

Integrating Qmail with Teamware Office

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1 Introduction

Qmail is a mail server written by D.J. Bernstein, <http://cr.yp.to>, and at the date of writing this document, the current release was 1.03.

Qmail became increasingly used recently, especially on Linux platforms. The present document presents different solutions for integrating Qmail in Teamware Office environments.

This document is not meant to substitute the Qmail documentation. The reader is encouraged to consult the Qmail specific documentation for more information about Qmail.

2 Qmail configuration

2.1 How does Qmail handle SMTP requests

Let's have a look at how Qmail receives messages through its SMTP daemon, `qmail-smtpd`.

When a connection request is made on the SMTP port, `inetd` (or a similar daemon, e.g. `tcpserver`, depending on your system) checks its security settings and, if the request comes from an authorized host, it passes the connection to the `qmail-smtpd` daemon.

Then `qmail-smtpd` checks to see if the environment variable `RELAYCLIENT` has been set for this connection. If yes, it accepts the message unconditionally. If not, it checks if the destination of the message is a domain listed in Qmail's control file `rcpthosts`. If the destination domain is not listed there, it rejects the message. If it is listed, it accepts the message.

By default, Qmail does not allow relaying. This is a general good practice for any mail server, since servers opened to relaying are permanent targets for hackers and spammers.

When you want to use Qmail as an outgoing SMTP server, you have to configure it to allow selective relaying, which means it will accept to relay only messages coming from trusted sources, such as Teamware Office servers in your network.

There are more ways to configure selective relaying. We will present here the most important ones: using `inetd` and using `tcpserver`. Qmail's author, D.J. Bernstein, recommends the second method (he is also the author of `tcpserver`). The method using `tcpserver` is easier to set up and allows more flexibility and increased security. `Tcpserver` does not require the removal of `inetd` from your system, they can be used together with no problems. For more details about `tcpserver`, please consult <http://cr.yp.to/ucspi-tcp.html>.

2.1.1 Selective relaying with `inetd`

First make sure that you have the package `tcp_wrappers` installed on your system and that it is compiled with extended syntax. Otherwise you will not be able to set up selective relaying with `inetd`. If you have problems re-compiling `tcp_wrappers` with

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extended syntax, consider using `tcpserver` instead of `inetd`, it might save you a lot of time and effort.

If you don't have it already, insert the following line in `inetd.conf`:

```
smtp stream tcp nowait qmaild /usr/sbin/tcpd /var/qmail/bin/tcp-env
/var/qmail/bin/qmail-smtpd
```

After that, define in `hosts.allow` the connection rights for the SMTP port. For each server you want to accept relaying for, add a line like:

```
tcp-env:1.2.3.4: setenv = RELAYCLIENT
```

Of course, replace `1.2.3.4` with the correct address of the server that you want to enable relaying for. You can use complete IP addresses, or partial ones. For example:

```
tcp-env:1.2.3: setenv = RELAYCLIENT
```

This will make Qmail to accept relaying for all machines having an IP address starting with `1.2.3`. For the servers you want to accept SMTP connections from, but without relaying, you don't have to declare anything, because the default rule is to accept connections.

2.1.2 Selective relaying with `tcpserver`

If you don't have it, download and install `tcpserver`. You can find it at <http://cr.yp.to/ucspi-tcp.html>.

In order to start `tcpserver`, add in your startup file (e.g. `/etc/rc.d/rc.local`), the following line:

```
/usr/local/bin/tcpserver -x/etc/tcp.smtp.cdb -v -u504 -g504 0 smtp
/var/qmail/bin/qmail-smtpd 2>&1 | /var/qmail/bin/splogger smtpd 3 &
```

or:

```
/usr/local/bin/tcpserver -x/etc/tcp.smtp.cdb -u504 -g504 0 smtp
/var/qmail/bin/qmail-smtpd &
```

The first example enables logging, and the second one doesn't. The parameters used are presented below:

- `-x/etc/tcp.smtp.cdb` : Represents the rules database for that port. Will explain a little bit later how to create this file.
- `-v` : Instructs `tcpserver` to log error and status messages. The default logging level is `-q`, to log only error messages.

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- `-u, -g` : The user and group ID to switch to after start receiving data. Replace the values 504 in the example with the values for the `qmaild` user and group defined on your system. This feature greatly reduces the security risks, since the process of receiving data will not be run under root ID.
- `0` : The host address on which the daemon attaches. The value `0` means all addresses defined for that machine. However you can choose to attach the listener only to certain IP addresses. For example, you could have different servers listening on the same port number, e.g. 25, but each on a separate address. Or you could disable the SMTP port for public address if you want to allow access only from the internal network.
- `smtp` : The port to listen to. You can use any literals from `/etc/services`, or you can explicitly state the port number (e.g. 25, 2025 etc.).
- `/var/qmail/bin/qmail-smtpd` : The Qmail SMTP daemon. After the connection is accepted by `tcpserver`, the connection is passed to `qmail-smtpd`.
- `/var/qmail/bin/splogger smtpd` : The logging application. The output of this application will be passed to the standard logging daemon (e.g. `syslogd` on UNIX/Linux systems)

To create the rules database (e.g. `/etc/tcp.smtp.cdb`), create first a file called `/etc/tcp.smtp`, which contains lines like:

```
1.2.3.4:allow,RELAYCLIENT=""
```

Replace 1.2.3.4 with the IP addresses of the servers for which you want to allow relaying - for example the IP address of a Teamware Office server. You don't have to specify anything for the servers you don't want to relay for.

Then you have to create the database file `/etc/tcp.smtp.cdb` with a command like:

```
tcprules /etc/tcp.smtp.cdb /etc/tcp.smtp < /etc/tcp.smtp
```

3 Teamware Office configuration

Please keep in mind that Qmail is not DSN aware, so you will not be able to receive DSN reports for your outgoing messages if they are relayed through Qmail.

Also remember that if your incoming mail is being delivered to Teamware Office through Qmail, for each incoming message that requests DSN reports the originator will receive a "Relayed to non-DSN aware server" report, and the DSN requests will be deleted from the message header.

However, you can set Teamware Office to send by default different levels of DSN reports (All, Failure or None), even if they are not specifically requested. This is done with the Admin client in Connector for MIME section, Miscellaneous page.

If you are using Qmail as outgoing SMTP server, for each outgoing message requesting DSN notifications the MIME Connector will return a "Relayed to non-DSN aware MTA" report to the sender, after passing the message to Qmail. You can define the way in which these reports are treated, using the `deliver_relayed_dsn` option in the [MIME] section of `to.ini`. Possible settings are:

- `deliver_relayed_dsn = 0` (default) : Relayed DSN reports are treated as Teamware Office reports and handled accordingly, updating the status of the sent message to "Delivered to non-DSN aware MTA".
- `deliver_relayed_dsn = 1` : The reports are delivered to the sender as new messages.
- `deliver_relayed_dsn = 2` : The reports are discarded.

The last option, to discard Relayed DSNs, is the most suitable when delivering messages through Qmail. It reduces the load on your server, which doesn't have to process this way a new report for each outgoing message requesting DSNs. It will also prevent the situations when a "Delivered to non-DSN aware MTA" status prevents the sender from receiving failure notices.

If Relayed DSN reports are discarded, this does not mean that other DSN or RN reports will be discarded. So, if the recipient's mail server or client is set to generate these reports even if they are not specifically requested, the status of the sent message will be updated accordingly.

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Three other configuration parameters in the `[MIME]` section of `to.ini` are also recommended to be set. The first is `no_relay = 1` which prevents your Teamware Office server from being used for relaying. This way, when MIME Connector receives messages with recipient base addresses not declared on that server, it doesn't have to waste more time trying to find a route for that message.

The other two parameters are `mode` and `allow`. They define what messages are accepted by the server, when Teamware Office is configured as if sendmail is not installed on that server. For `mode`, possible values are:

- `any` : All incoming messages are accepted, regardless of their base address.
- `list` : Incoming messages are accepted only for domains listed after on lines like `allow=accepted.domain.com`. The list should contain the domains for which that Teamware Office server is defined as a MIME Gateway.
- `strict` : The server will accept only messages having the base address identical with (one of) the base address(es) defined for that server. In other words, only messages meant for that server are accepted.

4 Integrating Qmail with Teamware Office

As you will see below, the integration methods can be classified by multiple criteria:

- By the method Qmail uses to deliver messages to Teamware Office: `torecvm` or SMTP.
- By the method used by Qmail to make the routing: `~alias/.qmail-default`, `virtualdomains`, `qmail-users`, `smtproutes` etc.
- By the method Qmail will use to decide which mails are to be routed to Teamware Office: domain-based or user-based.
Domain-based routing means that Qmail determines if a recipient address belongs to a Teamware Office user from the domain part (base address). Therefore, Teamware Office base addresses and Qmail base addresses must be different, for example `@company.com` for Qmail and `@tw.company.com` for Teamware Office.
The user-based routing means the decision will be made based on the user part of the recipient address (e.g. `john.woo@company.com`). This means that both Teamware Office and non-Teamware Office users on the system will be able to share the same base address.

IMPORTANT NOTE: When using user-based routing, you should define from the start clear and distinct naming rules for the mail addresses. For example, you could use addresses like `johnw@company.com` for Linux/Qmail users and `john.woo@company.com` or `tw.john.woo@company.com` for Teamware Office users. This will also allow an easy switching between different routing models, when needed.

4.1 Using local deliveries with `torecvm`

Before choosing this integration method, you should be aware of the limitation of "piping" mails from Qmail to `torecvm`. The most noticeable one is this: Qmail will not set the "Return Path" header when it passes the message to `torecvm`, which, although it doesn't affect the delivery of the message, prevents the possibilities of generating receipt notifications (RNs), as RFC 2298, section 2.1 states:

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MDNs SHOULD NOT be sent automatically if the address in the `Disposition-Notification-To` header differs from the address in the `Return-Path`.

You should consult the section **4.2 Using SMTP deliveries** too before making a decision.

When you want Qmail to deliver messages to Teamware Office using `torecvm`, you must first configure Teamware Office as if Sendmail is installed on your server. You can do this by using `to config` and modifying the MIME Connector service configuration.

Then you have to instruct Qmail to treat all the base addresses used by Teamware Office as being local addresses. Add them to the Qmail control files `rcpthosts` and `locals`.

You will instruct Qmail to deliver the messages to `torecvm` by inserting in various Qmail configuration files (as you will see below) a line like:

```
| /usr/bin/torecvm -d/to/smtp -pA -f"$SENDER" -r"$RECIPIENT"
```

Where:

- `| /usr/bin/torecvm` : Tells Qmail to what program to deliver the message to and how (pipe in this case).
- `-d/to/smtp` : Instructs `torecvm` where to place the message files. If your Teamware Office server root directory is different than `/to`, replace accordingly.
- `-pA` : This is a `torecvm` switch. It means that Teamware Office will generate all types of delivery reports (success and failure). Other options are `-pF` (to produce only Failed delivery reports) and `-pN` (to produce No reports).
- `-f"$SENDER" -r"$RECIPIENT"` : Passes to `torecvm` the sender and recipient(s) of the message. The environment variables `$SENDER` and `$RECIPIENT` are set by Qmail for each message delivery.

IMPORTANT NOTE: As you noticed, the variables are enclosed in quotation marks. If you don't do that, and if `$SENDER` or `$RECIPIENT` are empty strings (e.g. in the case of some status reports), you will get Qmail delivery errors.

4.1.1 Using local deliveries with `torecvm` and `~alias/.qmail-default`

This method is suitable both for domain-based and user-based routing.

`alias` is a generic user created by Qmail for handling mails addressed to users that were not identified as Linux users or aliases declared in the `assign` file. You can create in the Qmail home directory a series of `.qmail` files for handling such e-mails. For example, you can create a file called `.qmail-postmaster` to handle the mails for the

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postmaster user. Please consult Qmail documentation for more information about using `.qmail` files.

If the above mentioned methods for determining the recipient of a mail have failed, Qmail will check for rules in the `~alias/.qmail-default` file. Insert in this file a line like:

```
| /usr/bin/torecvm -d/to/smtp -pA -f"$SENDER" -r"$RECIPIENT"
```

This will determine that all mails that can't be delivered locally by Qmail will be passed to `torecvm`.

4.1.2 Using local deliveries with `torecvm` and `virtualdomains`

This method is suitable for domain-based routing.

`virtualdomains` is a method used by Qmail to direct all messages having a specific base address to a user's mailbox (this is why it's called *virtual*). The idea in our case is to redirect the mails for that user not to its mailbox, but to `torecvm`.

You will have to declare the base addresses used by Teamware Office in the Qmail control files `rcpthosts` and `virtualdomains`. Do NOT declare them in the `locals` control file. `Virtualdomains` must contain lines like the one below, one for each Teamware Office base address:

```
tw.company.com:twu
```

Where:

- `tw.company.com` is one of your Teamware Office base addresses.
- `twu` is the name of the Linux user designated to receive the messages for that domain. It can be any user in your system, and you can use the same user for all the base addresses that need to be routed.

Then, in that user's home directory, modify the `.qmail-default` file to contain the line:

```
| /usr/bin/torecvm -d/to/smtp -pA -f"$SENDER" -r"$DEFAULT"@"$HOST"
```

Note that in this case two Qmail environment variables are used to create the recipient address: `$DEFAULT` and `$HOST`. This is so because, when using `virtualdomains`, Qmail appends the name of the user used for routing, followed by a dash, to the beginning of the recipient address.

For example: an original recipient address `john@tw.company.com` will become `twu-john@tw.company.com`. The `$SENDER` Qmail environment variable will contain the original, also called *default*, user part of the recipient address (`john` in our example) and `$HOST` will contain the domain part of the original recipient address (`tw.company.com` in our example).

4.1.3 Using local deliveries with torecvm and qmail-users

This method is suitable for user-based routing.

In Qmail, you can create alias databases with `qmail-users`. In the `/var/qmail/users/assign` file it is possible to assign different addresses to users. This is done by inserting in that file lines in the form:

```
=local:user:uid:gid:homedir:dash:ext:
```

This means that all addresses like `local@` will be delivered to `user`, with user ID `uid` and group ID `gid`, and with the delivery rules specified in `homedir/.qmaildashext`.

The above is a one-to-one assignation. For integration with Teamware Office, you will need to use wildcards, so the line should look like:

```
+tw.:twu:503:503:/home/twu:-::
```

The fields are explained below. You must use values suitable for your system.

- `+tw.` : The prefix used to identify the Teamware Office addresses, for example `tw.john@company.com`. Of course, you can use any prefix you want for your system. All addresses starting with that prefix will be directed to the Linux user specified in that line. Unfortunately, it is not possible in Qmail to define suffixes like `john.tw@company.com`.
- `twu` : The user to whom the mails will be redirected.
- `503:503:/home/twu` : The user ID, group ID and home directory of the user to whom the mails will be redirected.
- `:-: :` This means that the delivery instructions will be stored in the `.qmail-default` file from the user's home directory. That file should contain a line like:

```
| /usr/bin/torecvm -d/to/smtp -pA -f"$SENDER" -r"$RECIPIENT"
```

It is not advisable to specify an extension in `/var/qmail/users/assign` for integration with Teamware Office. If you do that, for example with a line like:

```
+tw.:twu:503:503:/home/twu:-:ext:
```

You will have to create a `.qmail-extname` for each recipient address like `tw.name@company.com`.

You can define as many rule lines in `/var/qmail/assign` as you want, but the last line must contain only a dot (".") by itself. After inserting all the needed rules, you must compile the file in the `cdb` format needed by Qmail, using the command `qmail-newu`.

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Also, it is possible to make different address manipulations in the `.qmail-default` file. For example, beside `$RECIPIENT` (for example `tw.john@company.com`), there are other variables available, such as `$DEFAULT` (containing `john` in our example), `$LOCAL` (containing `tw.john`) and `$HOST` (containing `company.com`). So you could use a command like:

```
| /usr/bin/torecvm -d/to/smtp -pA -f"$SENDER" -r"$DEFAULT"@tw.comp.com
```

This will rewrite the recipient address `tw.john@company.com` to `john@tw.company.com`. For more details on this, please see the `.qmail-command` man pages.

4.2 Using SMTP deliveries

If you plan to install Qmail and Teamware Office on the same machine, you have to define Teamware Office Connector for MIME SMTP port number to be something else than 25 (which will be used by Qmail), for example 2025. This is done from the Admin client, Connector for MIME section, Miscellaneous page.

Then you will have to configure the Connector for MIME, with `to config`, as if Sendmail is not installed on that machine. This will determine Teamware Office to accept SMTP connections on the port you defined above. This will determine the Teamware Office Connector for MIME to start the SMTP Responder process, which will listen for incoming SMTP connections.

If you plan to use Qmail and Teamware Office on different machines, there is no need to change Teamware Office's SMTP port number.

4.2.1 Using SMTP deliveries with `smtproutes`

This method is suitable for domain-based routing.

First of all, you have to declare your Teamware Office base address(es) in the `rcpthosts` control file. Make sure those base addresses do NOT appear in the `me` or `locals` control files, otherwise Qmail will use local delivery mechanisms.

Then define in the `smtproutes` control file the Teamware Office server to receive messages, inserting lines like:

```
tw.company.com:tw.server.company.com:2025
```

Where:

- `tw.company.com` : The base address to route.

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- `tw.server.company.com` : The FQDN (Fully Qualified Domain Name) of the Teamware Office server which handle that base address. You can also use IP addresses, but you have to enclose them in square brackets, for example: `[1.2.3.4]` (of course, replacing `1.2.3.4` with the real IP of the server).
- `2025` : The SMTP port number of the destination server. If the port number is `25`, you can leave the field empty.

You can also omit either the base address or the destination server, and you can use wildcards:

```
.tw.company.com:
```

In this case, all addresses ending with `.tw.company.com` (i.e. `john@srv1.tw.company.com`), but not `@tw.company.com` itself, will be routed according to their MX records on the Qmail server.

```
:tw.server.company.com
```

In this case, all the addresses that are not declared as local for Qmail will be artificially routed (to distinguish from the routing determined by the MX records) to the `tw.server.company.com` server.

If you have Qmail and Teamware Office running on the same machine, having SMTP port numbers `25` and `2025` respectively, and if you want all addresses that are not declared as local for Qmail to be routed to the Teamware Office server, `smtproutes` should contain a line like:

```
:[127.0.0.1]:2025
```

You can have as many routing rules as you want in `smtproutes`, but the messages will be handled only by the first one (in the order of appearance) that matches them.

Please keep in mind that local deliveries take precedence over `smtproutes`, which in turn takes precedence over the rules defined with MX records.

4.2.2 Using SMTP deliveries with `~alias/qmail-default` and `qmail-remote`

This method is suitable both for user-based and domain-based deliveries.

`qmail-remote` is the program used by the Qmail system to deliver messages to remote servers. You will use `~alias/qmail-default` to intercept all the messages that are not locally deliverable by Qmail (see section **4.1.1 Using local deliveries with `torecvm` and `~alias/qmail-default`** for more details on `.qmail-default`).

Insert in `~alias/qmail-default` a line like:

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```
| qmail-remote tw.server.company.com "$SENDER" "$RECIPIENT"
```

Where:

- | qmail-remote : Is the program used by Qmail to send messages to remote servers with SMTP.
- tw.server.company.com : The Fully Qualified Domain Name (FQDN) of the your Teamware Office Connector for MIME machine that will receive the messages. You can also use IP addresses, but you have to enclose them in square brackets: [1.2.3.4].
- "\$SENDER" "\$RECIPIENT" : The sender and the recipient(s) of the message.

By default, qmail-remote will send the messages to the machine tw.server.company.com on the SMTP port number 25. If MIME Connector uses a different SMTP port number, or if the Qmail server can't resolve that machine name, you will have to declare in smtproutes a line like:

```
tw.server.company.com:[1.2.3.4]:2025
```

Or, if Qmail and Teamware Office are installed on the same machine:

```
tw.server.company.com:[127.0.0.1]:2025
```

Doing this, you let Qmail know the IP address and the SMTP port number for the tw.server.company.com machine. See **4.2.1 Using SMTP deliveries with smtproutes** for more details.

If needed, you can modify the recipient address, for example by replacing "\$RECIPIENT" with "\$LOCAL"@tw.company.com. In this case, a recipient address like john@company.com will be rewritten as john@tw.company.com.

Please do not forget that, if the Teamware Office base address(es) are also declared local for Qmail, you will have to make sure that the user name in the e-mail addresses are different. For example, you can use addresses like johnw@company.com for Qmail users and john.woo@company.com for Teamware Office users. Otherwise, Qmail will deliver the messages to the Qmail mailboxes, without routing them to Teamware Office.

For special accounts, such as root, postmaster, webmaster etc. there is no need to create dedicated Teamware Office accounts. You can create instead ~alias/qmail-root, ~alias/qmail-postmaster, ~alias/qmail-webmaster etc. files, containing lines like:

```
| qmail-remote tw.server.com "$SENDER" admin@"$HOST"
```

This will cause all the mail for those accounts to be delivered to the admin@company.com Teamware Office mailbox.

4.2.3 Using SMTP deliveries with qmail-users and qmail-remote

This method is suitable for user-based routing.

It is similar with method **4.1.3 Using local deliveries with torecvm and qmail-users**. You only need to replace in `/home/twu/.qmail-default` the `torecvm` delivery with SMTP delivery, inserting a line like:

```
| qmail-remote tw.server.com "$SENDER" "$RECIPIENT"
```

Please see also **4.2.2 Using SMTP deliveries with ~alias/.qmail-default and qmail-remote** for details on `qmail-remote`.

4.2.4 Using SMTP deliveries with ~alias/.qmail-default by forwarding

WARNING! This method is presented just to show the use of the `forward` Qmail command and how to create alias base addresses for Teamware Office. The major disadvantage of this method is that `forward` converts all the recipient types to BCC. The only way to correct that is to create your own header manipulation program.

Nevertheless, the techniques used here might prove useful under special circumstances, so you should have a look at them.

As on method **4.1.1 Using local deliveries with torecvm and ~alias/.qmail-default**, you will use `~alias/.qmail-default` to intercept the messages for which Qmail can't find a local recipient. But the `~alias/.qmail-default` will contain this time a line like:

```
| forward "$LOCAL"@tw.company.com
```

Where:

- `| forward` : The Qmail program that forwards the mail to another address(es).
- `"$LOCAL"` : The user part of the original recipient address.
- `tw.company.com` : The base address to substitute the original recipient base address. The `tw.company.com` base address must NOT appear in the `locals` control file. This base address substitution is necessary because otherwise the message will generate a loop and will eventually be discarded by Qmail, since `forward` injects the message back in the Qmail processing system.

Then declare in the `smtproutes` control file which server handles the new base address. For example, if Qmail and Teamware Office Connector for MIME are installed on the

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same machine, with Teamware Office having the SMTP port number 2025, `smtproutes` will contain:

```
tw.company.com:[127.0.0.1]:2025
```

See **4.2.1 Using SMTP deliveries with `smtproutes`** for more details.

For Teamware Office users, the base address is declared to be the same as the base address used by Qmail (i.e. `@company.com`). Therefore, you will have to instruct Teamware Office to treat `@tw.company.com` as being an alias for `@company.com`. This is done by adding in the `tombsmtp.ini` file, after the line `own_node = company.com`, a line like:

```
own_node = A:tw.company.com
```

Therefore, the route of the message for the Teamware Office user `john@company.com` will be:

- i. Delivered to Qmail with recipient `john@company.com`.
- ii. Forwarded back to Qmail with the recipient `john@tw.company.com`.
- iii. Sent via SMTP to the Teamware Office server with the recipient `john@tw.company.com`.
- iv. Delivered to the Teamware Office user with the recipient address `john@company.com`.

5 General qmail tips

- All the Qmail environment variables (such as `$SENDER` or `$RECIPIENT`) support UNIX-style manipulations. There are many Qmail environment variables that you can use for address rewriting.

For example, you can change the base address in an address by replacing "`$RECIPIENT`" with strings like:

- "`$LOCAL`"@"`$HOST`" : This will compose the recipient address from the original recipient user and domain parts.
- "`$LOCAL`"@`my.domain.com` : This allows you to explicitly change the domain part of an address into `@my.domain.com`.
- "`$LOCAL`".`tw@twsrv.`"`$HOST` : This will add the `.tw` suffix to the user part of the address and the `twsrv.` prefix to the domain part. For example `john@company.com` will be rewritten as `john.tw@twsrv.company.com`.

Please consult the Qmail documentation and the `qmail-command` man pages for more details.

- If certain users in your system require different routing rules beside the global ones that you implemented, you can adapt some of the techniques described in this document. For example, you should always create an alias for the `root` user. By default, for security reasons, mail can't be delivered in the mailbox or maildir of the `root` user. Other aliases advisable to create (depending on your system) are: `postmaster`, `webmaster` etc. Here are two example of the methods you can use:
 - Use `~alias/.qmail` files to declare simple aliases. For example, create an `~alias/.qmail-root` file to declare who will receive the mail for the user `root`. That file can contain a simple user name (e.g. `john`) or a complete e-mail address (e.g. `admin@tw.company.com`).
 - Use `/var/qmail/users/assign` to declare more complex alias addresses and different `.qmail` rule files.
- You can use the `.qmail` control files to forward mails to multiple addresses. For example, you can create a `sales` user which automatically forwards all the messages to the members of your Sales department. You accomplish that by inserting in the `.qmail` file in the `sales` home directory the addresses of the Sales members, one per line.

Besides simple group forwarding, Qmail handles very well mailing lists, via the `ezmlm` package. You could find this feature useful, for example, to create

announcement mailing lists for your customers. More information can be found at <http://cr.yip.to/ezmlm.html>.

6 Additional resources

The list below presents a number of Internet resources that you might find useful. We take this opportunity to express our gratitude to the people behind them.

- www.qmail.org : The official Qmail web site.
- <http://cr.yip.to> : The site of Dan J. Bernstein, the author of Qmail.
- qmail-help@list.cr.yip.to : The Qmail mailing list.
- <http://www.archive.ornl.gov:8000> : Search engine for the Qmail mailing list.
- <http://cr.yip.to/qmail/faq.html> : An Qmail FAQ.
- <http://www.qmail.org/man.tar.gz> : The tarball man pages for Qmail, in HTML format.
- <http://www.palomine.net/qmail/relaying.html> : A guide for relaying with Qmail.
- www.nrg4u.com : Information about how Qmail works, including graphic charts of message flow.
- <http://Web.InfoAve.Net/~dsill/lwq.html> : "Life with Qmail", written by Dave Still, a very good document about installing and using Qmail.
- <http://cr.yip.to/ucspi-tcp.html> : The `tcpserver` page on D.J. Bernstein's site.