*:96 Overheads

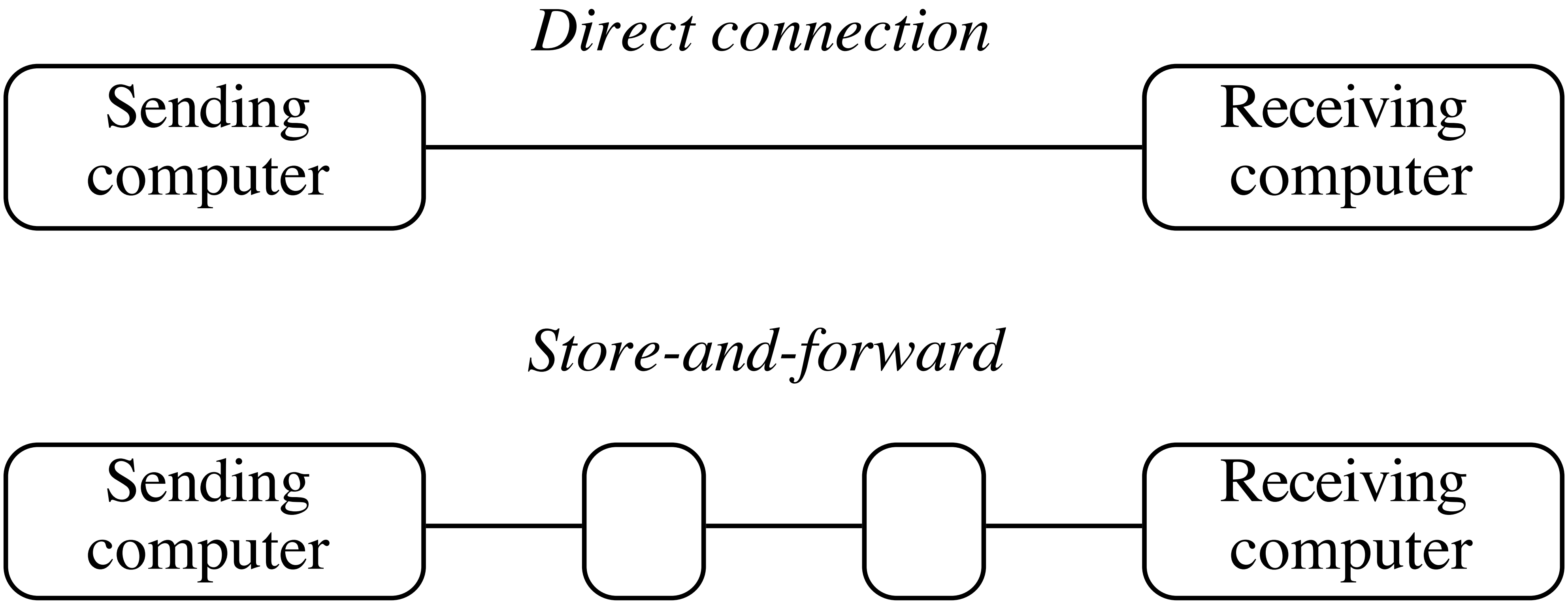
Part 3b: E-mail basics

More about this course about Internet application protocols can be found at URL:

`http://www.dsv.su.se/~jpalme/internet-course/Int-app-prot-kurs.html`

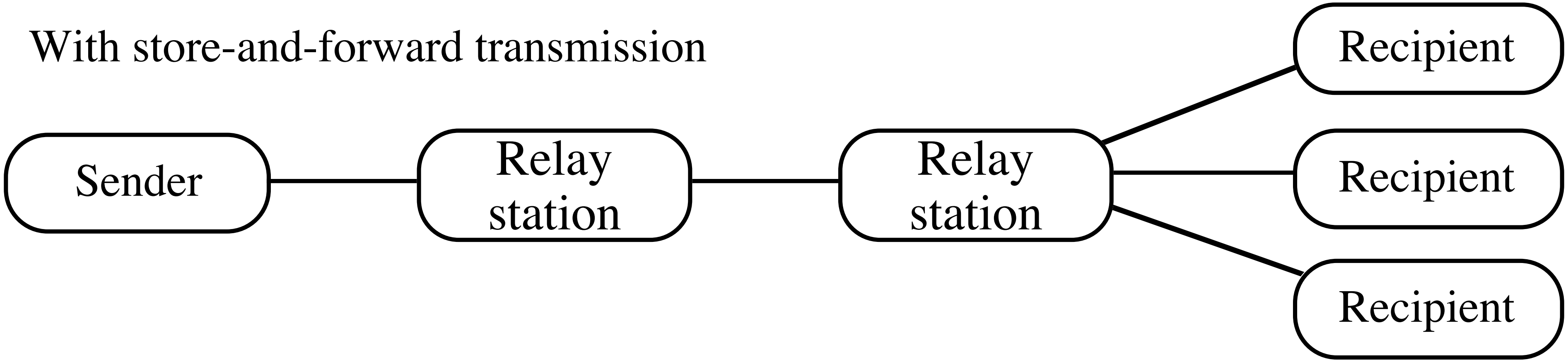
Last update: 23 Dec 2005

Direct connection and store-and-forward

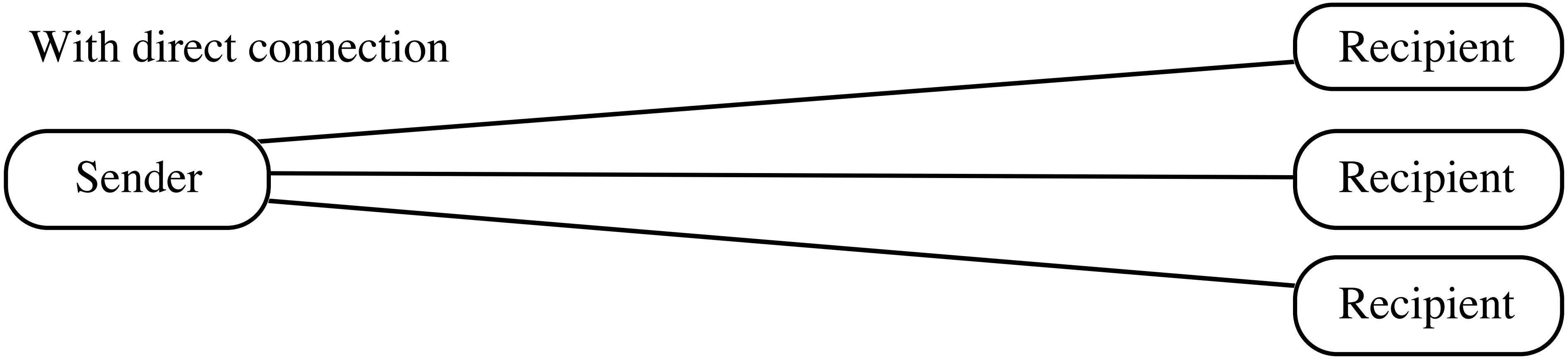


Many distant recipients

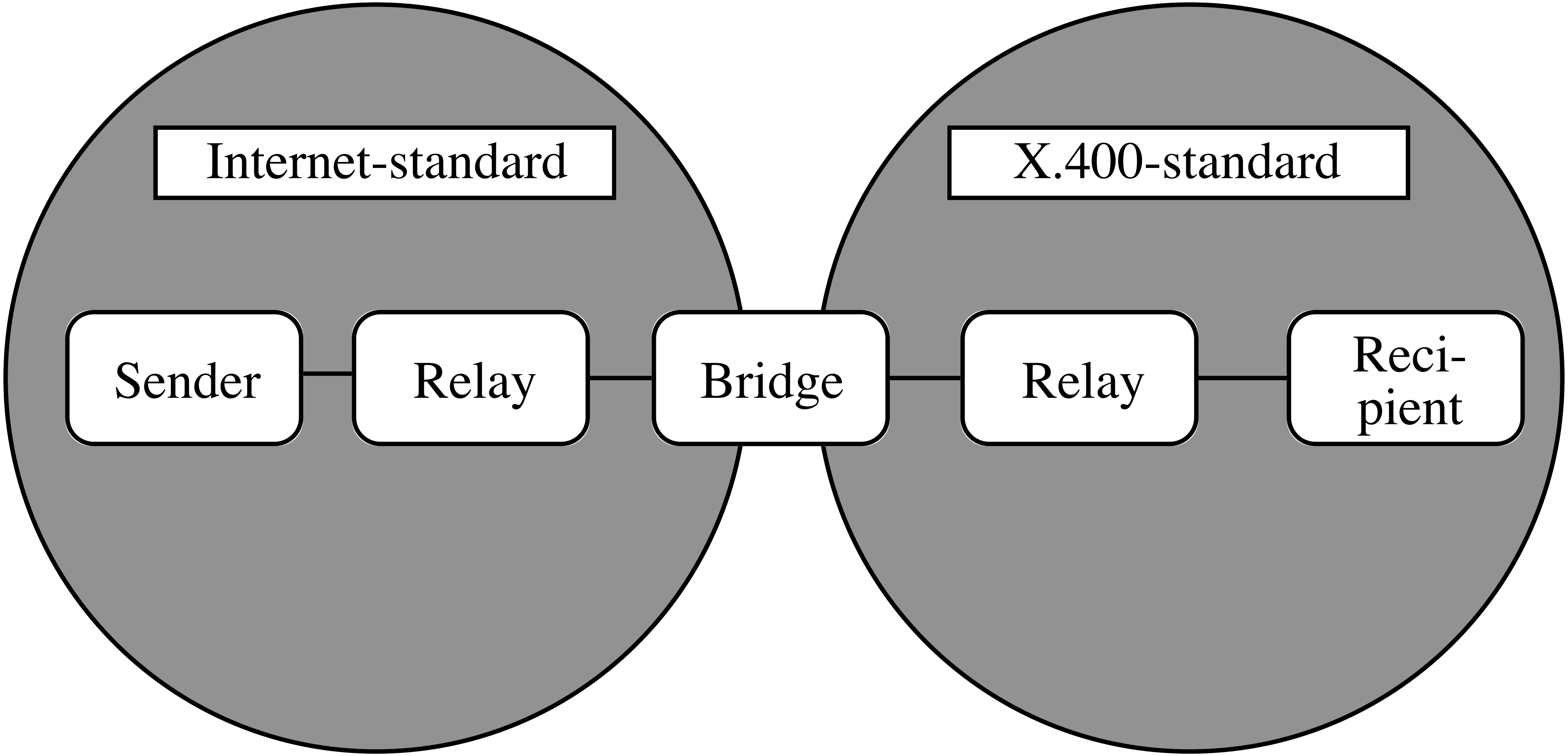
With store-and-forward transmission



With direct connection



Gateways' use of store-and-forward



Store-and-forward pros and cons

+ Distribution of tasks between specialized servers. But direct transmission can employ special routing information servers.
+ Reduced cost for message to many distant recipients.
+ Gateways usually store-and-forward-based.
– Reliability
– Can be more expensive because relayers must be paid.

Spooling - a limited kind of store-and-forward

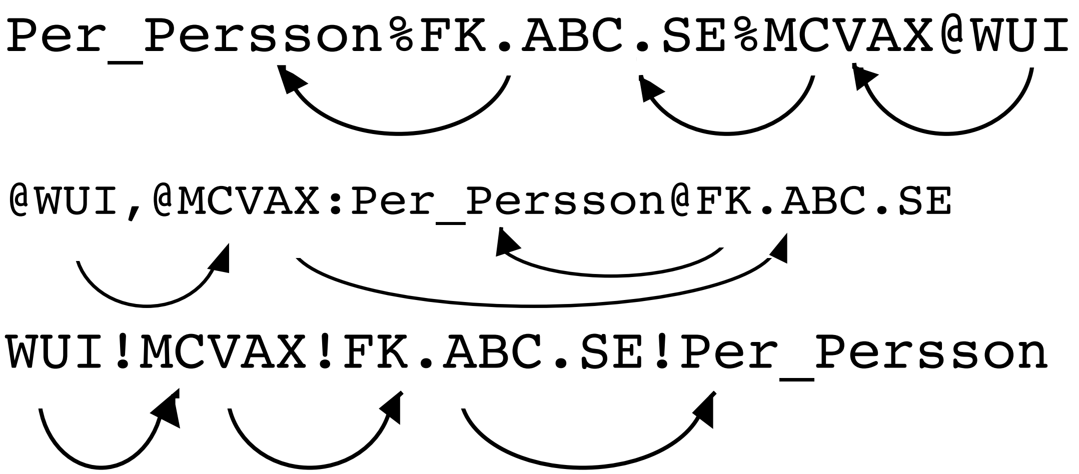
– No direct and immediate confirmation that the message has been delivered.

+ The sender need not wait during the transmission.

+ Temporary connection problems hidden from the user.

Absolute and relative addresses

An *absolute address* is the same address for a certain recipient, irrespective of where the message is sent from. A *relative address* indicates one or more relay stations on the route to the recipients.



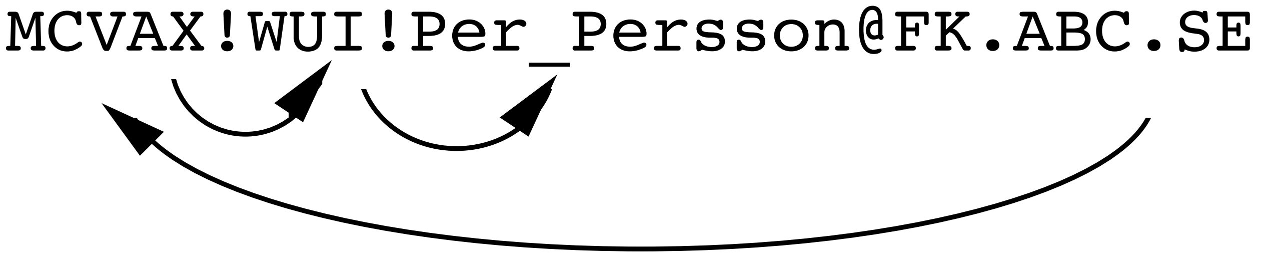
`Per_Persson%FK.ABC.SE%MCVAX@WUI` Grey book mail format

`@WUI,@MCVAX:Per_Persson@FK.ABC.SE` RFC 822 format

`WUI!MCVAX!FK.ABC.SE!Per_Persson` UUCP format

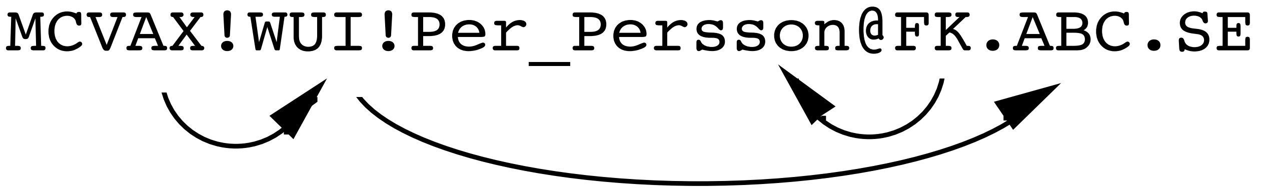
Mixed relative addressing

RFC 822 interpretation



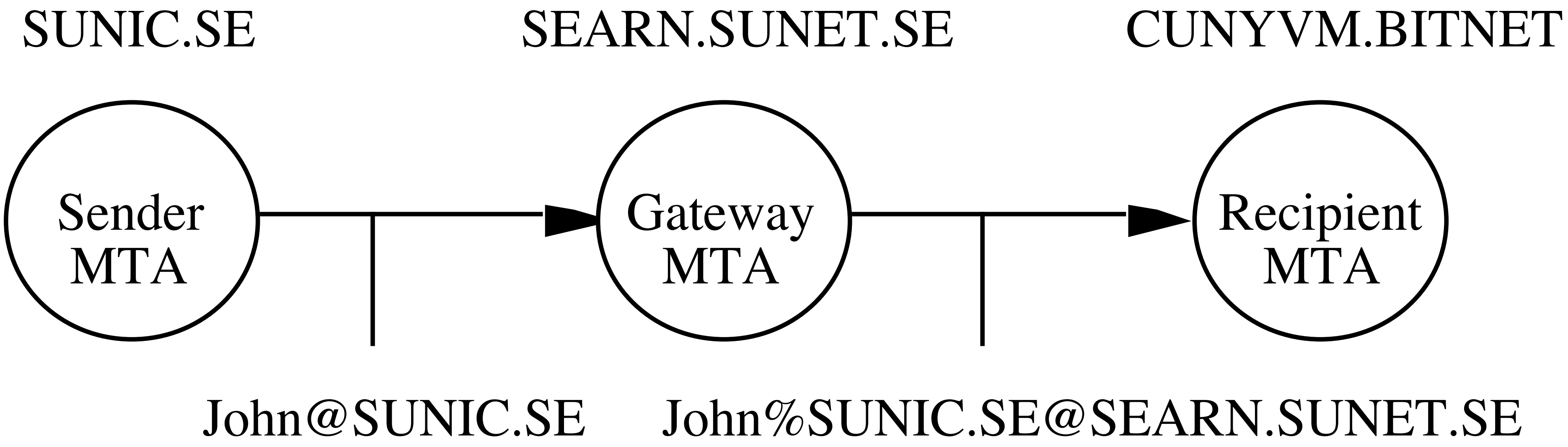
`MCVAX!WUI!Per_Persson@FK.ABC.SE`

older UUCP interpretation

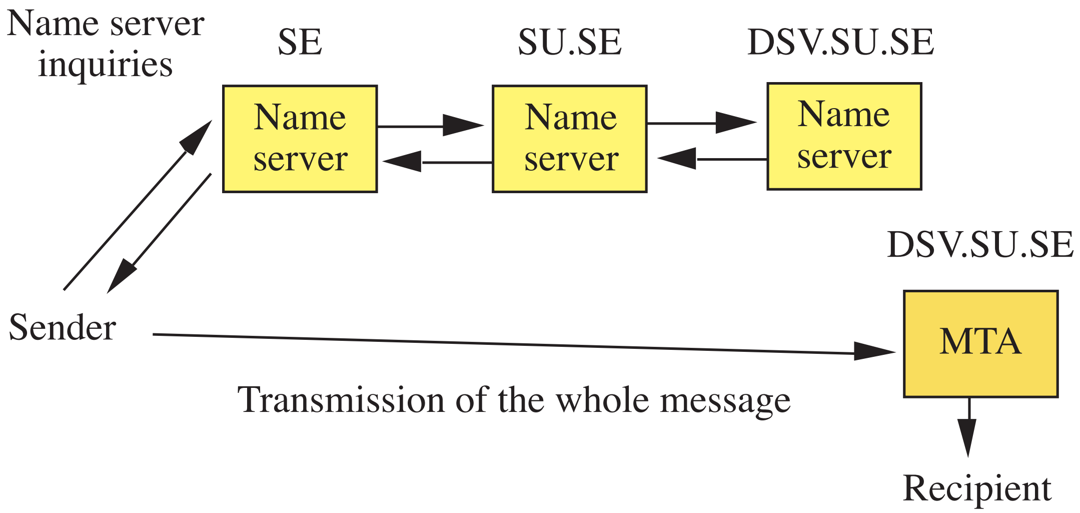


`MCVAX!WUI!Per_Persson@FK.ABC.SE`

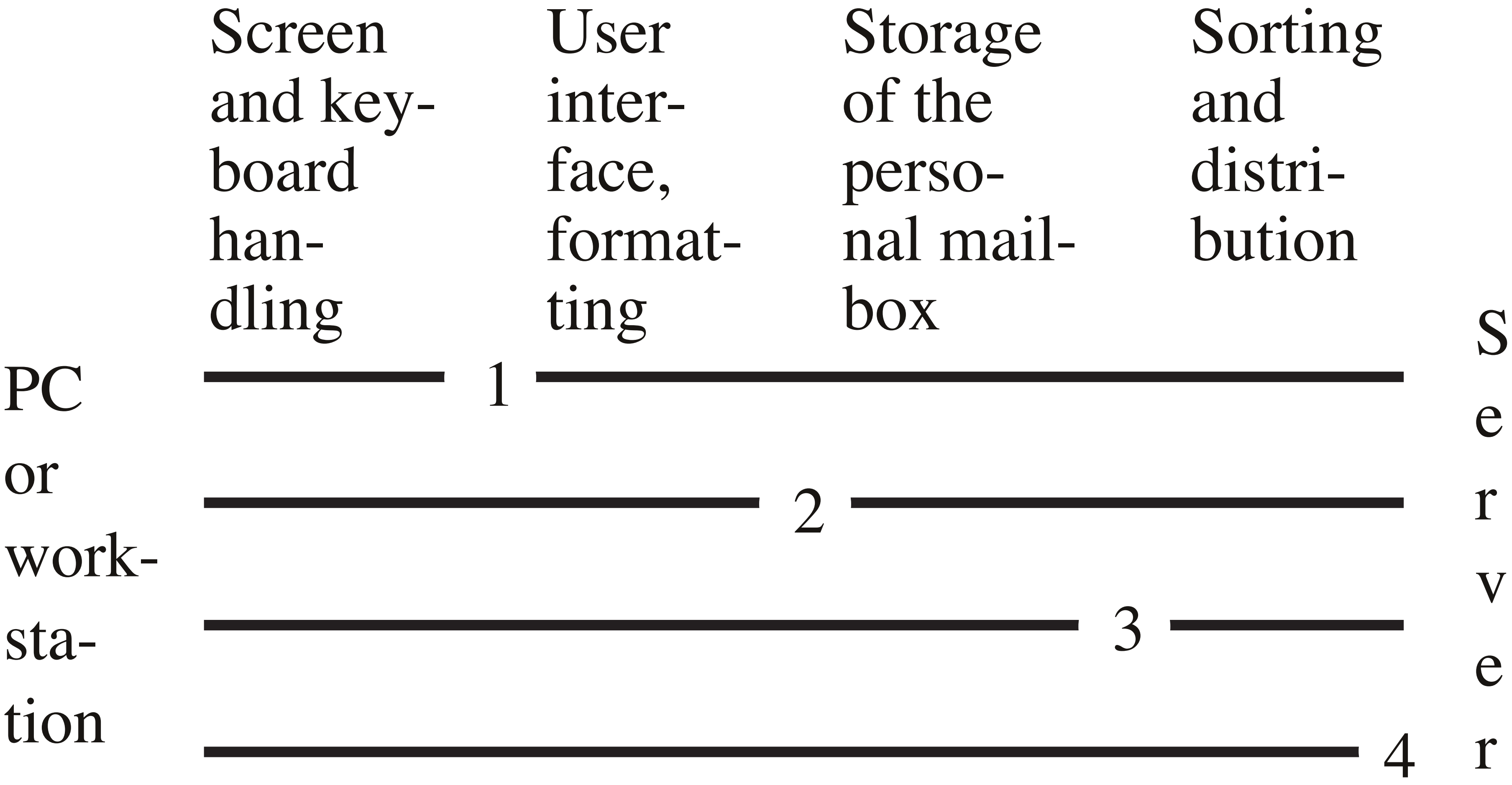
Why gateways produce relative addresses



Use of DNS servers for routing



PC-Server E-mail Architectures



Screen and keyboard handling

User interface, formatting

Storage of the personal mailbox

Sorting and distribution

PC or workstation

1

2

3

4

Server

Protocols: POP (3), IMAP (2, 3)

Public/secret key encryption

encrypted text = f_1(original text)

original text = f_2(encrypted text)

Can f_2 be derived from f_1?

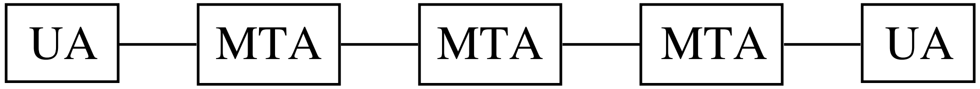
Pros and cons of public key encryption

+ Solves partly key transportation problem

– More CPU-time consuming

Authentication, authorization

- To verify the sender of a message
- Payments, agreements
- UA-UA or MTA-MTA



Authentication methods

(a) Passwords

(b) Specially designed networks

(c) Public key cryptography

Three levels of protection of message transmission:

(1) The agents identify each other using noninvertible forms of ordinary passwords. This is called *weak authentication*.

(2) The agents identify each other using public key encryption algorithms. This is called *strong authentication*.

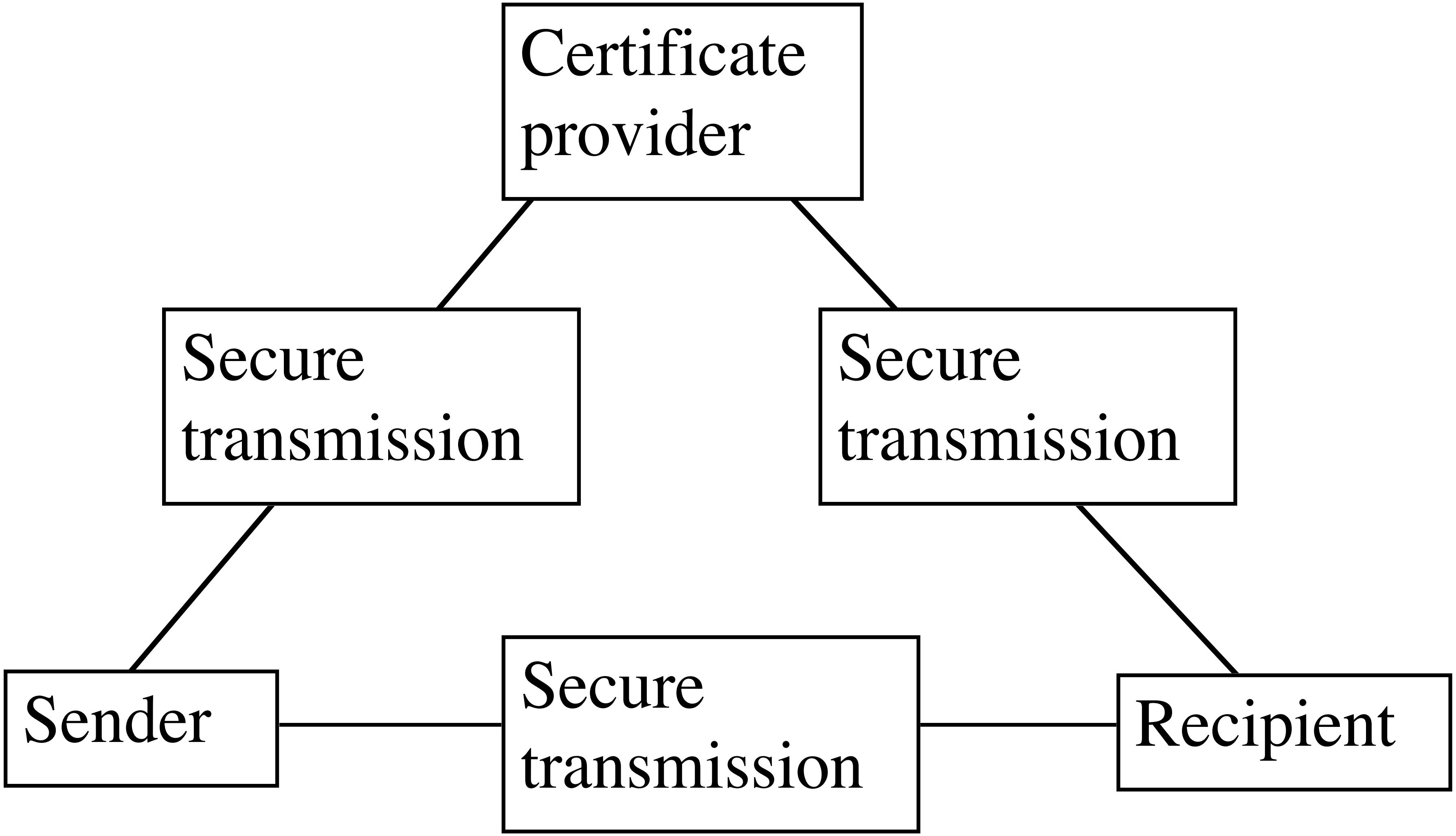
(3) Strong authentication is combined with encryption of all messages during the whole transmission.

Digital Signatures and Digital Seals

Methods: Secret key encryption of signature or checksum, which anyone can decrypt with public key

- Number of interactions
- Need of a neutral third party
- Bilateral or open to groups

Certificate Authorities



Certificate provider

Secure transmission

Secure transmission

Sender

Secure transmission

Recipient