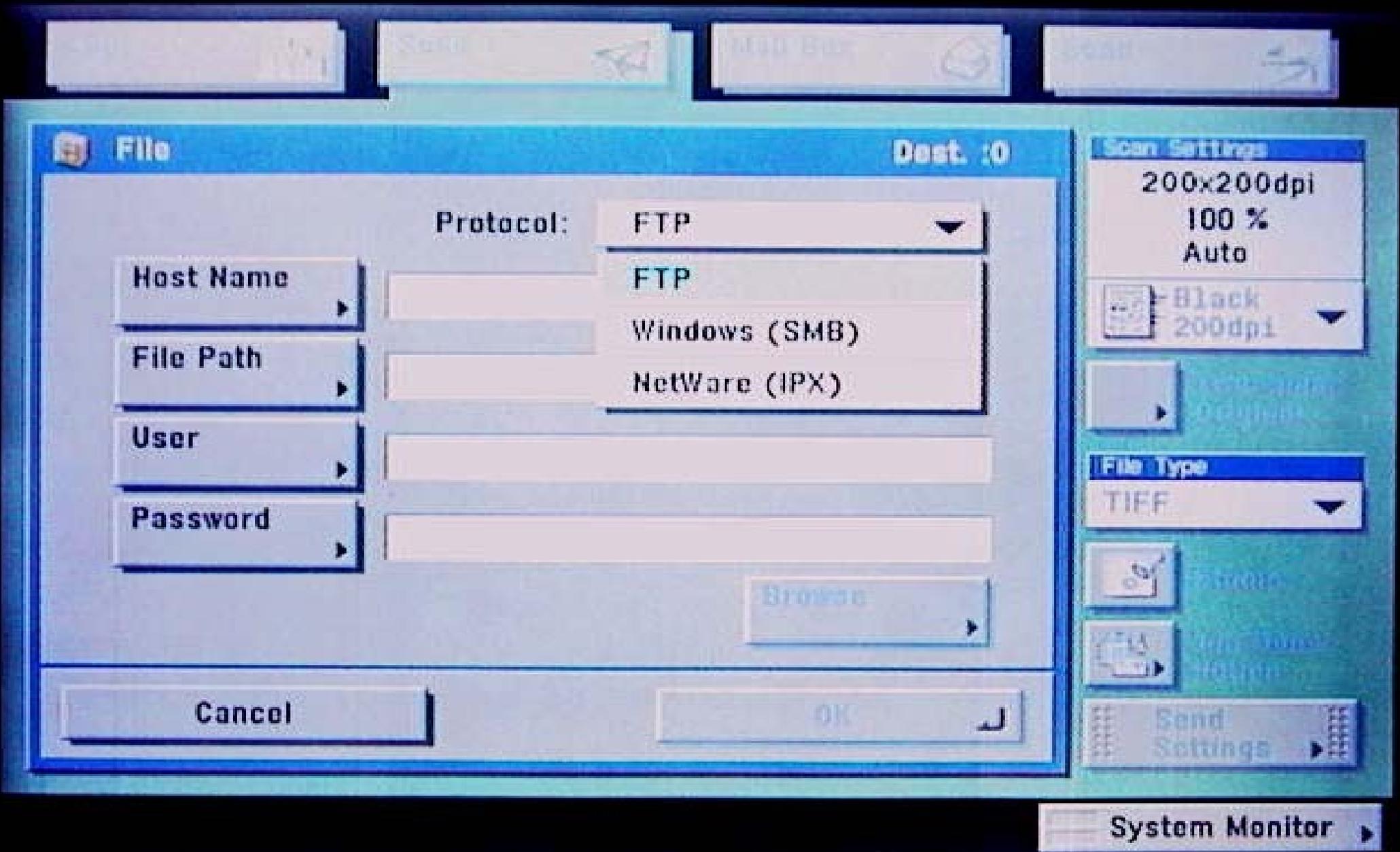
Canon's "Universal Send"

Main screen:

First Let's look at Sending a File



Send File: Protocol types



Some Current Limitations

We can only scan to a Linux/Samba box using "Share" level security. We are able to send to both open and closed shares.

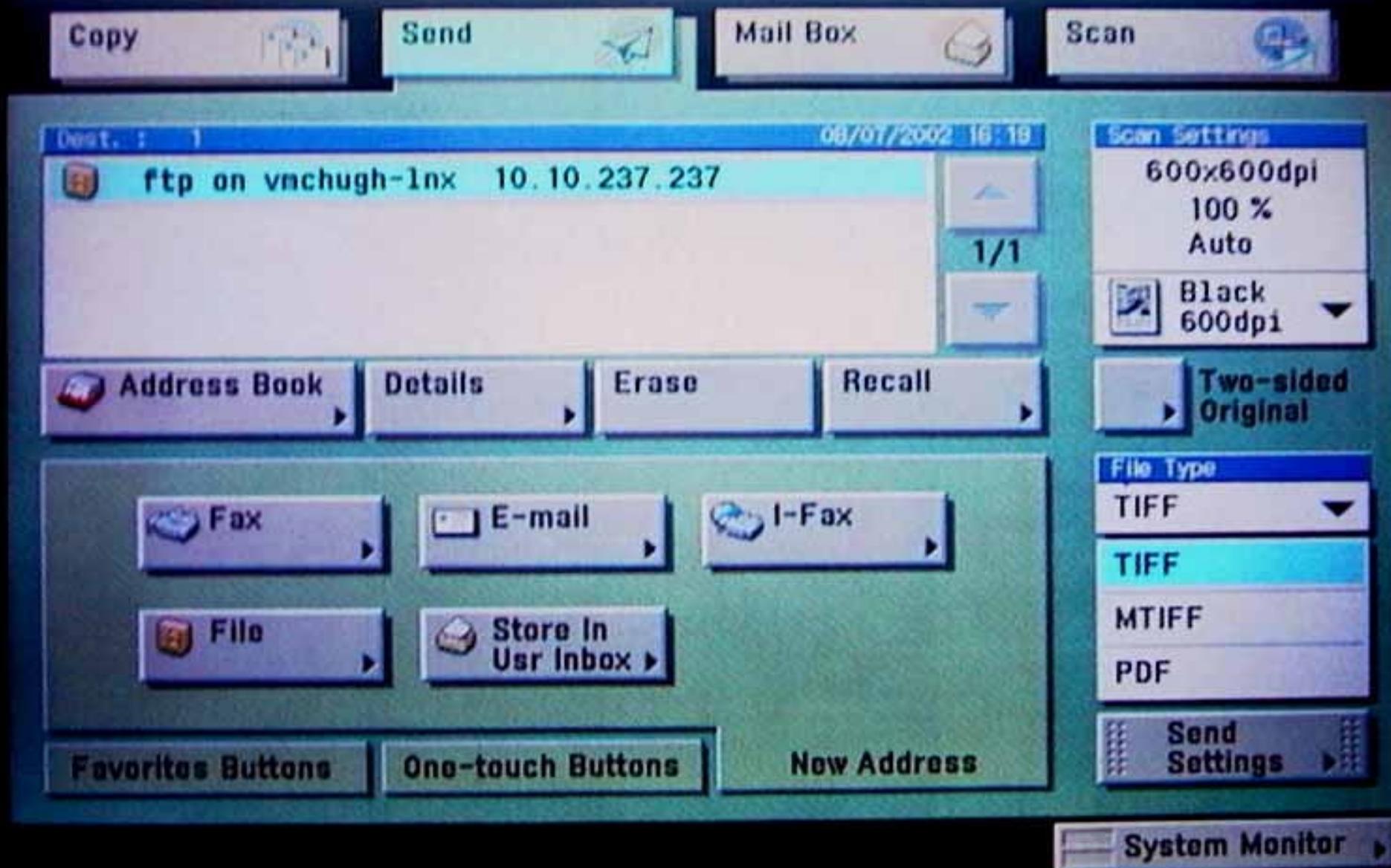
We can not (at this time) push scan using "User" level security.

(We will continue to work on this)

This only applies to smb.

Email & ftp do work with the Canon "i" series with Push scanning

Select Your File type (Tiff, Mtiff, or PDF)

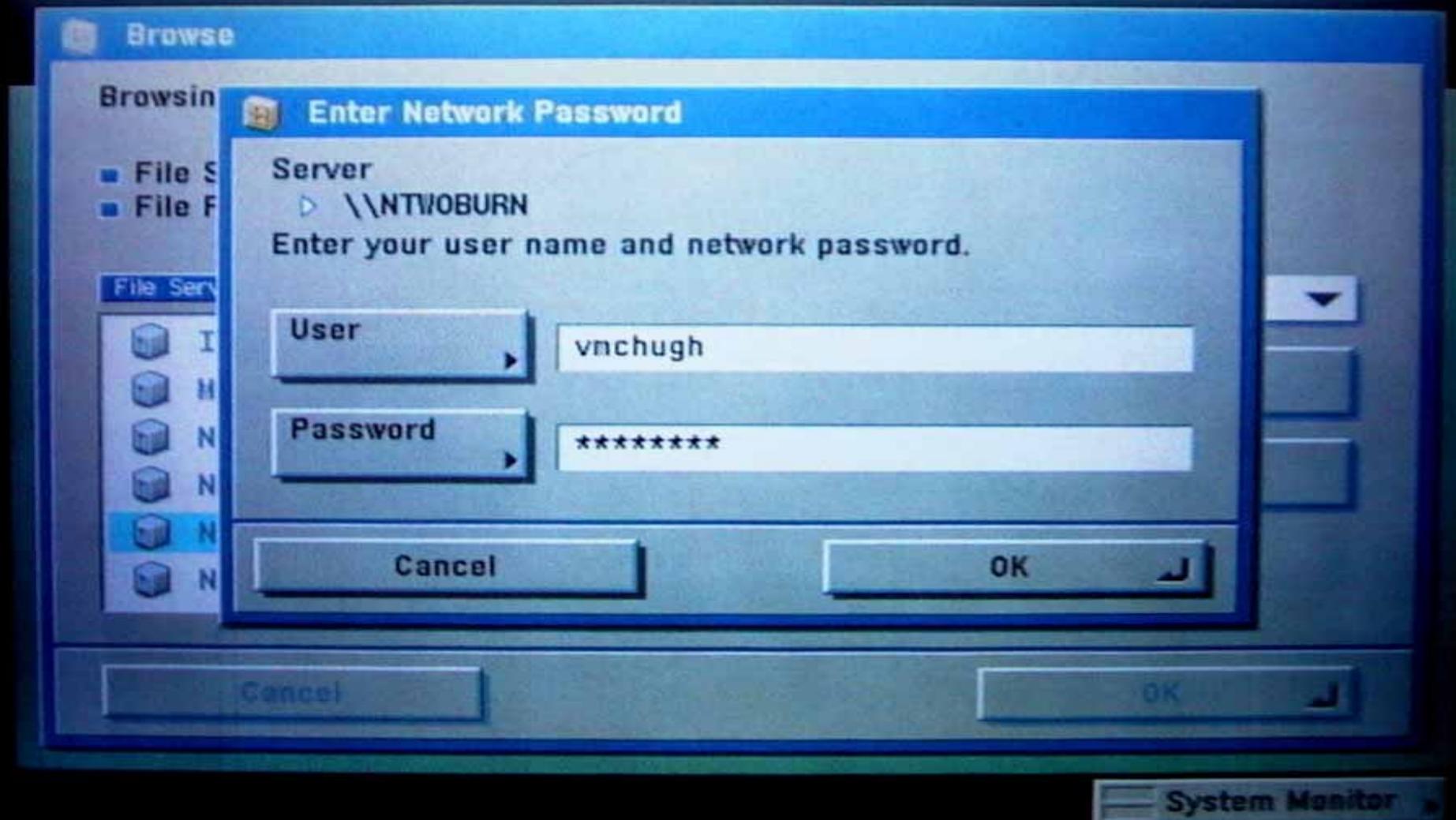


If you choose "smb" you can browse to your samba share
You can view WorkGroups & Domains



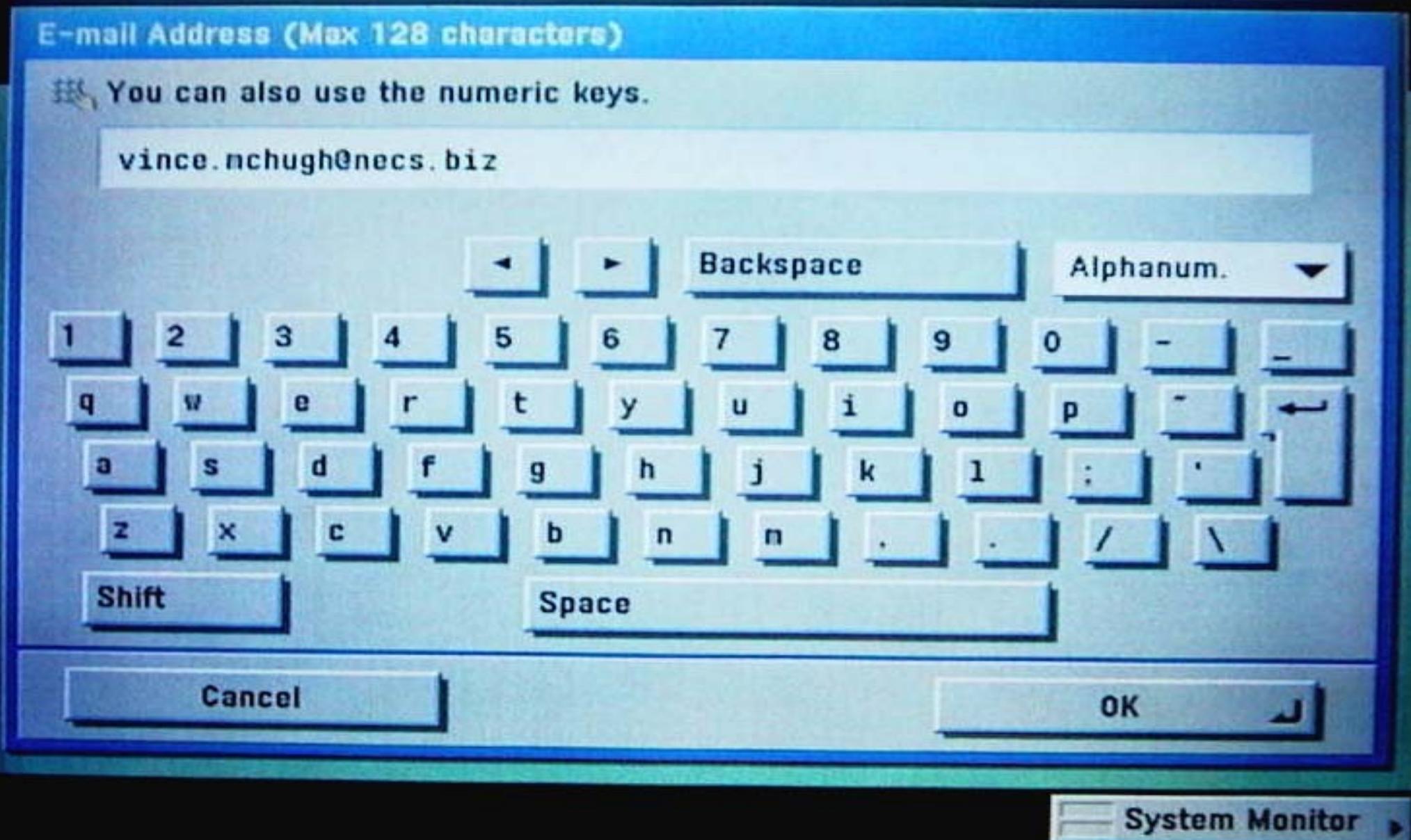
When browsing security is enforced

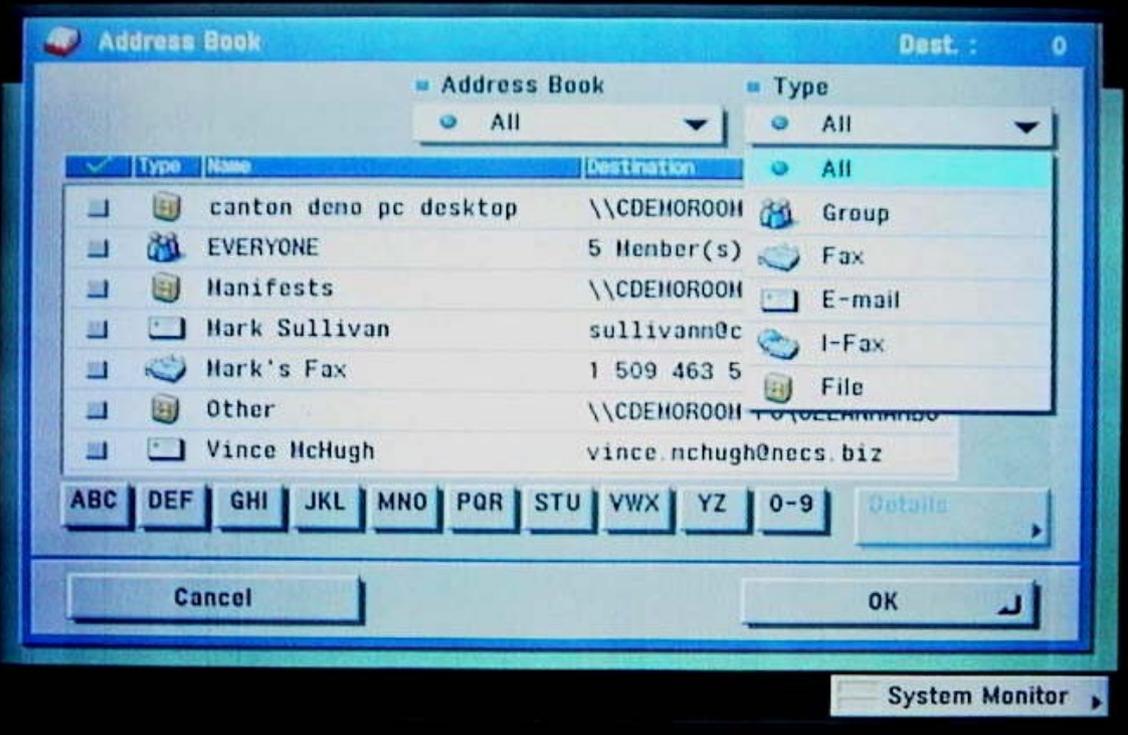
(NTWOBURN is one of our Linux \Samba servers)



You can type in an Email address "on the fly" with the virtual keyboard but..

The 10 built in address books makes it much easier !!!



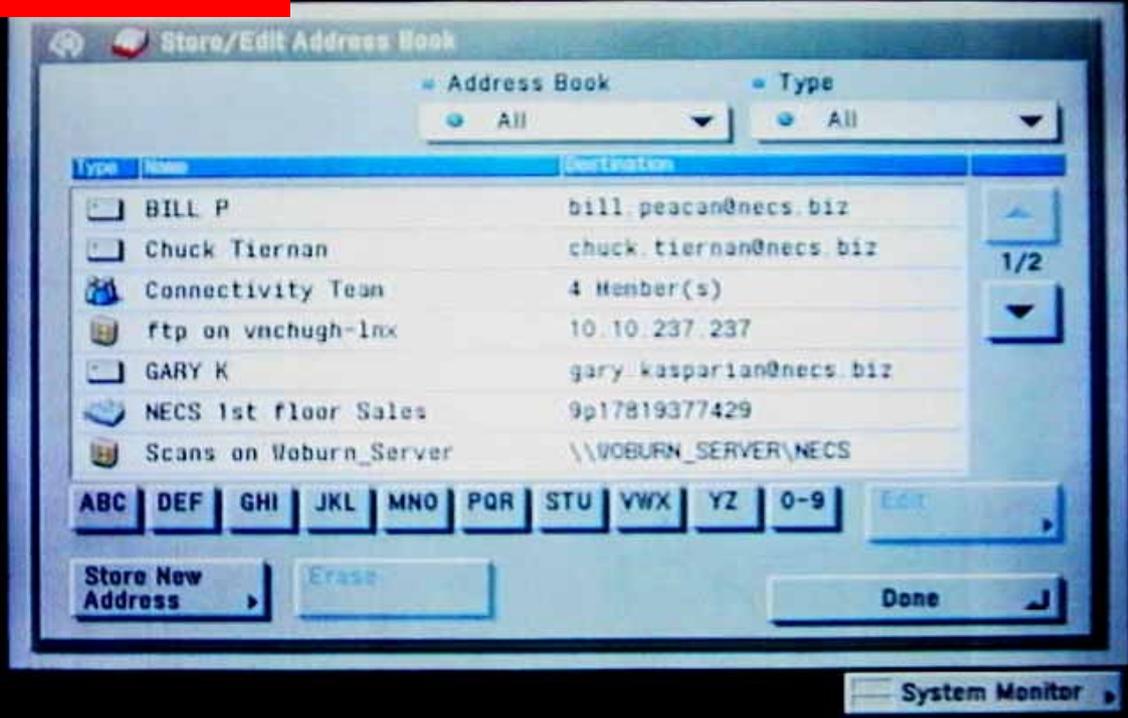


You can set up
10 different
 address books

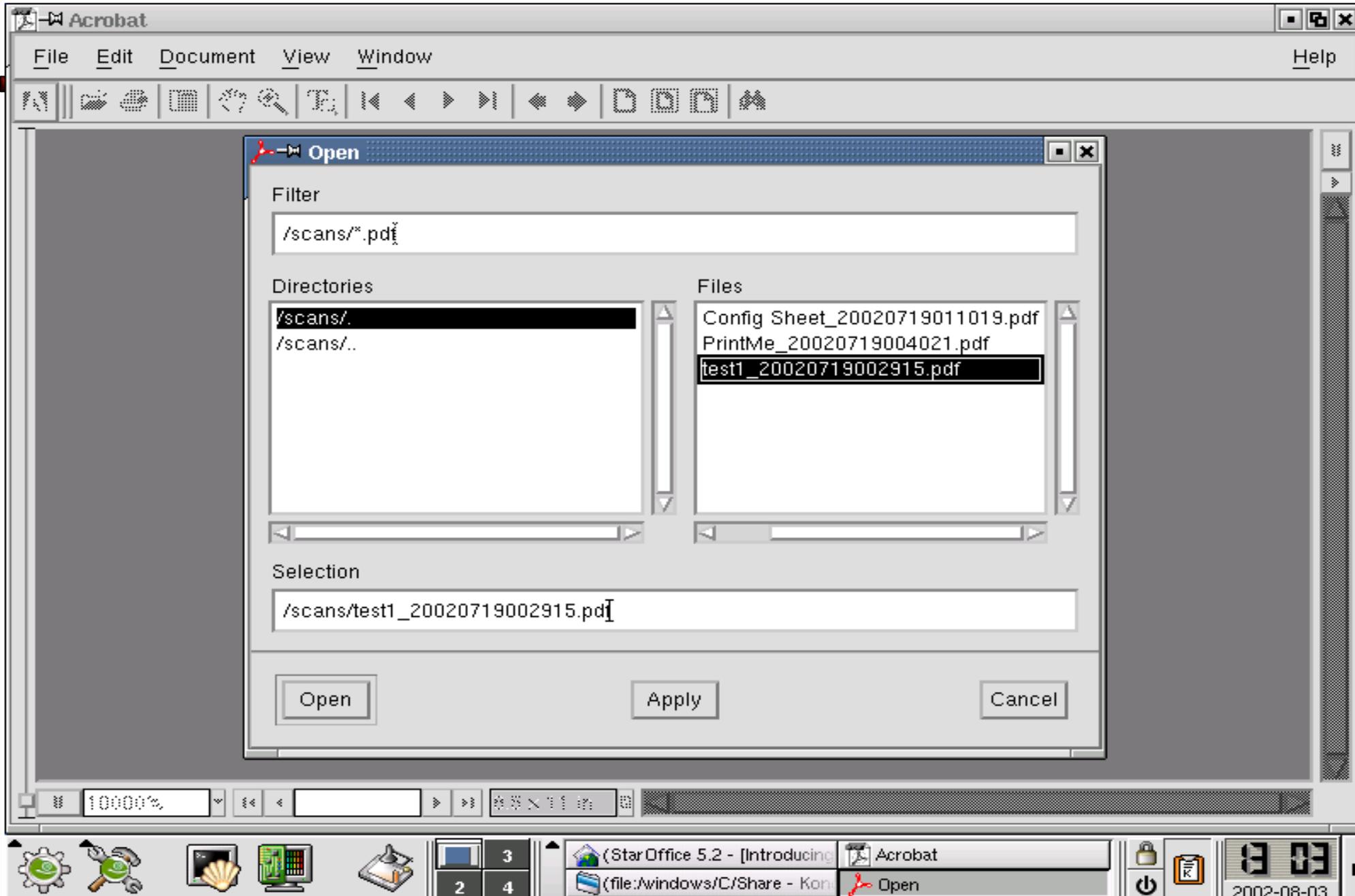
You can mix and match any
 of the address types in any
 address book.

Email, smb, ftp, fax, i-fax

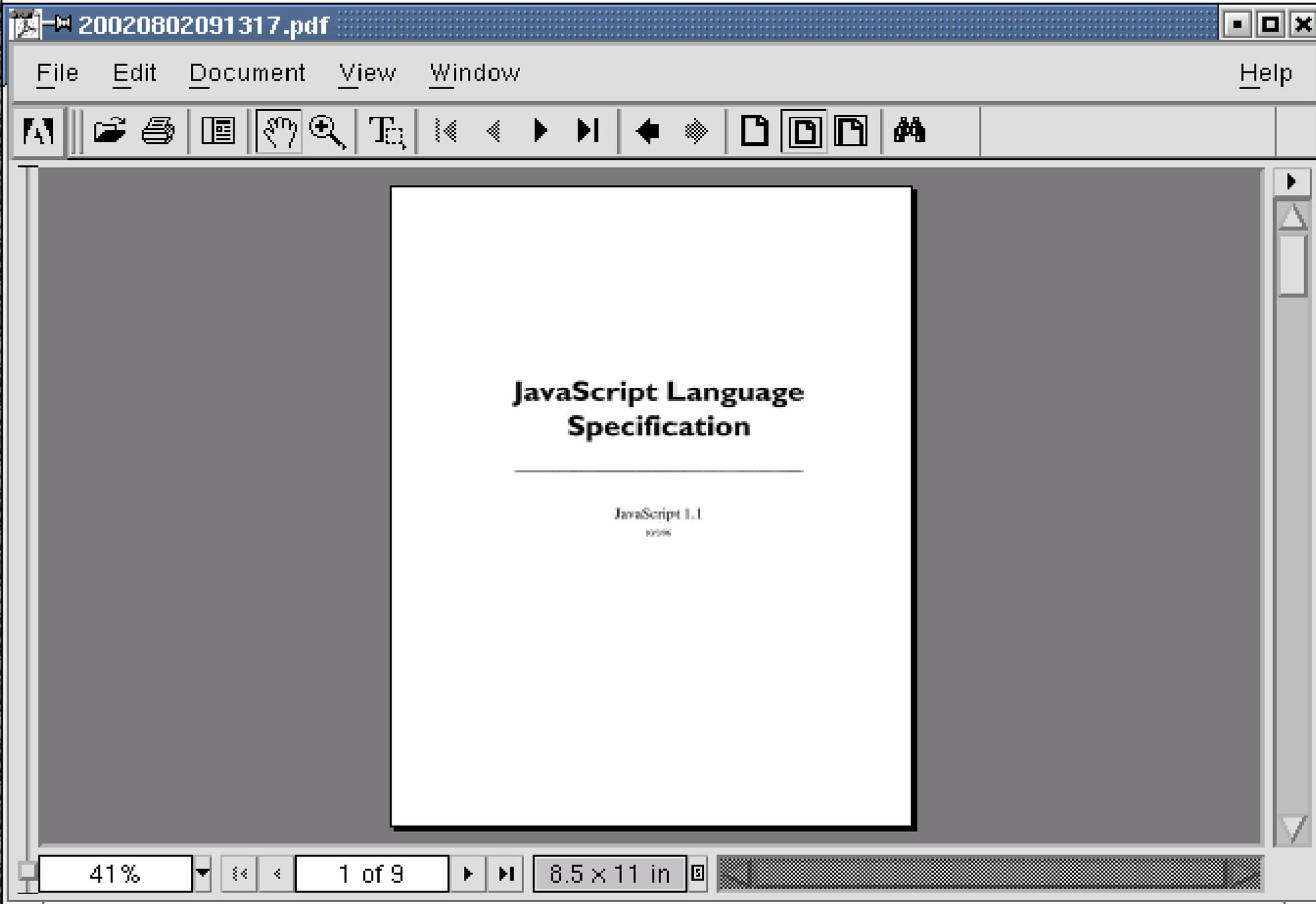
You can even mix address
 types in a single "Group" send



Once You've sent the file to your **Linux Work Station**, you can open it with Your favorite **PDF** or **TIFF Viewer**.



Acrobat Reader on my Linux Work Station



You can also use Your Linux Email to route your documents

The screenshot shows the Evolution 0.12 email client interface. The window title is "Inbox (47) - Evolution 0.12". The menu bar includes File, Edit, View, Actions, Tools, and Help. The toolbar contains icons for Send / Receive, Compose, Reply, Reply to All, Forward, and other email functions. The left sidebar shows shortcuts for Inbox, Calendar, Tasks, and Contacts. The main pane displays a list of emails in the "Inbox (47)" folder, with 47 new and 48 total emails. The selected email is from "scans@necs.biz" with the subject "Attached Image" and sent at 8:53 AM. The detailed view of the selected email shows the following headers:

From: scans@necs.biz
Reply-To: vince.mchugh@necs.biz
To: VINCE MCHUGH <vince.mchugh@necs.biz>
Subject: Attached Image
Date: 07 Aug 2002 08:53:07 -0400

Below the headers, there is a PDF document attachment (javascript_001.pdf).

Easy Email set up

E-mail/I-Fax

SMTP Receipt

On

Off

POP

On

Off

SMTP Server

10.10.25.11

E-mail
Address

scans@necs.biz

POP Server

necs.biz

POP Address

10.10.25.11

POP
Password

POP Interval

(0=off, 1-99)

10

min

sec

-

+

Cancel

OK

System Monitor

Wrap Up

With **CUPS** you get both **Ip** and **Ipr** with added **modern print features**.

And **Best of All** CUPS makes it **easy to manage**.

Scanning & Imaging are here to stay!!!

Choose companies that use standard (non proprietary) technologies, protocols, and file formats.

Then **you** can easily implement **Linux Scanning**.

Vince McHugh

I am currently The **Systems Support Manager** for the largest independent Canon dealer in New England.

I have been working with **Linux** for about **4 years**.

I am a member of the Greater New Hampshire Linux User Group (**GNHLUG**).

I also read the mailing lists for **blu.org** and **linuxprinting.org** (general and sometimes canon)

I also hold a **Novell CNE** and a Microsoft MCP.

I can be reached through the above mailing lists or if it's off topic **vince_mchugh@yahoo.com**