95 - Fax Server (Hylafax)

Beschreibung

Der Fax-Server HylaFax ermöglicht es, dass sowohl Linux- als auch Windows-Clients in einem Intranet auf einen zentralen Punkt zum Faxsenden, -empfangen und verwalten zugreifen können. Das schließt auch die Anzeige des augenblicklichen Sende- und Empfangsstatus ein.

Die meisten Verzeichnisse und Dateien des Hylafax-Servers befinden sich im Verzeichnis `/var/spool/fax`. Das umschließt die Konfigurationsdateien für den Server an sich, die Konfigurationsdateien für die Geräte (Modem), die log-Dateien, die Verzeichnisse für eein eingehendes und ausgehendes Fax und die FIFO-queue. Die Datei- und Verzeichnisrechte sind hier sehr sorgfältig zu setzen - es sollte hier in jedem Fall ein rigoroser Kurs gefahren werden! Das gilt besonders beim FIFO-file und beim Verzeichnis für den Faxausgang, wo jeweils das Sticky-Bit gesetzt ist.

Mit dem Kommando addfaxmodem kann eine beliebige Anzahl von Faxgeräten eingerichtet werden, solange die entsprechende Anzahl an seriellen Ports konfiguriert ist.

Der HylaFax-Server liest eine Modemkonfigurationsdatei jedesmal vor dem Senden eines Fax oder einem Reset neu ein. Das bedeutet, daß Sie den Server nur dann nach einer Änderung ausdrücklich neu starten müssen, wenn Sie ein Fax empfangen wollen.Sie können außerdem einen Neustart des Servers umgehen, in dem Sie über die Programme `cu` oder `tip` mit dem Modem kommunizieren, was den Server aus seinem „Schlaf" holt und zu einem selbsttätigen Reset veranlaßt, nach dem die Programme `cu` oder `tip` beendet worden sind.

TIFF/Class F sind die Formate, in denen HylaFax die eingehenden Faxe abspeichert. Es existiert eine Dokumentation im `faxrcvd`-Skript, die der Faxserver bei jedem eingehenden Fax einliest. Diese muß den lokalen Gegebenheiten angepaßt werden, um die Faxe ausdrucken zu können. Es soll zum Beispiel das Programm `fax2ps`, das zum Umfang von Hylafax gehört, in Verbindung mit ghostscript und dem Laserjet-Treiber benutzt werden:
`/usr/local/bin/fax2ps $1 | gs -q -sDEVICE=ljet3 -dNOPAUSE -sOutputFile=- | lp`. Ein weiteres nützliches Programm zum Drucken von TIFF-Dateien heißt `tiff2ps` und gehört zum TIFF-Software-Umfang.

Genutzte Ports : 4559(new) 4557(old). Es werden beide genutzt.

Sollte `/dev/modem` als Gerätedatei für das Modem genutzt werden, ist darauf zu achten, daß der Softlink `/dev/modem` auf den seriellen Port des Modems zeigt
        z.B.: `/dev/modem ---> /dev/ttyS0` und
die erzeugte Konfigurationsdatei des Modems (siehe weiter unten) den Namen: `/var/spool/fax/etc/config.modem` trägt

Installation und Konfiguration

Installation des Packets `hylafax` (SuSE: serie `n` package `hylafax`)
Stellen Sie sicher, dass das Modem eingeschaltet ist und dass eine Verbindung
zu einem der serielen Ports besteht:
(COM1=`/dev/ttyS0` , COM2=`/dev/ttyS1` etc)
Wenn Sie nicht wissen, an welchem seriellen Port das Modem angeschlossen
ist, können einen Test mit den Programmen `minicom` oder `cu` durchführen:
Minicom

`Ctrl-A O`	Kommando, um das Setup des seriellen Ports zu ändern.
`atz<Enter>`	Kommando, um zu testen, ob eine Verbindung zum Modem besteht es sollte mit OK antworten.
`Ctrl-A x`	Kommando zum Beenden von `minicom`
`cu`	
`cu -l ttyS0`	stellt die Verbindung zum seriellen Port des Modems her
`at+fclass=?`	Abfragen der Klasse des Modems (1.0, 2, 2.0)
`~.`	Trennen der Modemverbindung

Starten des Programms `faxsetup` als `root`. Die Warnung zu
`/usr/sbin/egetty` kann ersteinmal ignoriert werden.

Die weiteren folgenden Fragen sollten nach bestem Wissen beantwortet werden
- Erläuterungen hierzu stehen weiter unten. Können bestimmte Fragen nicht
beantwortet werden, einfach *<Enter>* drücken.

Wenn das Modem noch nicht konfiguriert worden ist, wird `faxsetup` jetzt
anbieten, das Programm `faxaddmodem` zu starten: Bestätigen Sie hier mit `yes`.

Das Programm wird versuchen, das Modem (Klasse) am seriellen Port zu
ermitteln.

Beantworten Sie die Frage nach der Konfiguration eines weiteren Modems
mit `no`.

Beantworten Sie die Frage nach dem Start des Programms `faxmodem` mit `no`,
wenn Sie nur einen "Fax-Send-Only-Server" betreiben möchten.

In der Datei `/etc/inittab` muß die folgende Zeile stehen:
`mo:35:respawn:/usr/lib/fax/faxgetty /dev/ttyS0` (oder `/dev/modem`)
(entweder ist das Kommentarzeichen zu entfernen oder die Zeile muß eingefügt
werden)

Um das Programm `faxgetty` richtig zu starten, muß der init-Prozeß seine
Konfigurationsdatei `/etc/inittab` neu einlesen:
```
    kill -HUP 1
```

Ob die Dämonen laufen, überprüfen Sie mit dem ps-Kommando:

```
    ps -ax |grep hfaxd
    ps -ax |grep faxq
    ps -ax |grep faxgetty
```

Der Faxserver-Status, mit `faxstat` abgefragt, muß wie folgt aussehen:

```
user@host.domäne:~# faxstat
HylaFAX scheduler on [host.linux.local]: Running
Modem ttyS0 (+49.30.1234567) : Running and Idle
```

Die Ausgaben über Domäne [host.linux.local], Device [ttyS0] und Fax-Nummer werden dem jeweiligen Server entprechend ausfallen.

Testen Sie nun Koniguration mit `sendfax` (ASCII-Programm)

Beispiel:
```
sendfax -n -m -h faxserver.com:4557 -d 5551212 -d 743892 /etc/passwd
```

Die Datei `/etc/passwd` wird ohne Deckblatt (`-n`) mit hoher Auflösung (`-m`) über *faxserver.com* (`-h faxserver`) an zwei Nummern (`-d 5551212 -d 743892`) über den Standardprt 4557 (`:4557`) gesendet.

oder mit `susefax` (Java-Programm).

Senden eines Faxes aus Star Office heraus:

1. Drucken Sie ein Dokument in eine Postscript-Datei (xxxx.ps) mit 72 dpi.
2. Zum Senden des Dokuments verwenden Sie `usesfax xxxx.ps` .

MS Windows®-Client-Programme: **Cypheus , WHFC**

Cypheus:
http://www.urania.com/cypheus/frm_down_e.htm
WHFC:
`ftp://ftp.transcom.de/pub/whfc/whfc-1.0.8_setup_en.exe` (english)
`ftp://ftp.transcom.de/pub/whfc/whfc-1.0.8_setup_de.exe`(deutsch)

Beispiel einer Konfiguration unter SuSE mit faxsetup

ausgehend von einem **Klasse 2.0-Modem** und einem Anschluß in Berlin mit der Ruf-nummer **7654321**

Erstellen der Konfigurationsdateien (Schedulerkonfiguration):

```
root:~# faxsetup
Should an entry be added to /etc/initd.conf [no]? <ENTER>
Country code [1]? 49                       (Landesvorwahl ohne führende "00")
Area Code [ ]? 30                          (Ortsvorwahl ohne führende "0")
Long distance dialing prefix [1]? 0        (Vorwahleränzung)
International dialing prefix [011]? 00      (Vorwahleränzung)
Dial string rules file (relative to
/var/spool/fax) ["etc/dialrules]? <ENTER>
Tracing during normal server operation [1]? 527
Default tracing during send and receive
sessions [0xffffffff]? 527
Continuation cover page (relative to
/var/spool/fax) []? etc/cover.templ
Timeout when converting PostScript
documents (secs) [180]? <ENTER>
Maximum number of concurent jobs to a destination [1]? <ENTER>
Define a group of modems []? any:.*
Time of restriction for outbound jobs ["Any"]? <ENTER>
Pathname of destination controls file (relative to
/var/spool/fax)[]? <ENTER>
Timeout before purging a stale UUCP lock file (secs) [30]? <ENTER>
Max number of pages to permit in an
outbound job [0xffffffff]? 30
Syslog facility name for serverTracing
messages [demon]? <ENTER>
```

Es wird nun eine Zusammenfassung der Eingabe ausgegeben.

Danach wird der Server konfiguriert. Faxsetup fragt nach der Einrichtung eines Modems. Dazu wird das Programm **faxaddmodem** aufgerufen. Bei der Frage nach dem seriellen Port des Modems, wird nur der Name der Gerätedatei angegeben - d. h. entweder **ttySx** oder **modem**.

Serverkonfiguration:

```
Country code [49]? <ENTER>
Area Code [30]? <ENTER>
Phonenumber of fax modem [+1.999.555.1212]? +49.30.7654321
Local identification string (for TSI/CIG) ["NothingSetup"]? "[Firma]/[Name]des Absenders"
Long distance dialing prefix [0]? <ENTER>
International dialing prefix [00]? <ENTER>
Dial string rules file (relative to
/var/spool/fax) ["etc/dialrules]? <ENTER>
Tracing during normal server operation [1]? 527
Tracing during send and receive sessions [0xffffffff]? 527
Protection mode for received facsimile [0600]? 0644
Protection mode for session logs [0600]? <ENTER>
Protection mode for modem [0600]? 0666
Rings before answering [1]? <ENTER>
Modem speaker volume [off]? <ENTER> (oder low)
Command line arguments to getty program ["-h %l dx_%s"]? "-r -b -s %s %l"
Pathname of TSI access control list file
(relative to var/spool/fax) [""]? <ENTER>
Pathname of Caller-ID access control list file
(relative to var/spool/fax) [""]? <ENTER>
Tag line font file (relative to
var/spool/fax) [etc/lutRS18.pcf]? <ENTER>
Tag line formating string
["From %%l|%c|Page %%p of %%t"] ? <ENTER>
Timeout before purging a stale UUCP lock file (secs) [30]? <ENTER>
Hold UUCP lockfile duing inbound data calls [YES]? <ENTER>
Hold UUCP lockfile duing inbound voice calls [YES]? <ENTER>
Percent good lines to accept during copy
quality checking [95]? <ENTER>
Max consecutive bad lines to accept during
copy quality checking [5]? <ENTER>
Maximum number of pages to accept in a received
facsimile [25]? <ENTER>        (je nach Papiervorrat...)
Syslog facility name for serverTracing
messages [demon]? <ENTER>
Set UID to 0 to manipulate CLOCAL [""]? <ENTER>
```

Hiernach erfolgt wieder eine Zusammenfassung der Eingaben.

Durch den Eintrag

```
GettyArgs:   "-r -b -s %s %l"
```

in der `/var/spool/fax/etc/config.ttyS0` (config.modem) ist faxgetty in der Lage, ein anderes getty zu starten, wenn es sich nicht um einen Faxanruf handelt sondern um einen Datenanruf. Dafür muß das Programm `mgetty` installiert sein und dessen Konfigurationsdatei `/etc/mgetty+sendfax/mgetty.conf` um den Eintrag

```
port modem (ttyS0)
     direct y
     toggle-dtr n
```

erweitert werden.

Weitere Einträge

In der `/etc/passwd` müssen folgende Einträge existireren:

```
uucp:*:10:14:Unix-to-Unix Copy system:/etc/uucp:/bin/bash
fax::33:14:fax user:/home/fax:/bin/bash
```

Die `/etc/services` muß die Einträge aufweisen:

```
hylafax4559/tcp #HylaFAX client-server protocol(new)
fax4557/tcp           #HylaFAX transmission service
snpp444/tcp           #Simple Network Paging Protocol
```

In der `/etc/alias` muß der Eintrag für den Faxmaster stehen

```
# alias for notification messages from HylaFAX servers
FaxMaster: root
```

Zugriffsrechte auf den Server

In der Datei `/var/spool/fax/etc/hosts.hfaxd` sind die Hosts oder User aufgelistet, die den Dienst benutzen dürfen. Nach der Installation sieht die Datei wie folgt aus:

```
localhost
127.0.0.1
```

Weitere Nutzer werden in der gleichen Weise eingetragen.

```
user.domain.xyz
IP-Adresse
```

Fax Dispatching (Fax als email-attachment weiterleiten)

Erzeugt man im Server-root-Verzeichnis (/var/spool/fax/) die Datei etc/FaxDispatch, so überprüft HylaFax den Inhalt der Datei nach entsprechenden Einträgen und leitet bei erfolgreicher Suche das eingegangene Fax als email-attachment weiter.

Syntax: [Fax-Nummer]   SENDTO=[mail]

Beispiel:

```
#!/bin/sh
case "$SENDER" in
*41*55*555*1212*)
            SENDTO=john@home.domain
            ;;
# sende alle faxe aus der schweiz zu john
*1*212*555*8649*)
            SENDTO=office
            ;;
# sende alle faxe aus NY zu den (localen) gruppemitgliedern office
esac
```

Anmerkung

Ein eintreffendes Fax hat das G3-Faxformat., was etwas irritierend ist, da die Dateiendung .tiff lautet. Um es anschauen zu können, wird entweder eine G3-fähige Ghostscriptversion benötigt oder man wandelt sie in das pbm-Format, um sie mit faxedit betrachten zu können. Das entprechende Programm heißt g32pbm.

HylaFax-Programme der SuSE-Distribution

hfaxd	HylaFax-Dämon
faxq	HylaFax-Warteschlangen-Dämon
faxgetty	HylaFax-'getty'-Programm (Kommunikation mit dem Modem) für eingehende/ausgehende Faxe über ttySx
faxmodem	HylaFax-Programm für 'Nur-Senden' Umgebungen (wird statt faxgetty installiert)
rchylafax	(SuSE)Link zum Start/Stop-Skript des HylaFax-Service
faxsetup	HylaFax-Konfigurationsskript
faxaddmodem	HylaFax-Konfigurationsskript für ein serielles Modem
sendfax oder faxsend	Hinzufügen von Faxaufträgen in die Warteschlange (Queue) zulässige Formate sind: ASCII, troff, PDF and Silicon Graphics image format
sendpage	Senden eines Faxes (submit a pager job for transmission)
faxcover	Generiert ein Postscript-Deckblatt für ein ausgehendes Fax
mkcover	Kommando zum Generieren eines Deckblatts
faxrcvd	Meldet eingegangene Faxe
faxrm	Löschen eines Faxes aus der Queue (Abbruch einer Faxübertragung)
faxabort	Kommando an faxgetty, die Übertragung eines eingehenden Faxes abzubrechen
faxalter	Ändert nachträglich Parameter von Faxaufträgen in der Queue
faxanswer	Kommando an faxgetty zu antworten
faxstate	Sendet an *faxq* den Modemstatus (ready, buzy or down).
faxstat	Bildschirmausgabe des Hylafax-Job-Status
faxqclean	Helfer-Programm zum "Aufräumen" der Fax-Spool-Umgebung
faxinfo	Kommando zur Ausgabe von Informationen über eingegangene Faxe
faxquit	Kommando zum nachdrücklichen (force) beenden des Faxservers
faxconfig	dynamisches Ändern der HylaFAX-Konfigurationsparameter

`xferfaxstats`	listet ausgegangene HylaFAX-Übertragungen auf	
`notify`	HylaFAX-user-notification-script	
`pollrcvd`	HylaFAX-Skript for delivering facsimile received by polling	
`recvstats`	listet eingegangene HylaFAX-Übertragungen auf	
`faxrcvd`	`faxd` Kommando zum Behandeln neuer eingegangener Faxe	
`mkcover`	`faxd` Kommando zum Generieren von Deckblättern	
`pollrcvd`	`faxd` Kommando zum Übergeben von Faxe die über `polling` getroffen sind	
`ps2fax`	`faxd-`Kommando zum Konvertieren von POSTSCRIPT in TIFF	
`pdf2fax`	`faxd-`Kommando zum Konvertieren von PDF in TIFF	
`pcl2fax`	`faxd-`Kommando zum Konvertieren von PCL in TIFF	
`tiff2fax`	`faxd-`Kommando zum Konvertieren von TIFF in FAX	
`faxmail`	'mail-to-fax'-Gateway-Programm	
`choptest`	HylaFAX page chopping test program	
`cqtest`	testet die Druckqualität	
`dialtest`	testet den dial string auf Richtigkeit der Syntax	
`faxadduser`	Hinzufügen eines neuen Fax-Nutzers	
`faxdeluser`	Löschen eines Fax-Nutzers	
`faxwatch`	zeigt low-level-Aktivitäten des HylaFAX-Servers an	
`probemodem`	Skript zum Testen des Modems	
`tagtest`	HylaFAX Tag-Line-Testprogram	
`tiffcheck`	überprüft TIFF für HylaFAX bei Umwandlungsanfragen	
`tsitest`	HylaFAX-TSI-access-control-list-checking-program	
`typetest`	Kompatibilitätstestskript für Fax-Eingangsdateien	
`FaxDispatch`	Versendet Fax nach email in Abhängigkeit eigener MSN oder Extention (ISDN)	

Der Inhalt des Verzeichnises `/var/spool/fax`

`etc/config`	HylaFax-Konfigurationsdatei
`FIFO.ttySx` oder `FIFO.modem`	`FIFO` für die Kommunikation mit einem `faxgetty-`Prozeß
`etc/config.ttySx` oder `etc/config.modem`	Konfigurationsdatei des seriellen Ports des Modems
`etc/config.sav`	Backup einer früheren config-Datei nach dem Aufruf von `faxsetup`
`etc/setup.modem`	Modem-Support-Funktionen (z.B. Seitenkopf)
`etc/setup.cache`	Server-Setupdatei von `faxsetup` erzeugt
`etc/hosts.hfaxd`	Liste der Hosts, die HylaFax nutzen dürfen
`etc/xferfaxlog`	Protokolldatei der gesendeten/empfangenen Faxe
`etc/hosts`	Liste der Hosts, die Faxe senden dürfen
`etc/cid`	caller id access control list
`etc/tsi`	fax machine receive access control list
`docq`	Vorbereitung ausgehender Faxjobs
`info/*`	Datenbank über die Fähigkeiten der Faxgeräte, mit denen HylaFax schon einmal kommuniziert hat
`client/*`	FIFO-Spezialdatei (von Clientprozessen erzeugt)
`config/*`	Konfiguration, Zugriffskontrolle und Benutzerverwaltung
`log/*`	Protokolldateien der Sende- und Empfangssitzungen
`recvq/`	"Ablage" der eingegangenen Faxe
`sendq/`	Warteschlange der Faxaufträge
`doneq/`	Hier werden Jobs zwischengelagert, die abgearbeitet jedoch weder gelöscht noch archivert worden sind
`status/*`	Informationsdateien über den momentanen Serverstatus
`tmp/*`	wie docq
`archive/*`	Tabelle mit archivierten Aufträgen, sofern der *job archival support* aktiviert worden ist

Hylafax installation/configuration
(By Rawn Shah)
`http://www.linuxworld.com/linuxworld/lw-1999-06/lw-06-hylafax.html`

The bounty of the Internet may be changing practically every type of business
 transaction, but for the moment faxing still rules the document-transmission arena. PDF
aside, faxing is the easiest way to send just about any material, from freestyle handwritten
notes to printed and illustrated data sheets. As a result, practically every business, large or
small, has a fax machine.

You would think by now there would be an integrated end-to-end digital document-
transmission solution to fully unites scan and print technology with e-mail. This isn't yet the
case. Unfortunately, if you want to use a computer to send faxes, you must still work with the
analog fax system, instead of around it. In such a scenario (called network faxing), you send
off a document directly from your computer to a fax server. The fax server then collects the
document, formats it, and dials out to a remote fax number for transmission. Fax servers can
also receive documents, attaching incoming faxes to e-mail messages and directing them to
appropriate mailboxes.

Linux users aren't without network faxing capability. There's at least one good freeware
package -- HylaFAX -- that suits the needs of not just Linux users, but Mac, Windows and
Unix users as well. Given both its complexity and its support for multiple platforms, HylaFAX
is a veritable poster child for open source development. Not only does it run on more Unix
platforms than many commercial products, but it also continues to improve, thanks to the
many contributions from the open source community over the years. Here, we'll take a look
at setting up HylaFAX, including ways to link this network-fax system to mail and Web
servers.

How HylaFAX works
HylaFAX is a client/server system; the HylaFAX client generates a document that the server
can transmit over the telephone. In short, the client -- which is available for Linux, Windows,
Mac, and a number of different Unix systems -- converts the user's document into a
PostScript file. It then contacts the fax server and sends the document, along with control
information about where to send it. The fax server receives the document over the network
and processes it to be delivered to any number of attached fax modems.
We tested HylaFAX version 4.0, patch level 1, on Red Hat 5.2 and 6.0, and the Windows
HylaFAX (WH) client. (Of course, the Linux client can run either on the server or from a
remote Linux machine.) The HylaFAX server includes three main components -- the `faxq`
scheduler process, the `hfaxd` network server process, and the `faxgetty` incoming-fax
terminal process, along with several support scripts. `faxq` and `hfaxd` are for setting up the
system and sending outgoing faxes. `faxgetty` and `hfaxd` are required for receiving
incoming faxes.

Here's how HylaFAX receives faxes:
When a fax comes in over the line, `faxgetty` picks up the connection, receives the
document, places it in the incoming queue, and calls the `faxrcvd` script. `faxrcvd`
determines how to either alert users that a fax has arrived or, if the document should be
printed instead, determines how to print it. In addition, the `faxqclean` helper application
keeps the fax spool area clear, and `faxcron` tracks log files and activity in the spool area.
The WH client is implemented as a simple fax/print device recognized by Windows as a
printer on the client machine. When you need to fax a document, you simply send a print job,
through your application's print dialog, to the appropriate "fax printer." A follow-up dialog box
then asks you where to send the document and what information to put on its cover. The
client converts the document into the PostScript format understood by fax servers, contacts
`hfaxd` running on your designated fax server, and sends the document along for `hfaxd` to

process.

HylaFAX's communication protocol is actually an extension of FTP. So, although the package adds additional commands particular to the faxing environment, its command set and communication methods will be familiar to anyone who uses that tried-and-tested protocol.

Putting it on

HylaFAX is available in both source code and binary packages (see Resources). We opted to download the server RPM (Red Hat package module) rather than compile a new one. We also downloaded the WH client for Windows 95 and Windows NT systems from the contrib directory. It's worth noting that HylaFAX is supported on practically every major Unix platform, including AIX, Solaris, IRIX, HP-UX, Compaq/Digital Unix/Ultrix, and SCO. And the HylaFAX site does have a tar file containing the binaries for Linux systems other than Red Hat; unfortunately, it lacks a good installation script.

At the download site, you'll find a list of all fax modems that have been tested with HylaFAX. Check it out before installing in order to confirm that you have a tested fax modem on your server. And remember, fax modems and data modems are not the same; for that matter, not all fax modems are equal. Many data modems do have fax capabilities, but check against the tested list in any case. Also, stay away from internal WinModems. This type of modem, which uses software drivers for analog-to-digital conversion, works only on Windows platforms. Double-check your modem's packaging to make sure it doesn't include the words WinModem or made for Windows. (For more information on WinWare, check out Rick Cook's Linux 101 column in the May issue of LinuxWorld.)

If your modem isn't on the tested list, but you want to use it anyway, try sending it the following test command using a terminal program like `kermit`, `minicom`, or `cu`: (responses from the modem are underlined)

```
# cu -l ttyp1
Connected
at+fclass=?
0,1,2,2.0
OK
~.
Disconnected
#
```

The `fclass` command queries the modem to see which class of fax services it can support. Class 0 is for nonfax data communications. Classes 1, 2, and 2.0 are for fax services. HylaFAX works with any of the latter three. While class 1 fax modems are supported, it's recommended that you use the newer class 2 or class 2.0 modems. Although the different classes aren't supersets of each other, every class 2 modem does also support class 1 communications. For our testing, we used a Creative Labs Modem Blaster external modem supporting classes 1 and 2, connected to `COM1` or `/dev/ttyS0`. (Note that the Digicom DE-5620 is comparable to the Modem Blaster.) If you're unsure about how to connect your modem to the system, you may want to review the Linux Documentation Project's modem how-to document. (See Resources.)

Virtually all fax machines (i.e., group 3 fax machines) use the TIFF document format, so TIFF conversion capabilities must be installed on your server. TIFF support is normally a part of the Linux installation, but to make sure you've got it, check for `libtiff`, (`ls /usr/lib/libtiff.so*/ usr/lib/libtiff.a`). If you need to, you can download the library from your Linux-release vendor. In addition, make sure you have the `ghostscript` installed on your system to perform conversion between PostScript and TIFF.

Setting it up

Once you've compiled and installed the software and connected your modem, you're ready to set up the fax service by running the command `/usr/sbin/faxsetup`. `faxsetup` checks that your installation went properly, verifying pathnames and file locations. It also verifies that `/etc/services` (the network-protocol service mapper) includes a protocol entry for HylaFAX. Furthermore, it sets up an e-mail alias for FaxMaster (the default recipient is root) and adds entries to inetd.conf so that the hfaxd server and faxq daemons are started on boot.

Most of the files for fax service are located under the directory `/var/spool/fax`, including service configuration files, device configuration files, faxes that are to be sent and that have been received, log files, and the FIFO queue for the fax device. The file and directory permissions in this area are set purposefully, so don't try to close them off for privacy's sake -- especially the FIFO file and the outgoing directory, which has the sticky-bit set.

If you use the `cron` daemon to run the logrotate tool to trim the log files generated by your Web, FTP or other servers, make sure that the entry in `/etc/logrotate.d/hylafax` points to the proper log file. By default, `logrotate` looks for the file `xferlog`, while HylaFAX uses the name `xferfaxlog` (in `/var/spool/fax/etc`). This small error caused unnecessary cron job failures and e-mail warnings during our own testing. Simply edit the filename entry in `/etc/logrotate.d/hylafax` to reflect the correct name (`xferfaxlog`).

Once the general fax system has been installed, you'll need to use the command `/usr/sbin/faxaddmodem` to add modem services. This interactive script collects information about your fax service, such as area code, fax number, header and page-numbering format, number of rings to wait for before answering, and which fax cover to use. The script is fairly straightforward, but if you want a detailed explanation of how it works and what it does, you can read the setup documentation on the HylaFAX site. Note that you can add any number of fax modems using the `faxaddmodem` command, as long as your system is configured with the appropriate number of serial ports.

If you plan to use your fax modem as a permanent incoming/outgoing fax service, you need to run the `faxgetty` process on the serial port. To have `faxgetty` launched and maintained through the system `init` process, you'll want to define an entry for it in `/etc/inittab`. Adding the following entry to `/etc/inittab` turns your specified serial/modem port into a permanent incoming/outgoing fax service:

Run faxgetty on COM port 1 (serial port ttyS0)
```
        t0:23:respawn:/usr/sbin/faxgetty ttyS0
```

Running `faxgetty` as respawn through init ensures that the process is always running, even if it is accidentally killed. Keep in mind that you won't be able to run other modem-based services such as PPP over the specified COM port if you use `respawn`, since the port will no longer be free for access. If you're unsure, either leave this line out of `inittab` or replace `respawn` with once to launch `faxgetty` only once after boot; then, if you kill the process, you can simply start it again when you need it with `/usr/sbin/faxgetty ttyS0`.

If you also want to have HylaFAX started by the inet daemon, add the following line to `/etc/inetd.conf`:
Start HylaFAX Network Fax Server

```
hylafax    stream    tcp nowait    fax /usr/sbin/hfaxd hfaxd -l
```
Finally, for rudimentary security, you should update the `/var/spool/fax/etc/hosts` file with either the IP addresses or hostnames of the client systems that will be allowed to

access the fax server. This is, unfortunately, the only protection mechanism you have, since HylaFAX doesn't support proper password protection on a per-user basis. Also unfortunately, HylaFAX doesn't yet support individual user mailboxes. Routing is a general shortcoming of most fax systems today, and the International Telecommunications Union's standard for fax routing is still very new. HylaFAX, by default, simply prints out faxes to the destination server's default printer. You can, however, configure fax routing to users if the sender's fax number is well-known. In other words, if you receive faxes regularly from a particular fax number, you can route them to a specific location. This is explained more fully in the section below on advanced configuration.

Installing and configuring the Windows HylaFAX client
The Windows HylaFAX client is designed to work as a network fax client service for Windows 9x and NT systems, communicating with hfaxd on a fax server to send faxes as needed. (The download page for WH can be reached through the HylaFAX page; see Resources.) WH doesn't work with Windows 3.x clients at all, although an application called Winflex (also available through the HylaFAX site) supports the older Windows platform. Before you begin your installation, make sure that you have Windows Sockets version 2 (Winsock2) installed on your machine. If you have Window 98 or Windows NT, you're already set, but Windows 95 users will need to download an upgrade patch from Microsoft. If you try to install WH without it, your system will simply barf and indicate that you need Winsock2 first. Winsock2 is fully backwards compatible with Winsock1.1 (the existing version on most Windows 95 systems), so you needn't worry that it will drastically affect your other network applications.

After installing WH, your next step is to configure a new printer device. From Explorer, click on the Printers folder and choose the "Add a New Printer" wizard. Choose "Local Printer," and type "Apple LaserWriter" as your printer (even though it really isn't). This selects an appropriate PostScript-capable printer device. In the Ports dialog box, select the WHFCFAX: port and click "Configure Port." Then specify the local spool directory for fax documents. The default, \Windows\Temp, is fine for most, although you can create a subdirectory \Windows\Temp\FaxSpool if you want to separate your spooled documents from the other files in the system temporary directory. Click "Open" for the default spool file listed as def.spl. Your new fax printer device is now ready to go.

Next, you'll tell WH where your fax server is located and which Linux user account to use to log on to the fax service. Start the WH application and get to the system settings dialog box via the Fax menu. All you should need to do now is add in the fax-server host name; everything else there should be correct. Move onto the User Settings dialog box and enter the requested user, company, and document-format information. The entry for "Login" should be your user name on the Linux fax server and "E-mail" should point to your e-mail address if you wish to receive notification whenever a fax has been scheduled for delivery at the server.

You may notice that, once again, the fax service doesn't seem to be password-protected. Unfortunately, this is a shortcoming of HylaFAX that still needs to be addressed. As mentioned earlier, only the client hostname listing on the server (in /var/spool/fax/ etc/hosts) limits access to the fax services. The name you supply under the "Login" entry does not. In fact, your login entry can be anything, even a closed account; it is only used in logs to show who's sent or accessed a document.

You should now be set up to send faxes from your Windows machine. When you wish to send a document via network fax, just specify in the Print dialog the fax printer that you set up earlier. A dialog box will prompt you for recipient information each time you "faxprint." WH includes a phonebook system for maintaining name and fax number information. The phonebook can work either from text files (called PHB files) or through a Windows ODBC

database link to Excel, Access, SQL Server, Fox Pro, Filemaker or any ODBC-compliant database system on your Windows machine. To define a phonebook, specify a name and format (PHB or an ODBC link) in "Define Phonebooks" under the Fax menu. After that, you can add or delete recipient names using "Open the Phonebook" (also under the Fax menu). Each entry is saved to its appropriate phonebook database; you make reference to it for future outgoing faxes by simply referring to the name of the intended recipient.

Using fax services from Linux
Under Linux, the HylaFAX fax service (which by default accepts any text or PostScript file) is available to all users on the fax server.

To send a fax, simply execute the command `sendfax`, directing your file to the appropriate phone number. For example:

```
sendfax -d 5551234 myfile.txt sendfax -d 14155559182 document.ps
```

If you're on a different Linux system on the network, you need to have `sendfax` installed in `/usr/bin`. Then, define your server with the environment variable `FAXSERVER` or type either of the following full commands on the command line:

```
sendfax -h faxserver -d 5551234 myfile
sendfax -h ttyS0@faxserver:4559 -d 5551234 myfile
```

The first command simply directs the target file to the hostname faxserver (where HylaFAX should be running).
The second command gets more specific, indicating not only the hostname, but also which modem to use and on which port HylaFAX is running (the default port is 4559).

You can also schedule the fax to be delivered at a certain time as follows:

```
sendfax -a "now + 45 minutes" -d 5551203 newfile
sendfax -a "1999.06.08:10:00" -d 5551239 happybirthday.txt
```

The program uses the same format as `at`, and in truth simply schedules `sendfax` to be executed by cron.

The first example above indicates that the fax should be sent 45 minutes from command execution. The second indicates that the fax should send out a birthday wish on June 8, 1999, at 10 a.m. Check out the man page on `sendfax` for more information on sending documents by fax.

HylaFAX is preconfigured to e-mail `sendfax` users when their fax has been sent out, providing a report on whether the fax succeeded, how long it took, and other session particulars. If you decide to cancel a fax job, first check which jobs are queued, using `faxstat`, and then delete your job with `faxrm` [job id].

Advanced configuration

HylaFAX supports special configuration options to control use of the fax server. Some of the more common advanced configurations are discussed here.

Routing by number
To set up fax routing according to the fax sender's number, you can create a file called `/var/spool/fax/etc/FaxDispatch` and add in the following lines:

```
-----------------------------------------------------
#!/bin/sh
case "$SENDER" in
*1*415*555*1212*)
            SENDTO=johndoe@home.domain
            ;;
# send all faxes from SF office to John
*1*212*555*8649*)
            SENDTO=office
            ;;
# send all faxes from NY office to the general office staff
*1*520*555*1938*)
            $TIFFBIN/fax2ps $FILE | lpr -P bob
            # print out any faxes from Tucson
            # office on network printer 'bob'
            ;;
            *)
            SENDTO=FaxMaster
            ;;
esac
-------------------------------------------------------
```

Limiting service
To help reduce phone costs, you can set limits on the hours during which users can send outbound faxes. Add the configuration parameter TimeOfDay to `/usr/share/hfaxd.conf` to specify these limits, which can be presented in multiple formats. The most basic format is a 24-hour clock representation showing start and end times:
```
# Receive any faxes between 8am and 6pm on any day TimeOfDay:
"0800-1800"
# Receive any faxes between noon and 3pm on weekdays and 8am and
midnight on Saturdays TimeOfDay:
"Wk1200-1500,Sat0800-0000"
```

What's more, you can define specific allowable time limits for given numbers or area codes. If you expect that a lot of fax traffic will be going to a certain area code (including international codes), you can define a set of rules governing when users can send outgoing faxes to that destination. First edit the file `/var/spool/fax/etc/config`, adding the line DestControls: `etc/destinations`
Then create a new file called `/var/spool/fax/etc/destinations` and add lines such as the following:
```
^[+]911$  RejectNotice = "You cannot place fax calls to 911"
^[+]011.* TimeOfDay = "1400-2300"
^[+]1415.*  TimeOfDay = "1000-1800" .*
TimeOfDay = "Any"
```

The syntax is exactly like that of the default `TimeOfDay` parameter, except that it also includes a regular expression matching the fax-number sequence.
(The system uses regular expressions to match numbers; for more information on this, see the man page on grep).
The first entry above rejects any calls on the specified number (in this case, 911). The second limits international faxes, (denoted in the US by the 011 international direct dial prefix), to times between 2 p.m. and 11 p.m., local time. The third entry limits calls to the 415

area code (San Francisco) to between 10 a.m. and 6 p.m. local time. Finally, the last example indicates that all other calls may be sent at any time of the day.

Distinctive ringing

HylaFAX can also use distinctive ringing, a special service provided by most phone companies that maps multiple phone numbers to the same phone line. With distinctive ringing set up, multiple telephone devices ring with different tones, distinguishing which line is ringing, and thus allowing devices such a faxes or modems to know when to pick up and when to ignore.

Especially helpful for small home offices, distinctive ringing saves on costs, since you pay only for one phone line and a small additional cost for the service. Check your modem's manual to see if it supports distinctive ringing. Settings are as follows:

```
RingVoice:      RING1 RingFax:  RING2 RingData: RING3
```

Adaptive answer

An alternative to distinctive ringing is the adaptive answer system available on some modems. Enabled modems pick up the line and listen for tones to determine if incoming calls are intended for fax or data services. Adaptive answer isn't 100 percent effective and may take a few seconds to pick up correctly. It doesn't require any special service to be provided by the phone company, but it does assume that either a fax or data line will be connected to the modem.

Here's how to enable it:

```
ModemSetupAACmd:      AT+FAA=1            # Setup modem for adaptive answer
AdaptiveAnswer:       yes                # use adaptive answer with faxgetty
AnswerRotary:         "fax data"         # try for fax first, then data calls
ModemAnswerCmd:       AT+FCLASS=1;A      # answer first as a fax service
ModemAnswerDataCmd:   ATH+FCLASS=0;A     # hang up then answer as data
Class1RecvIdentTimer: 5000               # time fax if no answer in 5 seconds
```

Also check out the advanced configuration documentation and FAQ at the HylaFAX Web site.

Fax to mail and Web gateways

You can set up e-mail aliases to send any incoming e-mail directly to a fax number by adding a simple entry to the `/etc/aliases` file, recreating the alias database, and restarting the `sendmail` daemon. For example:

```
# Fax any e-mail to the Life Sciences building on Campus faxoflife:
"|/usr/sbin/sendfax -d 5551212"
```

```
# Strip out spam mail with procmail before sending any faxes (make sure procmail is
properly installed) my homefax:
"|procmail |/usr/sbin/sendfax -d 5551234"
```

You'll have to recreate the mail alias database with the newaliases command and then restart the `sendmail` daemon i.e., kill the existing `sendmail` process, then restart it with:
`/usr/sbin/sendmail -q1h -bd`

Now you're just a step away from creating Web forms that perform any processing you like before sending input data to a fax machine. Just create a CGI script invoking the mail program to send information directly to a predefined e-mail/fax alias. The Web client sends data to the Web server, which sends it to the mail server, which in turn sends it to the fax server, which finally sends it off to a fax machine somewhere. It's a little roundabout, but it works very well. You could bypass the mail-to-fax-server step by directly calling the sendfax program in your script, but using the mail server helps create a phonebook entry that'll save you the trouble of managing fax numbers and other information. You could use an alternate

means, such as an LDAP directory server, to store your client fax numbers. Using a script created with a module such as PerLDAP, you could retrieve your data through the LDAP directory server rather than the more primitive e-mail alias system.

Network faxing plus

HylaFAX's client/server-based protocol allows you to set up remote fax services. Essentially, you can set up a fax server in, say, San Jose, and access it from clients in Tucson, Tacoma, or Tallahassee to send out local faxes within Silicon Valley. That uses the Internet to do most of the delivery, placing local calls only within the San Jose area, and thus (probably) reducing your overall cost of faxing. This becomes a real money- saver, particularly for international faxing, if you pay a flat-rate for your Internet service.

HylaFAX also supports **paging protocols**, allowing users to send alphanumeric messages to pagers, using the common IXO pager protocol. Such an e-mail-to-pager gateway is, like the e-mail-to-fax gateway we've discussed, relatively easy to set up. If you're interested, you should definitely read through the HylaFAX documentation.

About the author

Rawn Shah is an independent consultant in Tucson, AZ. He has worked with and written on multiplatform issues for years and is constantly surprised at how few people know about useful system tools. He can be reached at rawn.shah@linuxworld.com.

Resources

HylaFAX -- available in both source code and binary packages:
`ftp://ftp.HylaFAX.org/ pub/hylafax`

The Linux Documentation Project's modem how-to page:
`http://metalab.unc.edu/mdw/linux.html`

The main site for HylaFAX -- from here you can follow links to download the server software, along with setup instructions:
`http://www.HylaFAX.org/`

The Frequently Asked Questions list for HylaFAX:
`http://www.HylaFAX.org/HylaFAQ/index.html`

Modems tested with HylaFAX:
`http://www.HylaFAX.org/modems.html`

Links to all the various clients created for HylaFAX:
`http://www.HylaFAX.org/links.html`

The IETF's Internet Fax Working Group:
`http://www.imc.org/ietf-fax/`

Network Working Group, "RFC 2542: Terminology and Goals for Internet Fax" (IETF, April 1999):
`http://www.imc.org/rfc2542`

Network Working Group, "RFC 2301: File Format for Internet Fax," (IETF, March 1998):
`http://www.imc.org/rfc2301`

Network Working Group, "RFC 2303: Minimal PSTN address format in Internet Mail," (IETF, March 1998):
`http://www.imc.org/rfc2303`

Network Working Group, "RFC 2304: Minimal FAX address format in Internet Mail," (IETF, March 1998):
`http://www.imc.org/rfc2304`