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getting started with  
sendmail on mpe/ix 7.5

## product overview

### Major functionality:

- send SMTP e-mail
- receive SMTP e-mail to local mailboxes, programs, or files
- aliases can be created which map to local mailboxes, programs, files, or remote mailboxes
- powerfully flexible configuration language

### Built from:

- Sendmail 8.12.1
- Sleepycat Berkeley DB library 3.3.11

## system requirements

- will be released as a 7.0 patch
- will ship in 7.5 FOS
- requires TZ environment variable to be set correctly, preferably in the system logon UDC
- requires a local syslog daemon, either MPE FOS Syslog/iX or embedded spooling ISV syslog daemon
- the local e3000 must be configured correctly for DNS and must be listed correctly in the DNS database
- firewalls or other security devices must allow the local e3000 to make DNS connections (port 53) and SMTP connections (port 25)

## support

- Sendmail A.01.00 for MPE/iX will be fully supported by RC and WTEC
- Customers who call with questions regarding unsupported bixby.org freeware Sendmail 8.9.1 will be encouraged to upgrade to Sendmail A.01.00

## distribution highlights

- Apache-like VUUFF — CURRENT — PUB file layout
- /SENDMAIL/PUB/JDAEMON — batch job for running the server daemon
- /SENDMAIL/PUB/SENDMAIL — symlink to /SENDMAIL/CURRENT/SENDMAIL
- /SENDMAIL/CURRENT/SENDMAIL — combined server daemon and local mail submission program
- /SENDMAIL/CURRENT/bin — dnscheck, hoststat, m4, mailq, newaliases, purgestat, vacation
- /SENDMAIL/CURRENT/sbin — editmap, mailstats, makemap, praliases, sendmail, smrsh

## distribution highlights (cont.)

- /SENDMAIL/CURRENT/cf – directory tree for building \*.cf config files; see the README file!

- /SENDMAIL/CURRENT/doc/op/op.ps – Sendmail Installation and Operation Guide – READ IT!

- /SENDMAIL/CURRENT/etc – contains the POSIX shell profile for Sendmail along with the sample config files installed to /etc/mail

- /SENDMAIL/CURRENT/man – man page documentation, I.e.:

**export**

**MANPATH=/SENDMAIL/CURRENT/man**

**: \$MANPATH**

**man sendmail**

# hpux compatibility symbolic links

/usr/bin/m4

/usr/bin/mailq

/usr/bin/mailstats

/usr/bin/newaliases

/usr/bin/praliases

/usr/bin/vacation

/usr/lib/sendmail

/usr/sbin/editmap

/usr/sbin/hoststat

/usr/sbin/mailstats

/usr/sbin/makemap

/usr/sbin/newaliases

/usr/sbin/purgestat

/usr/sbin/sendmail

/usr/sbin/smrsh

## config files

- all config files live in `/etc/mail` which is populated from `/SENDMAIL/CURRENT/etc/mail.sample` at installation time if the `/etc/mail` files do not already exist
- all config files must be owned by the user `SERVER.SENDMAIL` and the `PO SIX` group `SENDMAIL`
- the server daemon must be stopped and restarted for config file changes to take effect
- `sendmail.cf` (mail server), `submit.cf` (mail submission) and aliases are the most important ones



## configuring \*.cf files

- submit.cf and sendmail.cf are created from macro files expanded by the m4 utility
- you can edit submit.cf and sendmail.cf directly to make MINOR parameter changes:  
**# "Smart" relay host**  
**DSmy.relay.host.name**
- major functionality changes REQUIRE you to edit the macro files and expand with m4
- so just play it safe and ALWAYS edit the macro files and expand with m4 for ALL changes:  
**define(`SMART\_HOST',**  
**`my.relay.host.name')**
- see  
/SENDMAIL/CURRENT/cf/README for the list of major \*.cf options

configuring \*.cf files  
(sendmail.cf for the mail  
server program)

To generate sendmail.cf:

1. `:HELLO SERVER.SENDMAIL`
2. `:XEQ SH.HPBIN.SYS -L`
3. `shell/iX> cd`  
`/SENDMAIL/CURRENT/cf/cf`
4. `shell/iX> cp generic-`  
`mpeix.mc.sample generic-`  
`mpeix.mc`
5. edit generic-mpeix.mc with the  
bytestream file editor (i.e. vi) of  
your choice to make your  
changes
6. `shell/iX> m4 ../m4/cf.m4`  
`generic-mpeix.mc >generic-`  
`mpeix.cf`
7. `shell/iX> cp generic-mpeix.cf`  
`/etc/mail/sendmail.cf`

configuring \*.cf files  
(generic-  
mpeix.mc.sample)

```
OSTYPE (mpeix) dn1
DOMAIN (generic) dn1
define (`confFORWARD_PATH',
        `$z/.forward') dn1
FEATURE (masquerade_envelope) dn1
FEATURE (domaintable) dn1
FEATURE (mailertable) dn1
FEATURE (genericstable) dn1
FEATURE (virtusertable) dn1
FEATURE (always_add_domain) dn1
FEATURE (access_db) dn1
MAILER (local) dn1
MAILER (smtp) dn1
```

## configuring database map files

- typically used by optional sendmail features like access\_db
- Berkeley DB database hash or btree files containing extra configuration data in key/value pairs
- maintained with the makemap and editmap utilities
- by convention, a map file named "foo" contains the ASCII input data, whereas "foo.db" contains the compiled binary database structures
- in commands and \*.cf files, a map file reference of "foo" actually refers to "foo.db"!

configuring database  
map files  
(cont.)

```
MPETEST:/BIXBY/PUB> cat - >foo  
key1 value1  
two abcdef  
abra cadabra  
:eod
```

```
MPETEST:/BIXBY/PUB> makemap hash  
foo <foo
```

```
MPETEST:/BIXBY/PUB> ls -l foo*
```

```
-rw-r--r--    1 MGR.BIXBY  
BIXBY          36 Feb 25 13:52  
foo
```

```
-rw-r--r--    1 MGR.BIXBY  
BIXBY        49152 Feb 25 13:52  
foo.db
```

```
MPETEST:/BIXBY/PUB> makemap -u  
hash foo
```

```
key1    value1  
two     abcdef  
abra    cadabra
```

## common non-default config changes

- defining a smart relay host in `sendmail.cf` to route all outbound e-mail via a single mail gateway
- define alternate routing for certain outbound mail domains via the `mailertable` feature
- creating aliases for inbound e-mail instead of using the basic `USER.ACT@host.name` mailboxes

## aliases database map

- a special type of map file containing one or more comma-delimited values per key
- /etc/mail/aliases and aliases.db
- maintained by `SERVER.SENDMAIL` with the `newaliases` and `praliases` commands
- defines username aliases for mail being delivered to the local machine, I.e.  
`postmaster@localhostname`
- installation default entries:

```
postmaster: SERVER.SENDMAIL  
MAILER-DAEMON: postmaster
```

## aliases database map (cont.)

- left-hand side is the user alias
- separated by a colon
- right-hand side is one or more delivery destinations:
  - USER.ACCOUNT or user@host.name or another alias
  - /path/to/local/file for appending
  - :include: /file/of/aliases (plaintext ASCII file)
  - "\/program/file parm1 parm2 parm3 ..."
- local usernames may be escaped with a backslash (I.e. \USER.ACCOUNT) to prevent recursive alias lookups



## `.forward files`

- an optional ASCII file named `.forward` residing in the local user's home group which tells `sendmail` where to forward the user's mail
- format is the same as the right-hand side of an aliases entry, I.e. one or more comma-separated destinations
- can be used to invoke the vacation autoresponder:

```
\USER.ACCOUNT,  
"/SENDMAIL/CURRENT/bin/vacation  
USER.ACCOUNT"
```

access\_db feature -  
accept or reject  
incoming e-mail based  
on envelope address or  
relaying mail server  
name

1. :HELLO SERVER.SENDMAIL
2. :XEQ SH.HPBIN.SYS -L
3. /bin/cat - >/etc/mail/access  
imaspammer.com REJECT  
:EOD
4. makemap hash /etc/mail/access  
</etc/mail/access

domaintable feature –  
rewrite domain names  
in e-mail headers

1. :HELLO SERVER.SENDMAIL
2. :XEQ SH.HPBIN.SYS -L
3. /bin/cat -  
>/etc/mail/domaintable  
oldcompany.com newcompany.com  
:EOD
4. makemap hash  
/etc/mail/domaintable  
</etc/mail/domaintable

genericstable feature –  
rewrite user and/or  
domain addresses in  
outgoing e-mail  
headers

1. `:HELLO SERVER.SENDMAIL`
2. `:XEQ SH.HPBIN.SYS -L`
3. `/bin/cat -`  
`>/etc/mail/genericstable`  
`USER.ACCOUNT@my.local.host`  
`customer_servce@company.com`  
`:EOD`
4. `makemap hash`  
`/etc/mail/genericstable`  
`</etc/mail/genericstable`

Note that domains being modified  
by genericstable must be added  
to `/etc/mail/sendmail.cf` class  
{G}.

mailertable feature –  
override default mail  
routing in sendmail.cf

1. :HELLO SERVER.SENDMAIL
2. :XEQ SH.HPBIN.SYS -L
3. /bin/cat -  
    >/etc/mail/mailertable  
    .bitnet    smtp:relay.bit.net  
    :EOD
4. makemap hash  
    /etc/mail/mailertable  
    </etc/mail/mailertable

virtusertable feature -  
remap incoming user  
and hostnames to local  
users

1. `:HELLO SERVER.SENDMAIL`
2. `:XEQ SH.HPBIN.SYS -L`
3. `/bin/cat -`  
`>/etc/mail/virtusertable`  
`info@bar.com INFO.BAR`  
`info@foo.com INFO.FOO`  
`:EOD`
4. `makemap hash`  
`/etc/mail/virtusertable`  
`</etc/mail/virtusertable`

Note that virtual hostnames must  
be listed in `/etc/mail/local-host-`  
`names`.

## starting the mail daemon

- Make sure a syslog daemon is running before you start the mail daemon!

- To start the MPE FOS syslog daemon, **:STREAM  
JSYSLOGD . PUB . SYSLOG**

- To start the mail daemon, **:STREAM  
JDAEMON . PUB . SENDMAIL**

## stopping the mail daemon

- Use the POSIX kill signal from `SERVER.SENDMAIL` or any user with SM capability:

```
kill $(head -n 1  
/etc/mail/sendmail.pid)
```

- Only use `:ABORTJOB` as a last resort!



## sending e-mail with mailx

- interactively:

```
mailx someuser@some.host
Subject: hello world
Hi,

How are you doing?
:EOD
EOT
```

- from a pipe:

```
echo "How are you doing?" |
mailx -s "hello world"
someuser@some.host
```

- from a disk file:

```
mailx -s "hello world"
someuser@some.host
</diskfile/containing/msg/body
```

- no attachments!
- limited control of mail headers!

## sending e-mail with SENDMAIL

```
1. /bin/cat - >message.txt
   To: someuser@some.host
   Cc: otheruser@other.host
   Bcc: secretuser@another.host
   Subject: hello world
```

```
Hi there!
:EOD
```

- ```
2. /SENDMAIL/CURRENT/SENDMAIL -t
   <message.txt
```
- the `-t` option reads the destination addresses from the message headers
  - destination addresses can alternatively be specified on the SENDMAIL command line
  - if you want attachments you must generate the MIME headers yourself

## sending e-mail with forged headers

```
1. /bin/cat - >message.txt
   From: forger@foobar.com
   To: someuser@some.host
   Cc: otheruser@other.host
   Bcc: secretuser@another.host
   Subject: hello world
```

```
Hi there!
:EOD
```

```
2. /SENDMAIL/CURRENT/SENDMAIL -t
   -f forger@foobar.com
   <message.txt
```

- the `-f` option sets the message envelope address, but a warning header is included:

```
X-Authentication-Warning:
local.e3000.host: USER.ACCT
set sender to
forger@foobar.com using -f
```

- `genericstable` and other options can forge without traces

## receiving e-mail with mailx

- invoke `/bin/mailx` with no parameters, and it will read e-mail from `/usr/mail/USER.ACCOUNT`
- a numbered headers summary is printed; refer to these numbers in `mailx` commands
- **type nnnn** – display a message
- **delete nnnn** – delete a message
- **help** – for further details
- **quit** – exits after updating the mailbox
- see “man mailx” or the Shell & Utilities manual for further details

## receiving e-mail programmatically

- incoming e-mail will be delivered to programs specified in the aliases database or .forward files
- the e-mail will be delivered to the program via a POSIX pipe connected to the program's stdin
- the POSIX newline character `\n` (ASCII LF) is used as a record separator
- if the program terminates with a non-zero POSIX exit status, any info written to `stderr` will be returned in a bounce message

## migrating from freeware 8.9.1

- must create new JDAEMON from /SENDMAIL/CURRENT/JDAEMON.sample
- all config files reside in /etc/mail instead of /SENDMAIL/PUB/etc
- 8.9.1 sendmail.cf is NOT compatible with 8.12.1
- copy all 8.9.1 ASCII map files to /etc/mail and rebuild with makemap and newaliases
- 8.9.1 queued messages won't be seen by 8.12.1
- 8.12.1 uses two queues (/var/spool/clientmqueue and mqueue) instead of 8.9.1's /SENDMAIL/PUB/mqueue

migrating from freeware  
8.9.1  
(cont.)

- 8.9.1 would submit new messages directly to the queue disk files, but 8.12.1 speaks SMTP to localhost port 25
- 8.12.1 uses two main config files, /etc/mail/submit.cf for submitting new messages, and sendmail.cf for general mail routing
- 8.12.1 does not include the Majordomo mailing list software that was bundled with 8.9.1. HP does not support Majordomo!

mpe /ix implementation  
issues  
(things that work  
differently)

- Sendmail programs don't read stdin terminal keyboard input correctly. Workarounds:
  - `/bin/cat - | makemap hash mymap`
  - `makemap hash mymap <diskfile`
- DeliveryMode=background on MPE is a hybrid between "background" and "interactive"
- Symlinks invoke different personalities of SENDMAIL (I.e. mailq, newaliases, etc), and these only work properly from the POSIX shell because the CI doesn't initialize ARGV[0]
- newaliases gives a "cannot change ownership" warning which can be ignored



## dns issues

- the #1 sendmail problem!
- before using sendmail, run the dnscheck script:
  1. `:HELLO SERVER.SENDMAIL`
  2. `:XEQ SH.HPBIN.SYS -L`
  3. `/SENDMAIL/CURRENT/bin/dnscheck`
- make any recommended config changes and then rerun the script until success is reported
- see speaker notes for sample dnscheck output

## dns issues (cont.)

- single-token hostname? I.e. `uname -n` returns "jazz"?
- domain name in `/SYS/NET/RESLVCNF`? I.e. "domain external.hp.com"?
- one or more nameserver entries in `RESLVCNF`?
- fully-qualified domain name has a DNS "A" record specifying the IP address of the local machine?
- IP address has a DNS "PTR" record specifying the fully-qualified domain name?
- if no to any of the above, sendmail may hang, refuse to start, be unable to recognize the local host, and generally fill up syslog with interesting msgs

## firewall issues

- the #2 sendmail problem!
- your 3000 needs to query port 53 on DNS servers to resolve the destination mail server hostname
- your 3000 needs to receive DNS query answers
- your 3000 listens on its port 25 for incoming e-mail
- your 3000 needs to connect to port 25 on destination mail servers
- does your firewall allow your 3000 to talk to the Internet?
- does your firewall allow the Internet to talk to your 3000?
- firewall blocking results in connection refused, timeouts, or just no activity!

# troubleshooting

- check syslog first!
- if nothing in syslog:
  - if your third-party spooling package has an embedded syslog daemon, you will probably need to use that one instead of Syslog/iX
  - is the syslog daemon running?
  - does the syslog daemon have read access to the config file and write access to the log file?
  - is syslog configured to log mail events?
- if syslog or e-mail message headers show strange timestamps, verify TZ is set properly, preferably in your system logon UDC

## troubleshooting (cont.)

- if syslog shows DNS lookup failures:
  - run the dnsccheck script to verify DNS is configured properly
  - verify that your firewall allows your 3000 to talk to DNS servers on port 53
- if syslog shows connection failures to remote mail servers, verify that your firewall allows your 3000 to connect to port 25; if it does not, you may need to configure sendmail.cf to use a smart host mail relay
- long delays submitting new messages are indicative of DNS problems; check syslog and run the dnsccheck script

## troubleshooting (cont.)

- if local users are submitting messages that aren't being delivered:

- verify that JDAEMON is running; if it is not, messages will be queued in /var/spool/clientmqueue
- transient network problems may cause a backlog in the mail daemon queue /var/spool/mqueue;  
run  
/SENDMAIL/CURRENT/bin/mailq  
as SERVER.SENDMAIL to get a formatted queue listing

## troubleshooting (cont.)

- if remote users are sending messages that aren't being delivered to the local 3000:
  - check syslog for remote connection attempts; if there are none, does your firewall allow connections to port 25 on your 3000, and are your 3000's DNS entries visible to the remote users?
  - verify that the remote users are using valid e-mail addresses for your 3000, I.e. USER.ACCOUNT or an alias, plus the correct hostname

## troubleshooting (cont.)

- if a sendmail config change doesn't appear to take effect:
  - stop and restart the mail daemon when making \*.cf changes
  - if you changed an ASCII database map file, don't forget to run `makemap` or `editmap` to compile the binary \*.db file
  - if you changed ASCII `/etc/mail/aliases`, don't forget to run `newaliases` to compile the binary `/etc/mail/aliases.db` file



for further information

- 7.5 Com m u n i c a t o r

- 7.5 Configuring & Managing  
M P E / i X Internet Services

- <http://jazz.external.hp.com/src/sendmail/>

- <http://www.sendmail.org/>

- <http://www.sleepycat.com/> for the  
Berkeley DB database used for  
map files

## join the hp3000-L community!

- Available as a mailing list and as the Usenet newsgroup comp.sys.hp.mpe
- In-depth discussions of all things HP e3000
- Talk with other people using Sendmail on MPE
  - seek advice, exchange tips & techniques
- Keep up with the latest HP e3000 news
- Interact with CSY
- <http://jazz.external.hp.com/papers/hp3000-info.html>