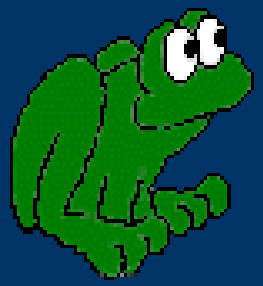
# HylaFAX



*Hyla* - Any of a genus of frogs, especially the tree frog.

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# What is HylaFAX

HylaFAX is the premiere open source (GPL'd) fax management systems.

HylaFAX was originally developed by Sam Leffler a developer at SGI. HylaFAX (originally FlexFAX) is not and was never an SGI product, however, the name HylaFAX is trademaked by SGI.

From the HylaFAX FAQ:
>Can I run HylaFax on my NT 4.0 Server?
NO. (NT is not the answer, it's the question and the answer is NO :-))

Platforms supported:

- AIX v3.x, v4.x, v5.x
- BSD/386 & FreeBSD
- HP-UX 9.x, 10.x
- IRIX,
- ISC4.0,
- Linux 2.2.x & 2,4.x
- OSF/1 V1.3 & V3.0,
- SCO
  - 3.2v4 with TCP/IP
  - SCO ODT 3
  - SCO 5.0
- Solaris 2.x & SunOS 4.1.x,
- SVR4.x
  - Intel x86 and MIPS
  - UnixWare, Onsite, SINIX, ...
  - Ultrix 4.4.

# Features

- Facsimile transmission
  - Automatic document type conversion
  - Scheduled transmission
  - Facsimile to electronic mail gateway
  - Automatic cover page generation
  - Sent documents can be any size
- Facsimile recieving
  - Scripted document management
  - Polling for remote documents
- Send pager messages
- Rule based call control
  - Block calls to 911, etc...
- Extensive logging

Client applications communicate with the server via a simple FTP like protocol, and you can actually control the server using any telnet client (not that would actually ever want to do that). The HylaFAX server listens on TCP port 4559.

# Prerequisites

- Ghostscript, the most recent version possible.
  - Ghostscript is used to convert documents (usually postscript) to the TIFF G3 format used by fax machines as well as converting recieved faxes to postscript or possibly PDF format.
- To build you should use gcc 2.6.3 or greater with libg++ 2.6.2 or greater.
  - RedHat 8.0 ships with gcc 3.2.7 and libg++ 2.7.2.8
- Working serial connectivity between the host and the modem.

Make sure your modem is available before attempting to configure HylaFAX. Use a program like minicom to verify communications with the modem and the presence of dial tone.

# Modems

# Modem Classes

Modems with fax capability support a specific “class” or version of the standard fax command set and operational standard.

Class 1 modems may only support software flowcontrol when in fax mode.

- Class 1
  - These tend to be very compatible but require very low latency as the protocol is timing sensitive. Latency, such as caused high system load or a busy IDE device will cause communication failures.
- Class 2
  - These are the most common type of fax modem available, but “2” represents a standard implemented before final adoption so compatibility varies. Class 2 modems also vary greatly in quality.
- Class 2.0
  - This indicates the latest ratified standard, they are less common than “2” modem but usually offer fewer compatibility problems.

# Modem Recomendations

Many modems available are simply manufactured from off the shelf parts. Hylafax can usually probe for and support modems based on the following “chipsets”:

- Rockwell
  - RC96AC
  - RC144AC
  - RC144DP
  - RC32ACL
  - RC224A
  - RC288DPI
- Exar
- Cirrus Logic

The fax software community tends to be very fond of Multitech modems.
http://www.multitech.com/

Modems are one device where you typically get what you pay for, buy nothing that costs less than $50.00

The Hylafax documentation contains a list of recommended modems:

- Class 1
  - Digicom Scout+
- Class 2
  - AT&T Paradyne DataPort 14.4
  - Telebit T3000 WorldBlazer (Class 2)
  - Multitech
    - MT1432BA, MT1432BA/A, MT1432MK, MT1432PCS, MT1432BG, MT1932ZDX, MT2834ZDX
- Class 2.0
  - Mutlitech MT5600ZDX (Class 2.0)
  - Zylex U1496, U1496e+

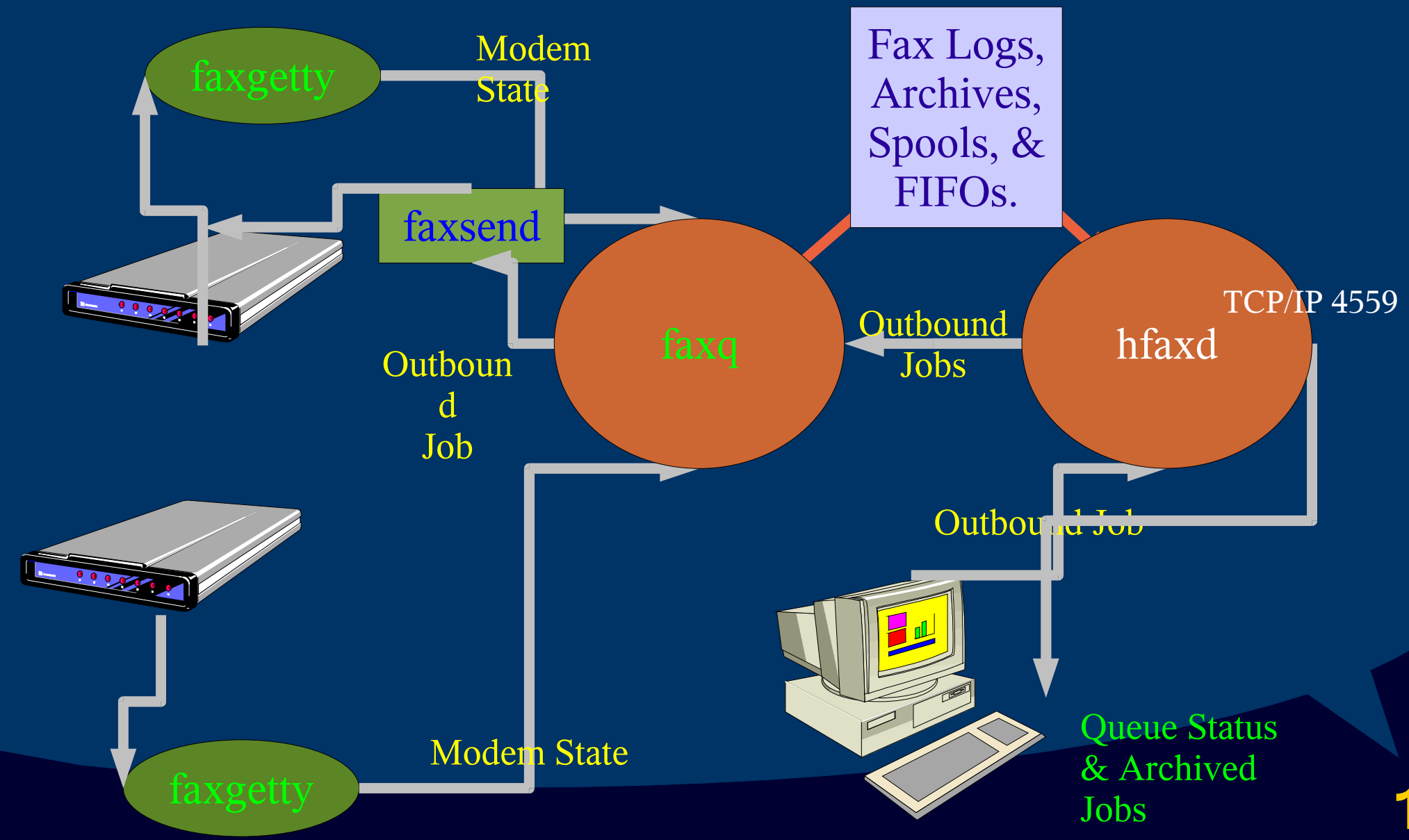
# Architecture

# Components

- Clients
  - sendfax - Local job submission.
  - faxstat - Display the status of the server.
  - faxrm - Cancel a pending transmission.
- The server
  - hfaxd - Job and status management
    - Single process, runs constantly
  - faxgetty - Manages fax devices.
    - One process per device, spawned by initd.
  - faxq - Job schedular
    - Single process, runs constantly.
    - faxsend & pagesend - Handle outbound jobs.
- Maintenance
  - faxqclean - Spool are cleaner
    - Controlled via crond

HylaFAX has many parts. Troubleshooting and managing a server requires understanding which parts are responsible for each task.

# Processes

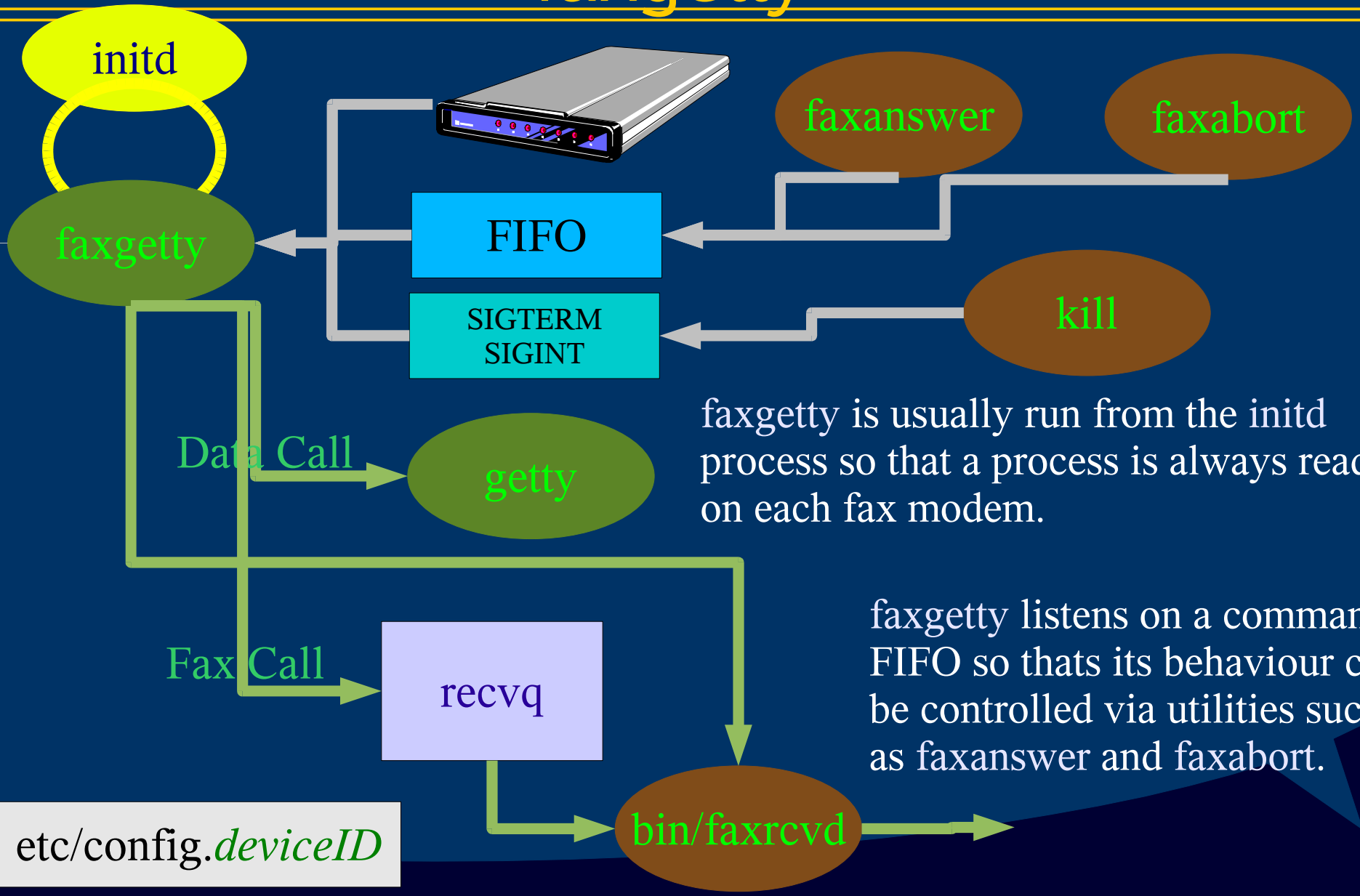

faxgetty
Modem State
Fax Logs, Archives, Spools, & FIFOs.
faxsend
faxq
hfaxd
TCP/IP 4559
Outbound Jobs
Outboun d Job
Outbound Job
faxgetty
Modem State
Queue Status & Archived Jobs

# Directories

- /var/spool/hylafax
  - archive - Old documents and logs, see the bin/archive script.
  - bin - HylaFAX script files; faxrecvd, mkcover, ps2fax, etc...
  - client - FIFO files used by faxd live here.
  - config -Modem specific files for modem type recognition, etc...
  - dev - ?
  - docq - Jobs scheduled for transmission.
  - doneq - Descriptions of transmitted jobs.
  - etc - HylaFAX configureation files: hosts.hfaxd, dialrules, etc...
  - info - Cache of information about fax devices HylaFAX has communicated with.
  - log - Hmm, log files perhaps?
  - pollq - Documents available to remote fax services/devices via polling.
  - recvq - Documents recieved by Hylafax, each is a Class F TIFF file.
  - sendq - Description files corresponding to jobs in docq.
  - status - Text status files maintained by the various daemons.
  - tmp - Scratch directory for the daemon processes.

# Receiving

# faxgetty




faxgetty is usually run from the initd process so that a process is always ready on each fax modem.

faxgetty listens on a command FIFO so thats its behaviour can be controlled via utilities such as faxanswer and faxabort.

# faxgetty

- Listens for ...
  - Incoming calls on device
  - Commands written to FIFO.*{device}*
    - Typically from the faxanswer or faxabort utilities.
  - SIGTERM & SIGHUP signals
- Notifies hfaxd and faxq about changes in modem state
- Reads its configuration from etc/config.*{device}*
- Automatically raises its process priority when spawned.
  - This can be disabled with the -p option in /etc/inittab.
- Implements access control based upon TSI or CID information.
- Highly configurable
  - RecvFileMode - Permissions of newly recieved documents.
  - RingsBeforeAnswer - Number of rings before pickup.
  - MaxRecvPages - Maximum length of a fax document.
  - PercentGoodLines & MaxConsecutiveBadLines - Tolerance of errors.

# faxrcvd

faxrcvd is a shell script invoked by Hylafax whenever a fax has been recieved. It is the last step in fax reception.

faxrcvd *{file} {devID} {commID} {error-msg} {cidnumber} {cidname}*

- *{file}* - File name of recieved document
- *{devID}* - The device name (ttyS0, etc...) on which document was recieved.
- *{commID}* - The communication identifier of the inbound call.
- *{error-msg}* - An error message if reciept failed in any way.
- *{cidnumber}* & *{cidname}* - Caller ID information if supported by both the modem and the inbound line.

The default script simply sends a notification e-mail to FaxMaster; you will almost certainly want to hack this part of your installation.

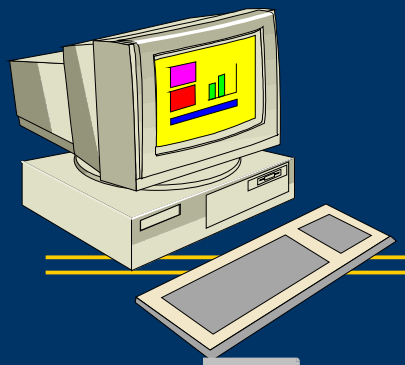
# Adaptive Answer

faxgetty support adaptive answer which permits a single device to handle fax, data, and possibly even voice calls. HylaFAX implements adaptive answer in the server and does not depend upon adaptive answer in the modem itself.

- Adaptive answer is disabled by default.
- Adaptive answer is enabled using the AdaptiveAnswer directive in the device's configuration file (etc/config.*deviceID*).
  - If adaptive answer is enabled the order by which the call type is tested is determined by the AnswerRotory directive.
    - AnswerRotary fax data attempts to first answer the call as a fax and they as a data call.
    - If data calls are to be answered a GettyArgs directive is required to inform Hylafax how to properly spawn the getty process
      - GettyArgs: "-h %l dx_%s" where %l is replaced with the device name and %s with the speed for matching a gettydefs line.

# Sending

# The Sending Process



Is this client allowed to send?

etc/hosts.hfaxd

etc/hfaxd.conf

hfaxd

hfaxd coverts document to the appropriate TIFF format if possible.

docq

sendq

FIFO

etc/config

etc/config.*device*

faxq

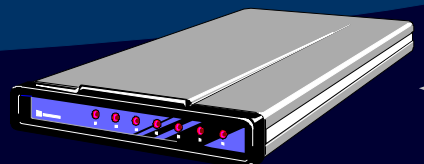
Document

Job Description

"Yo! New Job."

Exit Status

faxsend



# hfaxd

- Runs chroot'd to the top of HylaFAX's directory structure.
  - Usually /var/spool/hylafax
  - Be careful about specifying filenames that lie above this root as hfaxd will not be able to access them.
- If the file etc/shutdown is present hfaxd will deny all access to users who are not administrators.
- Primary configuration file is etc/hfaxd.conf
- Default TCP port is 4559
  - This can be modified with the -i *{port#}* command line switch, you may specify multiple port numbers by repeating the switch.
  - hfaxd can also be run from xinetd/inetd rather than as a stand alone daemon.
    - Specify the -I command line switch to enable superserver compatibility.

# A sendq description file

tts:1047171046
killtime:1047181786
retrytime:0
state:6
npages:0
totpages:4
ntries:0
ndials:0
totdials:0
maxdials:12
tottries:0
maxtries:3
pagewidth:209
resolution:196
pagelength:296
priority:127
schedpri:127
minsp:0
desiredbr:13
desiredst:0
desiredec:1
desireddf:3
desiredtl:0
useccover:1
external:3611124
number:3611124
mailaddr:adam@morrison-ind.com
sender:adam
jobid:6
jobtag:
pagehandling:61S61S61S61P
modem:any
receiver:
company:
location:
cover:
client:localhost.localdomain
owner:root
groupid:6
signalrate:
dataformat:
jobtype:facsimile
tagline:
subaddr:
passwd:
doneop:default
commid:
status:
notify:none
pagechop:default
chopthreshold:3
!postscript:0::docq/doc6.cover
fax:0::docq/doc6.cover;41
!postscript:0::docq/doc7.ps.6
fax:0::docq/doc7.ps;41

Once a fax has been trasmitted, or failed to be transmitted, this file moves to the doneq directory.

# Document Conversion

- In order to be sent as a fax any document must first be converted to a multi-page TIFF format often referred to as TIFF/F.
- hfaxd uses a small collection of helper applications in order to manage document type conversion if submitted documents are not TIFF/F.
  - PCL2FaxCmd - Command to convert PCL documents to TIFF/F.
  - PS2FaxCmd - Command to conver PS documents to TIFF/F.
    - Usually ps2fax, a Ghostscript wrapper script.
    - ps2fax is provided in most HylaFAX packages.
  - TIFF2FaxCmd - Command to convert TIFF documents to TIFF/F
    - Usually tiff2fax, a wrapper arround the tiffcp utility.
    - tiff2fax is provided in most HylaFAX packages.
    - On RedHat tiffcp is provided by the libtiff package.
- It is optimal to convert the document prior to submission in order to have the optimal output as you avoid any issues such as font substitution.

# Destination Controls

- Destination controls are rules defined in the destctrls file.
  - These rules are globally applied to all outgoing calls.
  - The first column of the destctrls file is a regular expression that matches the destination phone number
  - The second column is a list of *parameter=value* constructs, you may list more than one construct.
    - MaxConcurrentJobs, jobdPages, MaxTries, TimeOfDay, etc...
  - faxq scans this file and returns the first match, so order is important.

^911$ RejectNotice = "Calls to emergency numbers are not permitted"

The above rule will black all calls to 911, the sender will recieve an electronic mail message with the specified message.

# faxq

- faxq is in charge of scheduling outbound jobs.
  - Recieves information from hfaxd about new jobs via a FIFO
  - The faxquit utility also communicates via the FIFO
    - Running faxquit is the proper way to terminate faxq
- While a job is actively being processed the description file in sendq is locked via flock*(2)*.
  - hfaxd can check file locks in sendq to determine if a job is currently active.
- faxq usually spawns a faxsend to process each job.
  - The process actually used to send the job may be changed via the FaxSendCmd configuration directive.
  - faxsend communicates a transmissions success or failure back to faxq via its exit code.
    - 0=Retry, 1=Failed, 2=Success, 4=Reformat

# Maintenance

# faxcron

- Most the the routine maintencance regarding the HylaFAX spool area is managed by a Bourne Again Shell script: /usr/sbin/faxcron.
  - This script is meant to be executed by crond once a day (via /etc/cron.daily on a RedHat system).
  - By default this script -
    - Removes information from log and info that is more than 30 days old.
      - These values can be adjusted via the -log *{days}* and -info *{days}* command line switches.
    - This job also resets the file permissions of session log files.
    - Remove files from tmp older than one day.
      - This can be adjusted with the -tmp *{days}* command line switch.
    - Remove documents received more than seven days ago.
      - This can be adjusted with the -rcv *{days}* command line switch.

# faxqclean

- /usr/sbin/faxqclean is a binary excutable that should be executed via crond roughly once an hour (via /etc/cron.hourly on a RedHat system).
  - Remove documents from the doneq directory based upon age and the doneop flag in the corresponding job description file in sendq.
    - doneop is either a value that indicates *archive* or *purge*.
    - By default files remain in doneq for 900 seconds (15 minutes)
      - Adjustable via the -j *{seconds}* command switch
  - Remove unreferenced files from the doneq directory.
    - Default is to allow unreferenced files to exist for up to 3600 seconds (1 hour).
      - Adjustable via the -d *{seconds}* command switch.
- Archiving of jobs is managed by calling the bin/archive shell script whose parameter is the job id. This script can be hacked to achieve any custom archival method.

# Clients

# faxstat

The faxstat command is used the interrogate the Hylafax server processes as to the status of the various components as well as progess on the job queues.

- -a Display archive directory contents
- -d Display the status of all jobs completed
- -f Display status of all documents in the docq direcotry
- -g Display times and dates in GMT
  - This is the default behaviour, changed via the -l option.
- -h *{hostname}* Query the status of a specific host
- -i Display additions status information
- -l Display times and dates in local time zone
- -r Display the receive queue status
- -s Display the status of jobs in the send queue
- -v Trace protocol exchanges

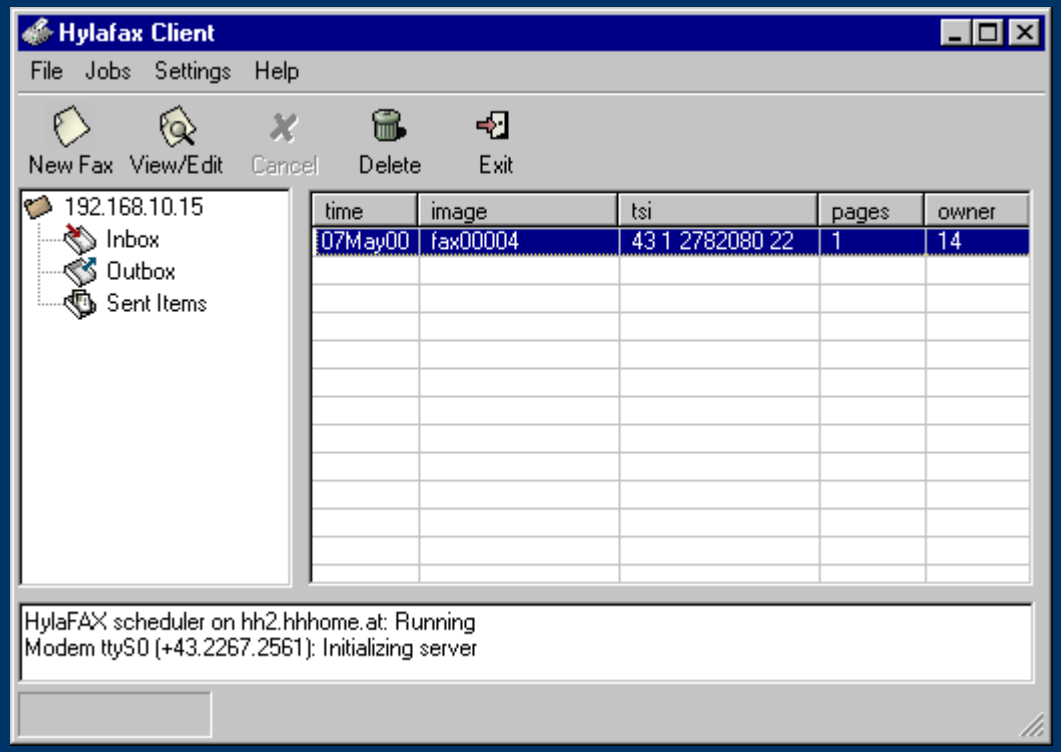
# sendfax

sendfax -d 1-810-351-4816 /etc/termcap

- The HylaFAX package includes the sendfax client, a very powerful command line fax job submission utility.
  - Destinations are indicated with the -d option.
    - The -d option may occur multiple times to specify multiple destinations.
  - Almost all of the HylaFAX configuration paramters can be overridden via switches from the sendfax command.
    - The manual page is eight pages.
  - Jobs can be scheduled for transmission up to one year in advance.
  - Documents types of text, PDF, and SGI image will be converted to either Postscript or TIFF/F prior to submission.
  - Jobs can be submitted to remote hosts.
  - sendfax supports passing parameters for cover page generation.

# w2hfax

http://w2hfax.sourceforge.net/



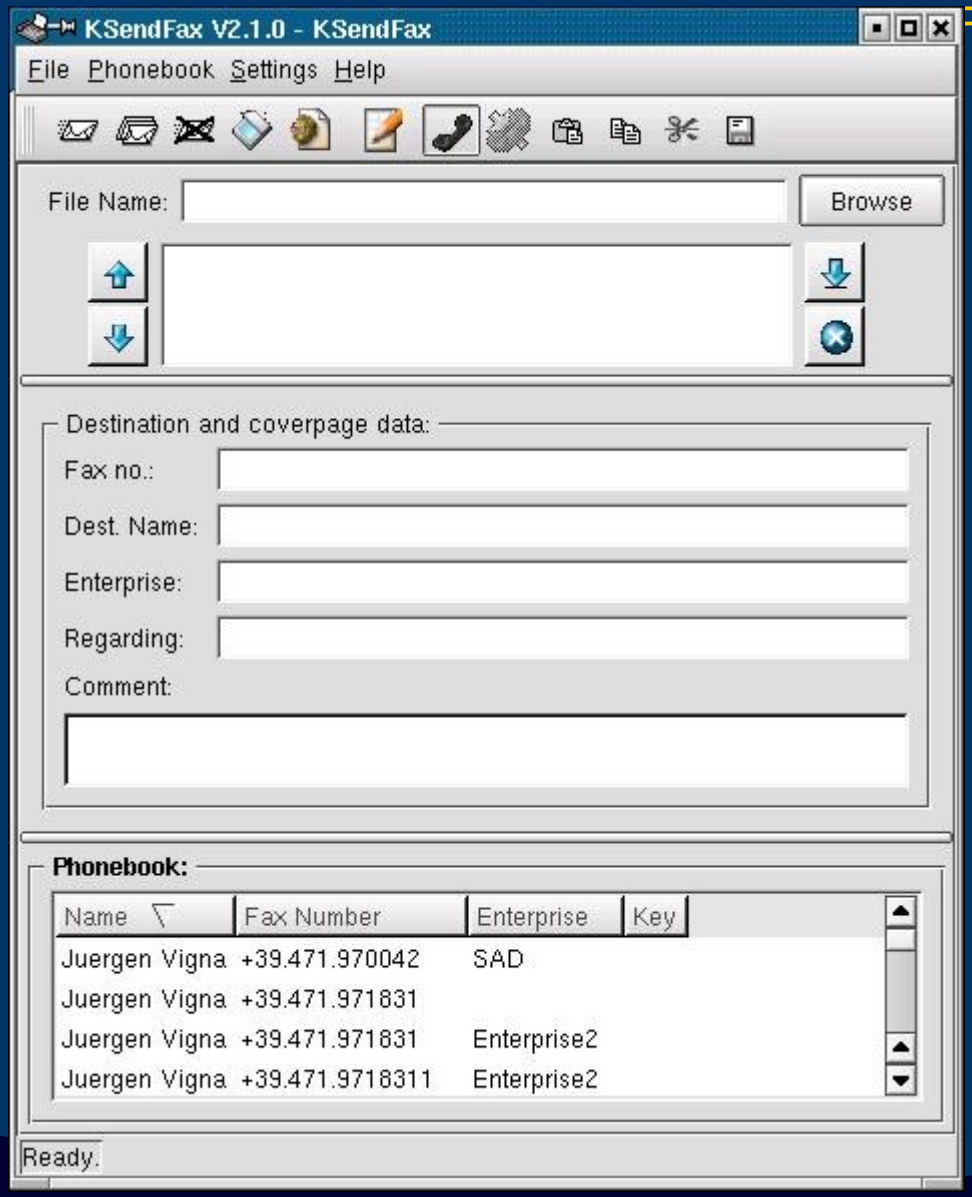

w2hfax is a Win32 Hylafax client written in Visual Basic that also includes an Active X component written in Python.

The Active X component permits sending faxes from within M$-Excel and M$-Word macros.

w2hfax provides all the functionality you'd expect from a fax application including viewing, cancelling jobs, viewing job detail, etc...

# KSendFax

http://ksendfax.sourceforge.net/




KSendFax is a Qt toolkit based fax client for Linux.

KSendFax supports not only HylaFAX but efax and mgetty+sendfax as well.

Integrates with xsane for faxing scanned documents.

# Byteforge.Networking.Hylafax

http://byteforge.ath.cx/hylafaxclient/

ByteForge has a freely available HylaFAX .Net component.

# fax4CUPS

http://gongolo.usr.dsi.unimi.it/~vigna/fax4CUPS/

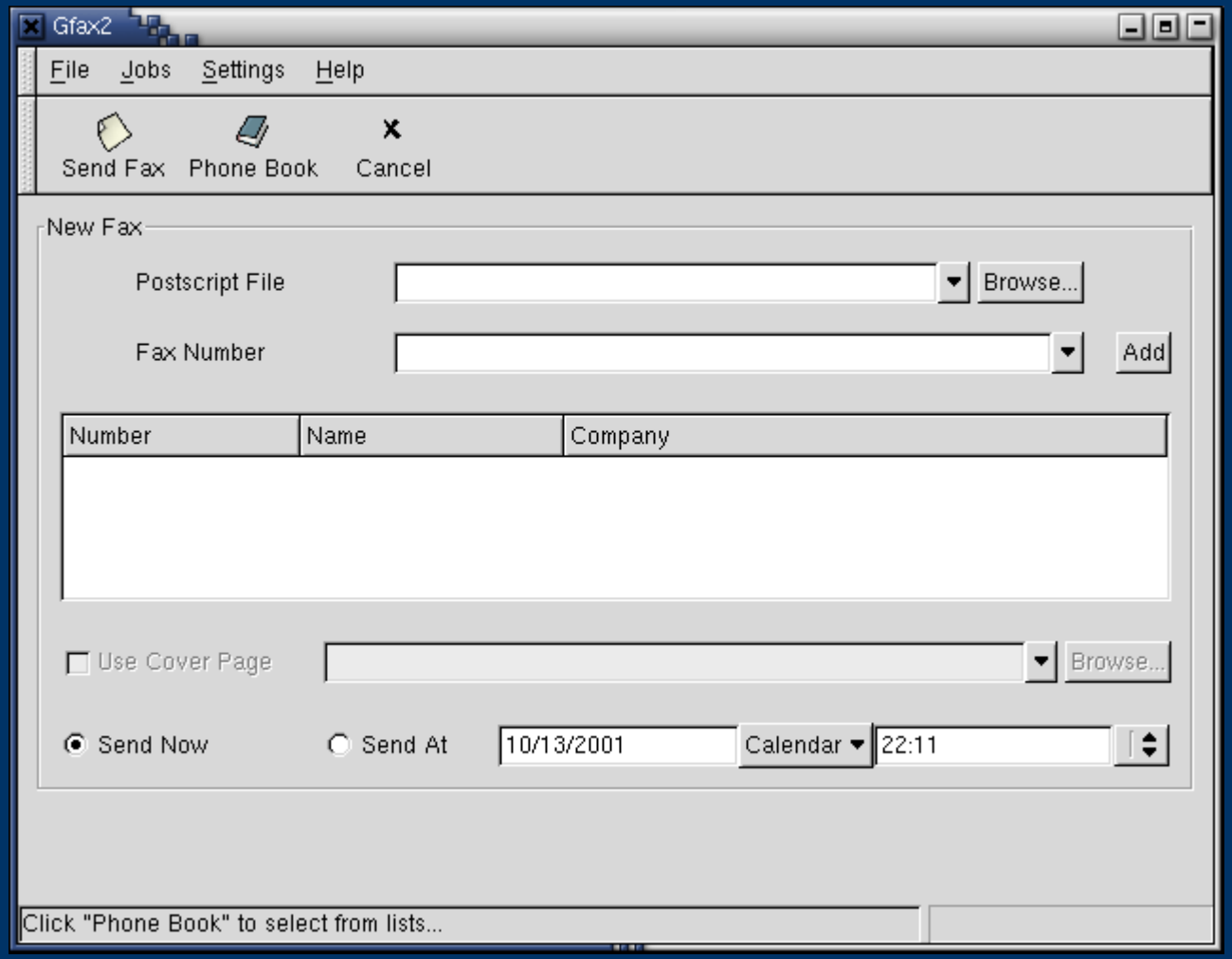
fax4CUPS is a backend module, including PPD file, that integreates a CUPS queue with either efax or HylaFAX.

Job status may be viewed using standard CUPS utilities, including the CUPS web interface. Pending jobs may be cancelled via the same.

The phone number may be passed to backend using lpr's -J *{jobid}* parameter.

# gfax

http://www.cowlug.org/gfax/



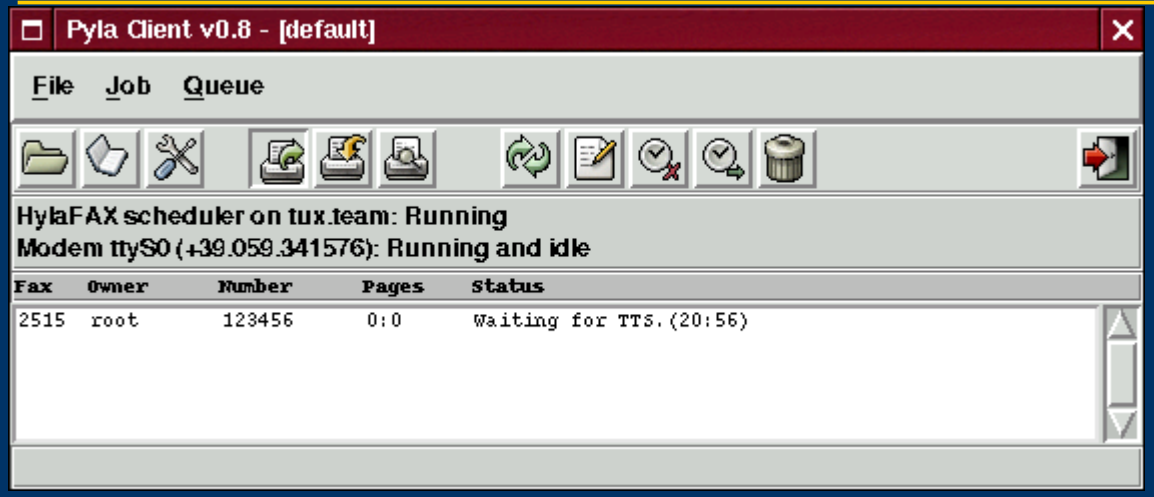

gfax is a GNOME 1.x fax client that supports both HylaFAX and mgetty +sendfax.

gfax integrates with gnome-print, provides a pop-up window, and reads GnomeCard phone books.

gfax is written in Python and relies on libglade.

# pyla

http://digilander.libero.it/aser76/docs/pyla.html




Pyla is a cross-platform HylaFAX client written entirely in Python. Pyla attempts to mimic WHFC.

# smbfax

http://inconnu.isu.edu/~ink/new/projects/smbfax/

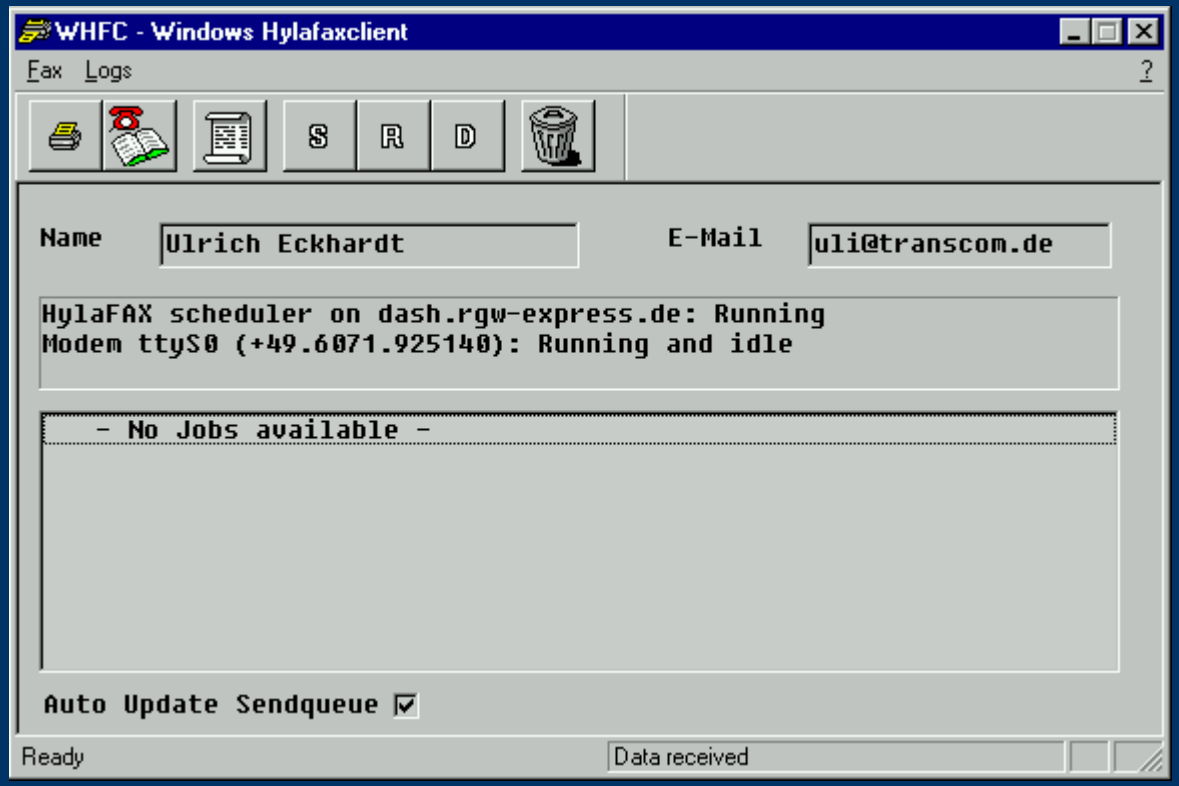
smbfax is a script that is used as the "print command" of a Samba print queue to enable CIFS clients to submit jobs to HylaFAX without any client side software.

Jobs appear as regular print entries in the Win32 print manager and can be cancelled there.

Once a job is submitted the user recieves and E-Mail containing a link. At that link the user can enter information about delivering the fax such as phone number and other details.

# whfc

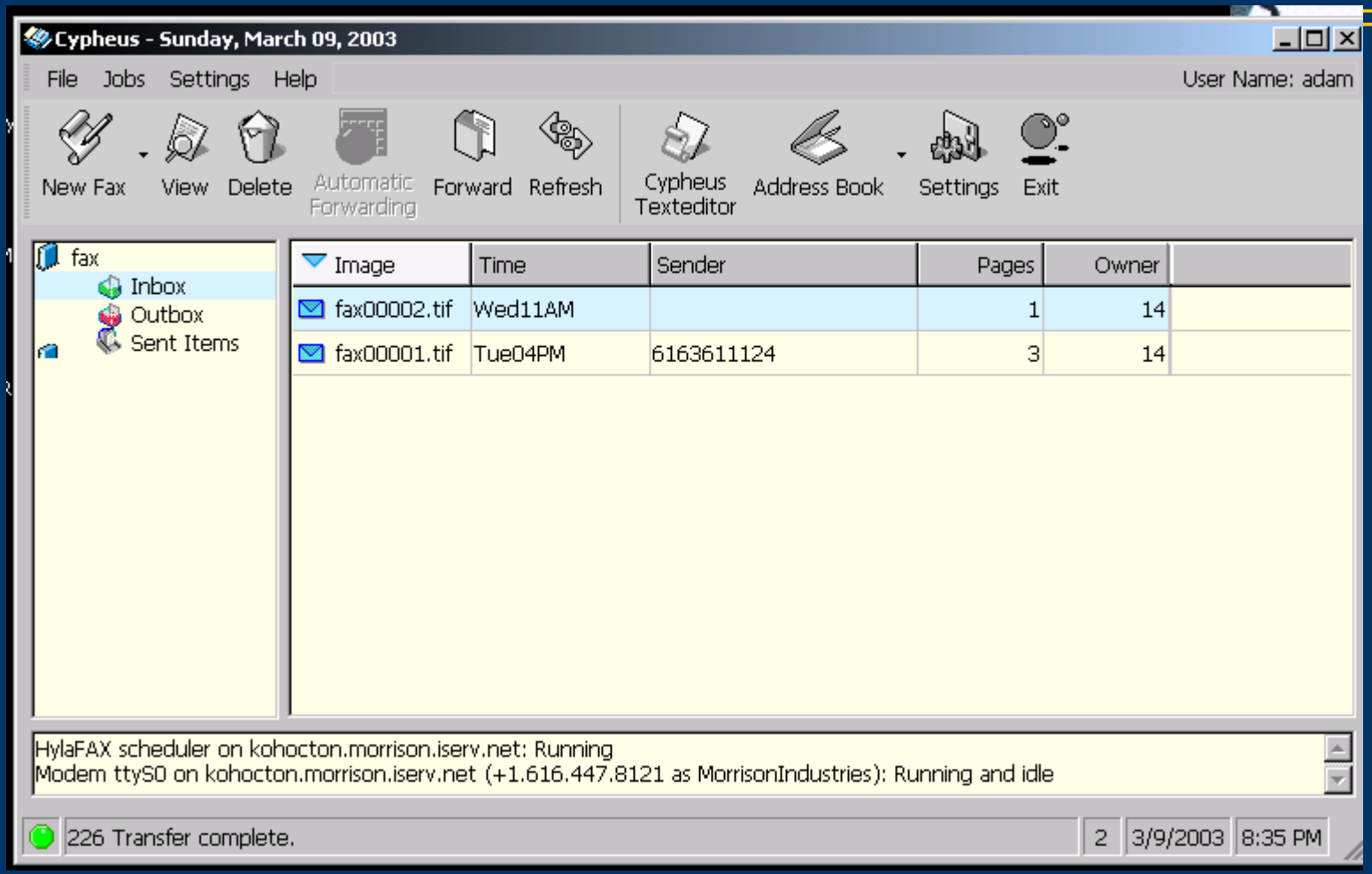
http://www.uli-eckhardt.de/whfc/




- whfc is yet another Win32 HylaFAX client. It provides all the functionality you would expect from a fax client, as well as...
  - Use of ODBC sources for address book information.
  - Offline mode
  - OLE support enables use from M$-Office macros.
  - Adjustable kill time.

# Cypheus

http://www.cypheus.de/



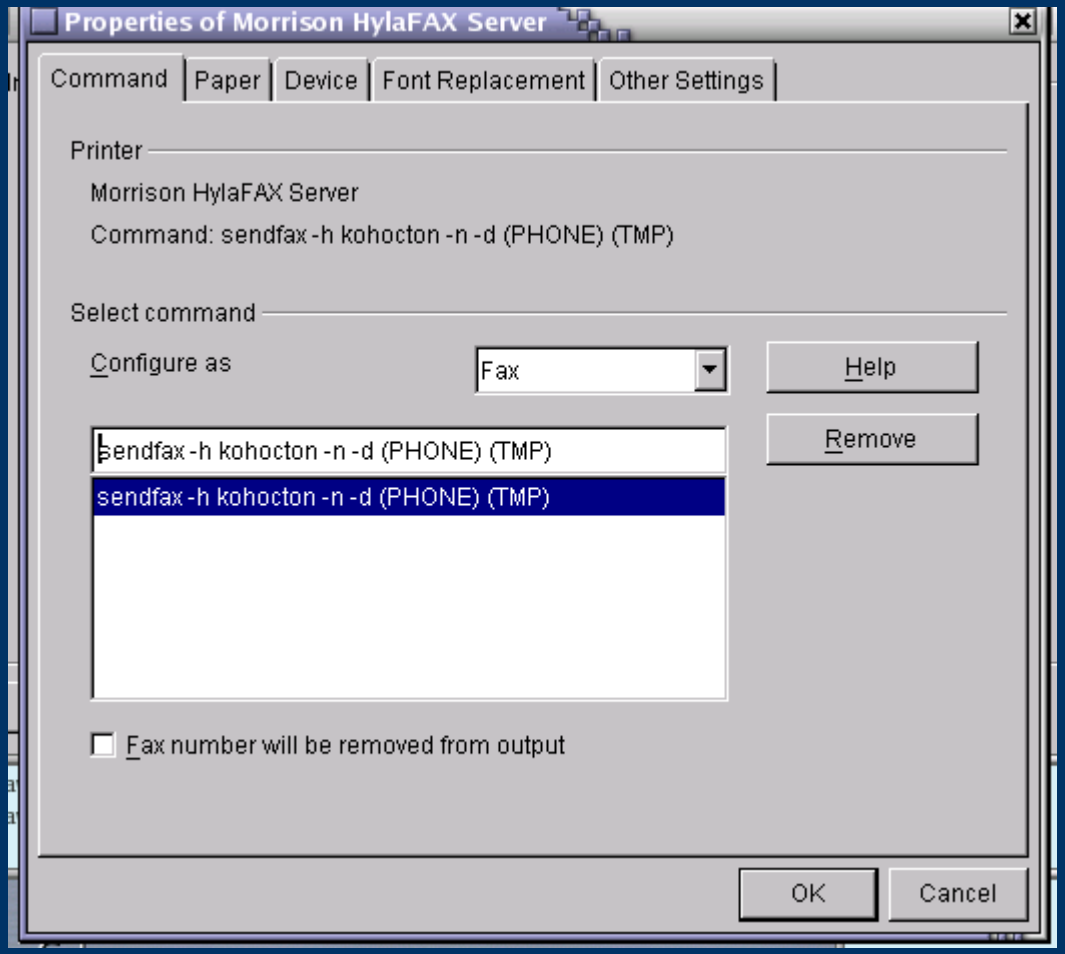

Cypheus is a commercial Win32 HylaFAX client that requires registration for commercial use.

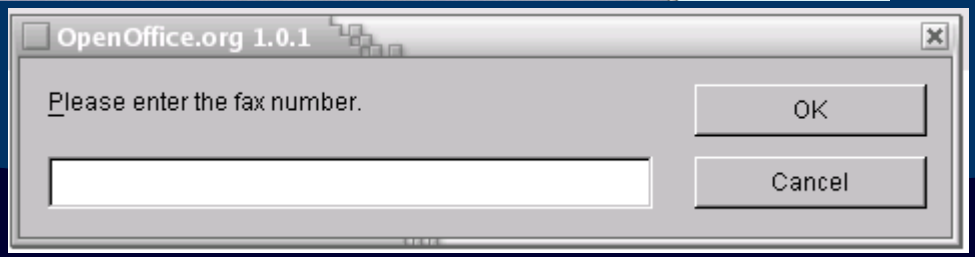
Cypheus is similair in functionality to WHFC but is more complete and current.

# Cypheus

- Drag&Drop Support
- Support for G3-2D TIFFs
- Job Suspend/Release
- Fax Polling
- Watched Folder
- Replied/forwarded icon
- Automatic addition of documents
- Comments are shown in tooltips
- New address book & MySQL table
- Import wizard
- Outlook integration
- CDO access on Outlook and Exchange folders.
- View faxes with the built in viewer,
- Annotate documents
- Save documents to the local disk.
- Send fax out of MS Word for Windows™ without typing a fax number again.
- Organize cover pages and add one to any fax.
- Use any address book.
- Set transmission time.
- Send mail merge faxes with MS Word™
- Save columns' width & position and sort order of list items
- You can assign any installed modem to each fax
- Login on different HylaFAX servers by a simple click in main window
- Forward any incoming fax by eMail as TIFF attachment
- Preview of all outgoing faxes
- Merge a number of PS documents to a single fax before sending
- Security features: You can assign restrictions for reading/sending a fax to each user
- Export all faxes to HTML/JPEG including index page
- Add sub-folders to organize received/sent faxes
- Cover Page/Text Editor

# StarOffice/OpenOffice




Star Office / Open Office are not fax clients in the strict sense, but via spadmin a queue can be setup that prompts for a fax number and calls up a fax client.

In this case the HylaFAX sendfax utility.

# Setup

# faxsetup

HylaFAX needs this to work properly, add it [yes]?
Added user "fax" to /etc/passwd.
. . .
No scheduler config file exists, creating one from scratch.
Country code [1]?
Area code []? 616
Long distance dialing prefix [1]?
International dialing prefix [011]?
Dial string rules file (relative to /var/spool/hylafax) ["etc/dialrules"]?
Tracing during normal server operation [1]?
Default tracing during send and receive sessions [0xffffffff]?
Continuation cover page (relative to /var/spool/hylafax) []?
Timeout when converting PostScript documents (secs) [180]?
Maximum number of concurrent jobs to a destination [1]?
Define a group of modems []?
Time of day restrictions for outbound jobs ["Any"]?
Pathname of destination controls file (relative to /var/spool/hylafax) []?
Timeout before purging a stale UUCP lock file (secs) [30]?
Max number of pages to permit in an outbound job [0xffffffff]?
Syslog facility name for ServerTracing messages [daemon]?

# faxaddmodem

/usr/sbin/faxaddmodem -s *{speed} {tty device}*

- The faxaddmodem command is used to configure the fax devices and is run once for each fax device.
- faxaddmodem uses the information in /var/spool/hylafax/config to identify various types of modems.
  - faxaddmodem is a Bourne Again shell script, and has problems with bash versions prior to 1.14.3.
  - faxaddmodem generates a modem configuration file in etc.
    - Modem configuration files are in the form of config.*{deviceID}*

```
CountryCode:          1
AreaCode:             616
FAXNumber:            +1.616.447.8121
LongDistancePrefix:   1
InternationalPrefix:  011
DialStringRules:      etc/dialrules
ServerTracing:        1
SessionTracing:       11
RecvFileMode:         0600
LogFileMode:          0600
DeviceMode:           0600
RingsBeforeAnswer:    1
SpeakerVolume:        off
GettyArgs:            "-h %l dx_%s"
LocalIdentifier:      MorrisonIndustries
TagLineFont:          etc/lutRS18.pcf
TagLineFormat:        "From %%l|%c|Page
MaxRecvPages:         25
```

# faxconfig

/usr/sbin/faxconfig –m *{ modem } {parameter value... }*

- faxconfig can be used to change configuration parameters on the fly without restarting the server.
- The available configuration directives are listed in the hylafax-config manual page.
  - Most configuration directives can be applied either globally (without a -m *modem* paramter) or to a specific device.
- faxconfig communicates with faxgetty processes, and the central faxq schedular via the FIFOs.
- Configuration changes made with faxconfig are not durable, they are lost when the server is restarted. To make durable changes you must modify the configuration files.

# Device Priority

- Each fax modem device has a priority, for systems with multiple modems this determines the preference for sending outbound jobs.
  - Priority ranges from 0 to 255
    - A lower priority indicates a greater preference.
  - Priorities can be adjusted dynamically
    - faxconfig -m ttyf2 ModemPriority 32
  - By default all configured modems have an equal priority.
    - The ModemPriority directive in a device's configuration file (etc/config.*deviceID*) determines the devices default priority.

# Cover Pages

# faxcover

- /usr/bin/faxcover is used by HylaFAX to generate fax cover pages.
- By default a simple cover page is used.
  - The default cover page is /etc/hylafax/faxcover.ps
- The fax cover page is parametized postscript, certain strings are replaced with the corresponding information.
  - to, to-company, to-location, to-voice-number, to-fax-number
  - comments1 .. comments20, regarding
    - The *comment?* parameters related to lines of commentary broken by newline (“\n”) characters.
  - from, from-company, from-location, from-voice-number
  - page-count, todays-date, pageWidth, pageLength

# Generating FAX Cover Sheets

- Generate an acceptable cover page with any application capable of outputing to a Postscript or EPS file.
  - You can use M$-Word on Win32 by creating a printer queue using the Apple LaserWriter driver and printing to a file.
  - Use easy to find text for the fields, such as "XXXX-to-company"
    - Edit the output document with a text editor changing your stand in text to the tags faxcover looks for.
      - So "(XXXX-to-company)" becomes to-company.
- Further Information
  - http://www.hylafax.org/HylaFAQ/Q202.html
  - http://www.hylafax.org/archive/2000-12/msg00090.html
  - http://www.hylafax.org/howto/tweaking.html

# Misc...

# Important

It is a requirement of United States law that a *tagline* including the transmitter's phone number appear on EVERY page of facsimile.

The *tagline* is typically found on the top of each page, often seperated from the document itself by a thin horizontal line.

HylaFAX's default TagLineFormat is

"From %%l|%c|Page %%P of %%T"

and satisfies these requirements. But you should verify the compliance of your installation before commencing operation.