

# Exim Process Structure

The Advantages of Anarchy over Central Control

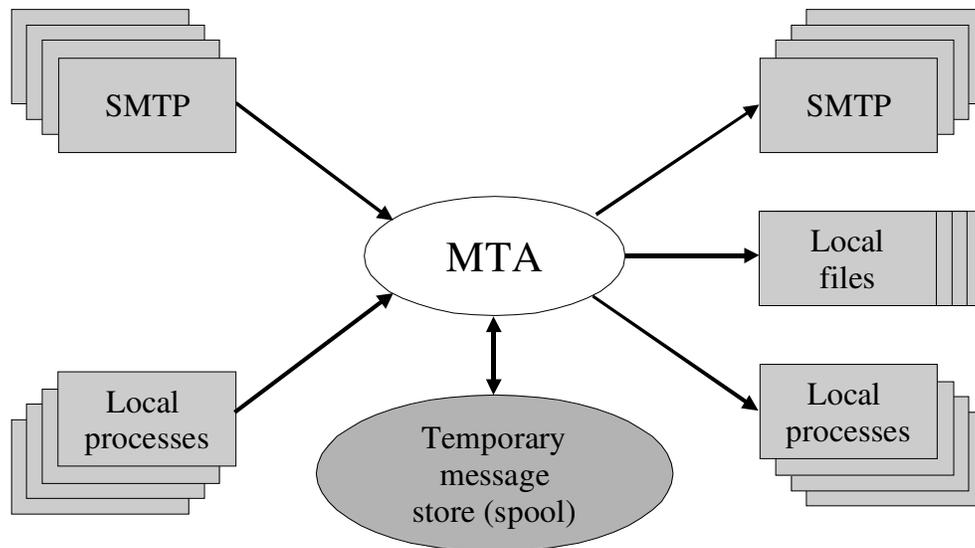
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<http://www.exim.org>

## The Life of an MTA



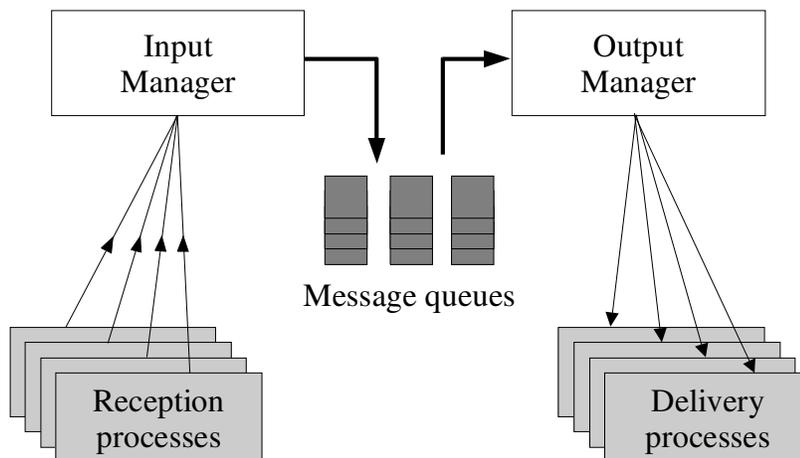
## Managing Multiple Processes

- Central control: all decisions taken centrally



- Anarchy: all decisions taken locally

## A Hypothetical MTA NOT Exim!



## Advantages of central control

- Can easily limit the resources used  
(for example, the number of processes)
- Entire MTA can be stopped and started easily
- Collection of “on the fly” statistics is straightforward
- Easy to batch up messages for the same remote host  
This makes supporting ETRN straightforward

## Disadvantages of central control

- Bottlenecks: everything passes through one control point  
Delays when busy
- A problem in a central process kills all mail
- Many long-lived processes  
Avoiding memory leaks is hard  
Cross-contamination must be avoided
- Danger of corruption of long-term in-memory data

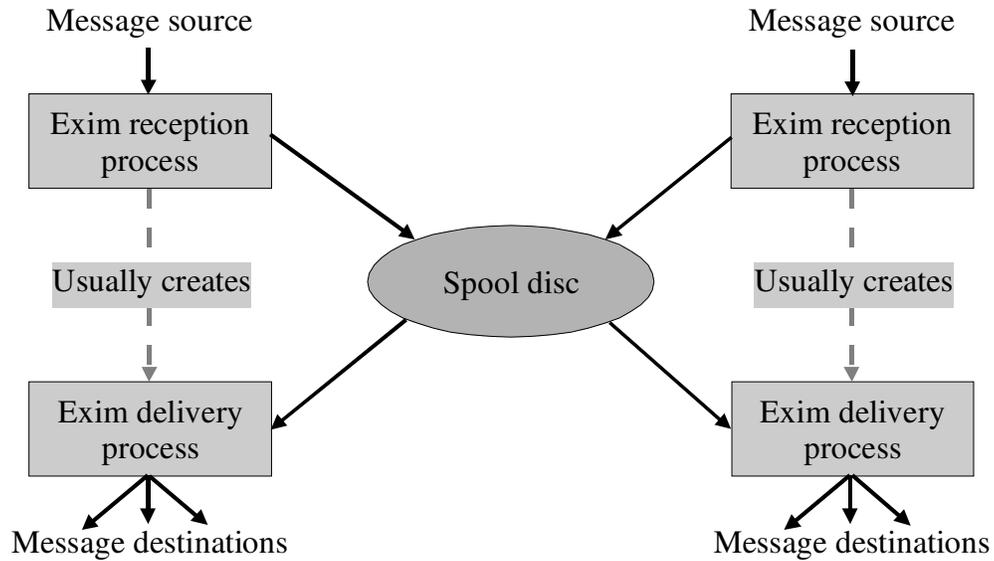
## The Exim way (1)

- Processes are short lived (with one exception)  
A process does one job, then finishes
- A reception process handles one incoming connection  
In SMTP, this may involve several messages
- A delivery process delivers one message  
There may be multiple recipients
- There are no message queues  
There is just a pool of message files on disc

## The Exim way (2)

- The daemon process *is* long lived, but is not complicated  
Listens for SMTP connections; forks for each one  
Starts queue runner processes at fixed intervals
- A queue runner process makes one pass through the pool  
A delivery process is started for each message  
The delivery process takes all the decisions  
The queue is processed in a random order
- In a conventional configuration, queue runners handle  
retries, not first delivery attempts

## Exim message handling



## Restrictions on anarchy

- **Prevent system overload**  
`queue_only_load = 5`  
`deliver_queue_load_max = 7`
- **SMTP input limits**  
`smtp_accept_max = 200`  
`smtp_accept_queue = 150`  
`smtp_accept_queue_per_connection = 10`
- **Parallel remote delivery**  
`remote_max_parallel = 10`
- **Manual delivery control is possible**  
`queue_only = true`  
Manually start queue runner processes as required

## Disadvantages of the Exim way

- Less central control (surprise, surprise)  
Harder to do inter-process coordination
- Cannot directly limit number of Exim processes
- Cannot stop or start the whole MTA trivially
- Statistics only by postprocessing the log
- Only occasional batching of messages for one host
- ETRN support is possible, but not “natural”  
No per-host queues

## Advantages of the Exim way

- Avoids the bottlenecks of central control  
Improved performance (Exim is limited by disc access)
- A problem with one message or one process does not bring down the whole MTA
- Short lived processes are easier to code  
Improved robustness
- Enough control is available when it is needed  
Flexibility to suit many different environments

## Information about Exim

**<http://www.exim.org/>**

The reference manual and FAQ are online

*The Exim SMTP Mail server: Official Guide for Release 4*

Published by UIT Cambridge (May 2003)

**<http://www.uit.co.uk/exim-book/>**