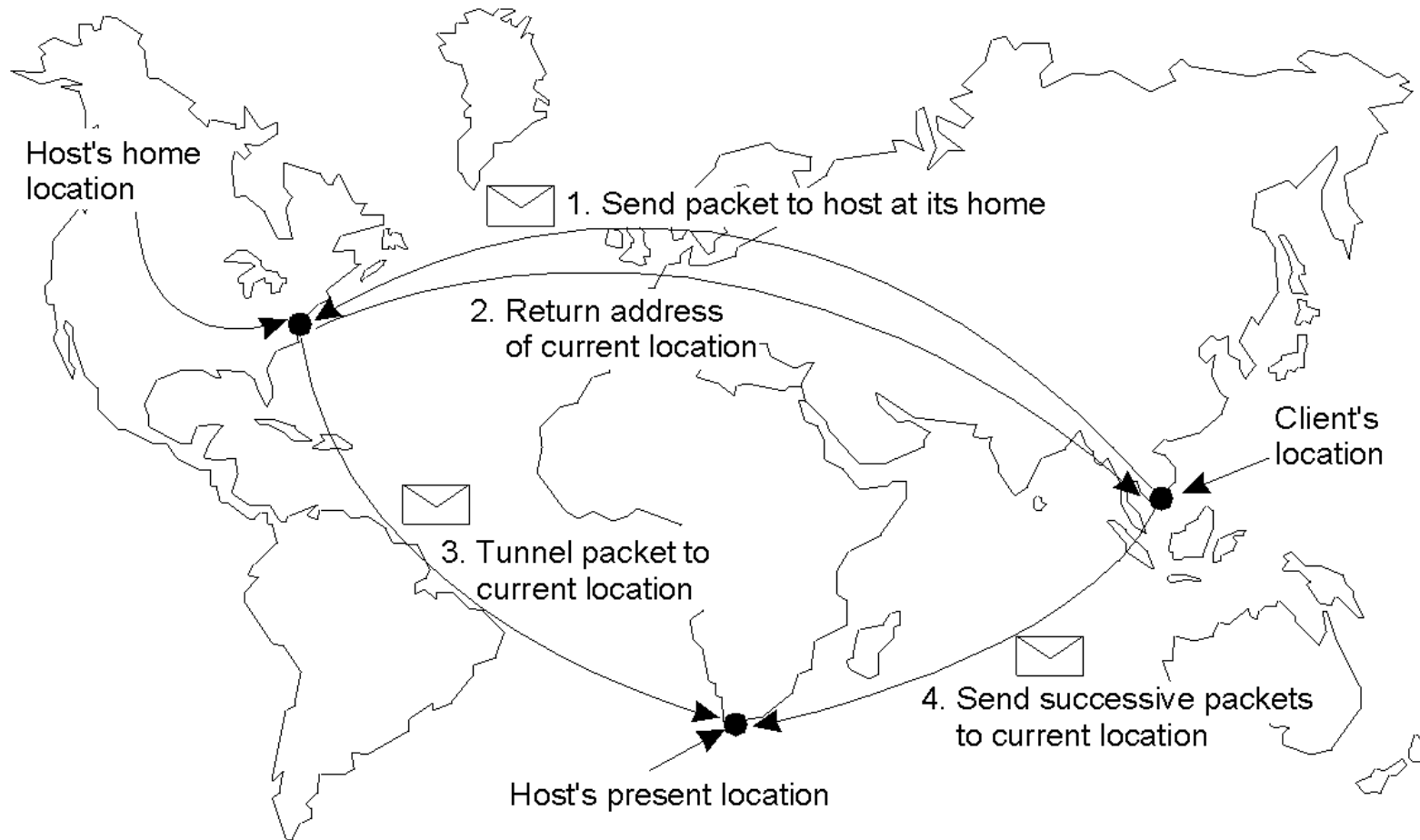# ECE151 – Lecture 6

Chapter 4
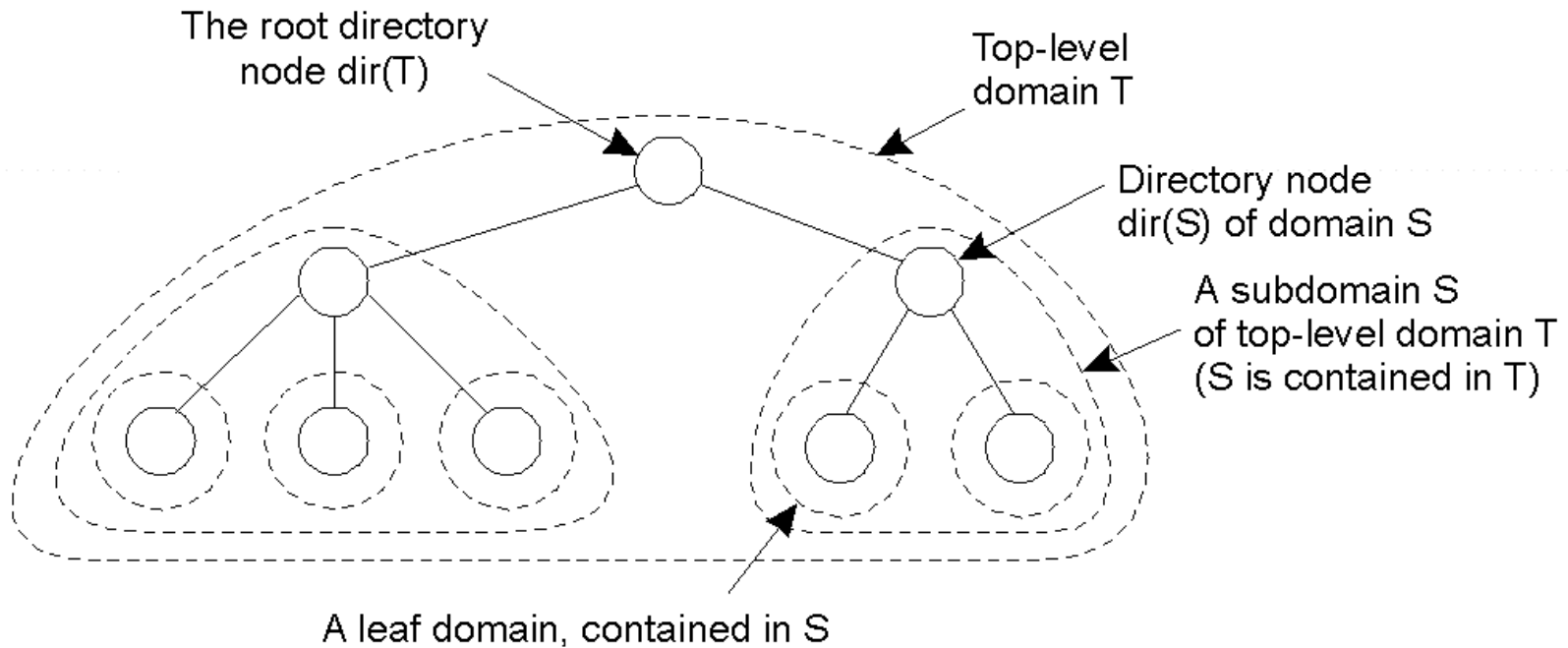Naming

Home-Based Approaches
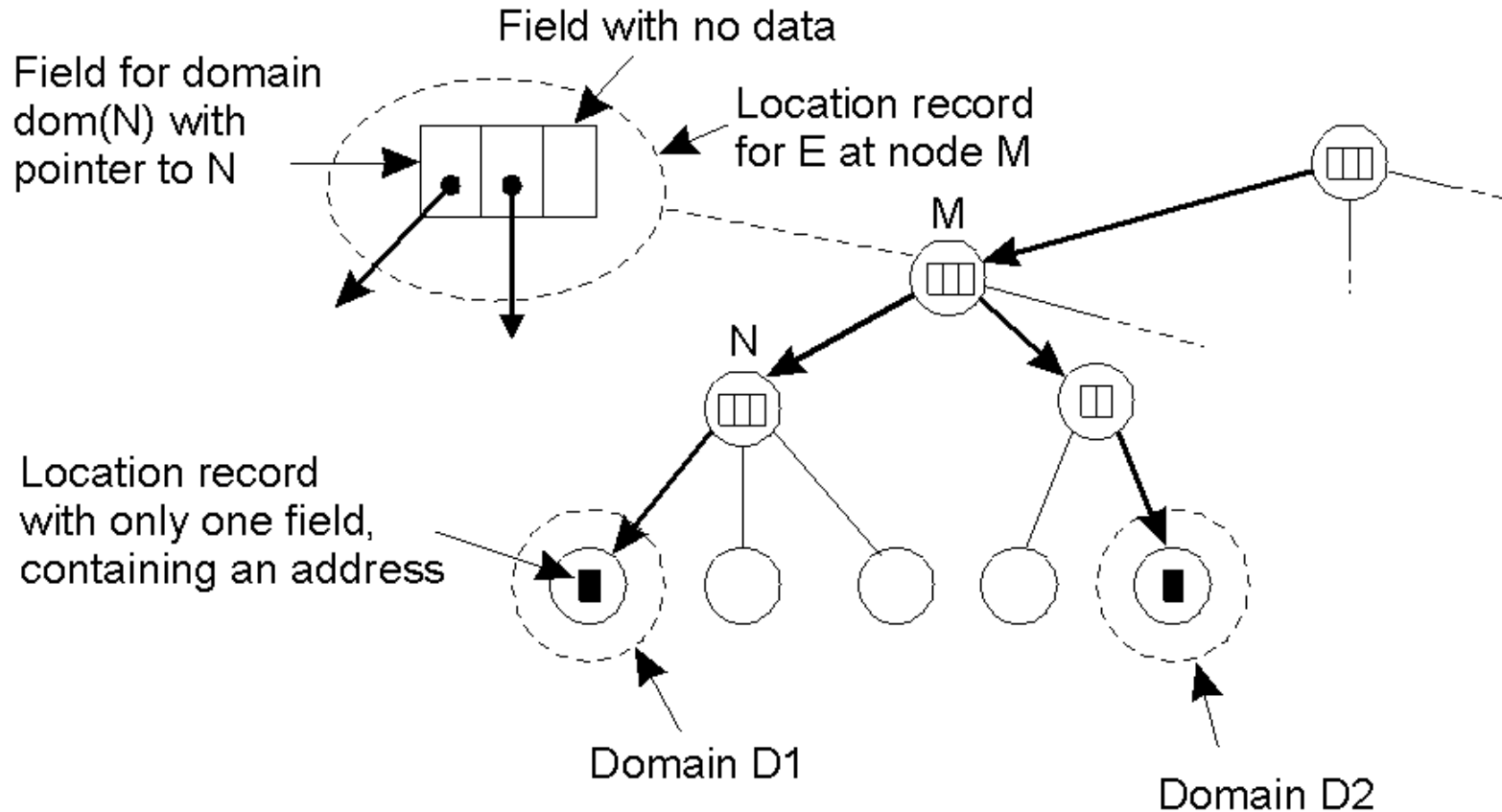

The principle of Mobile IP.

Hierarchical Approaches (1)

The root directory
node dir(T)

Top-level
domain T

Directory node
dir(S) of domain S

A subdomain S
of top-level domain T
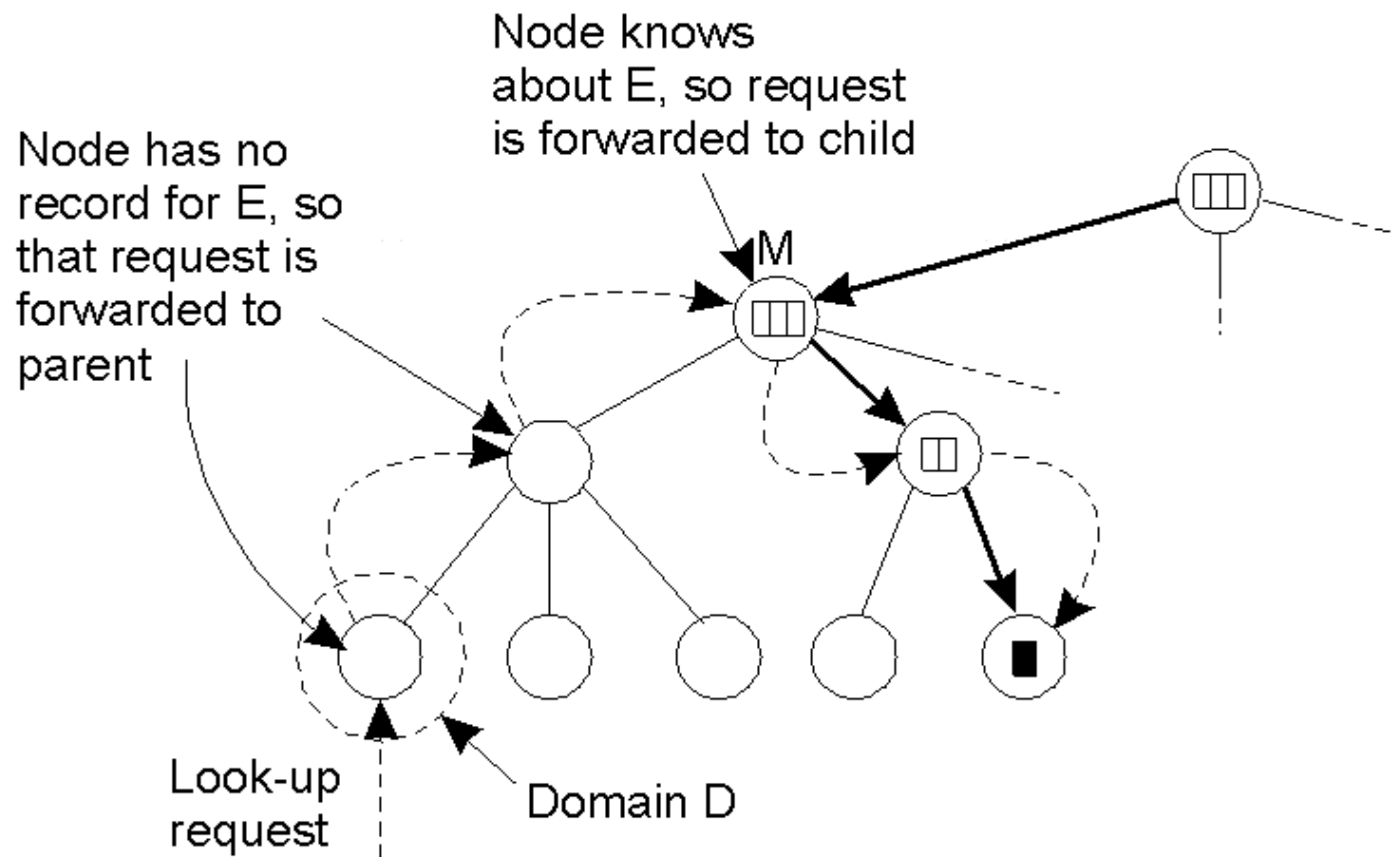(S is contained in T)

A leaf domain, contained in S

Hierarchical organization of a location service into
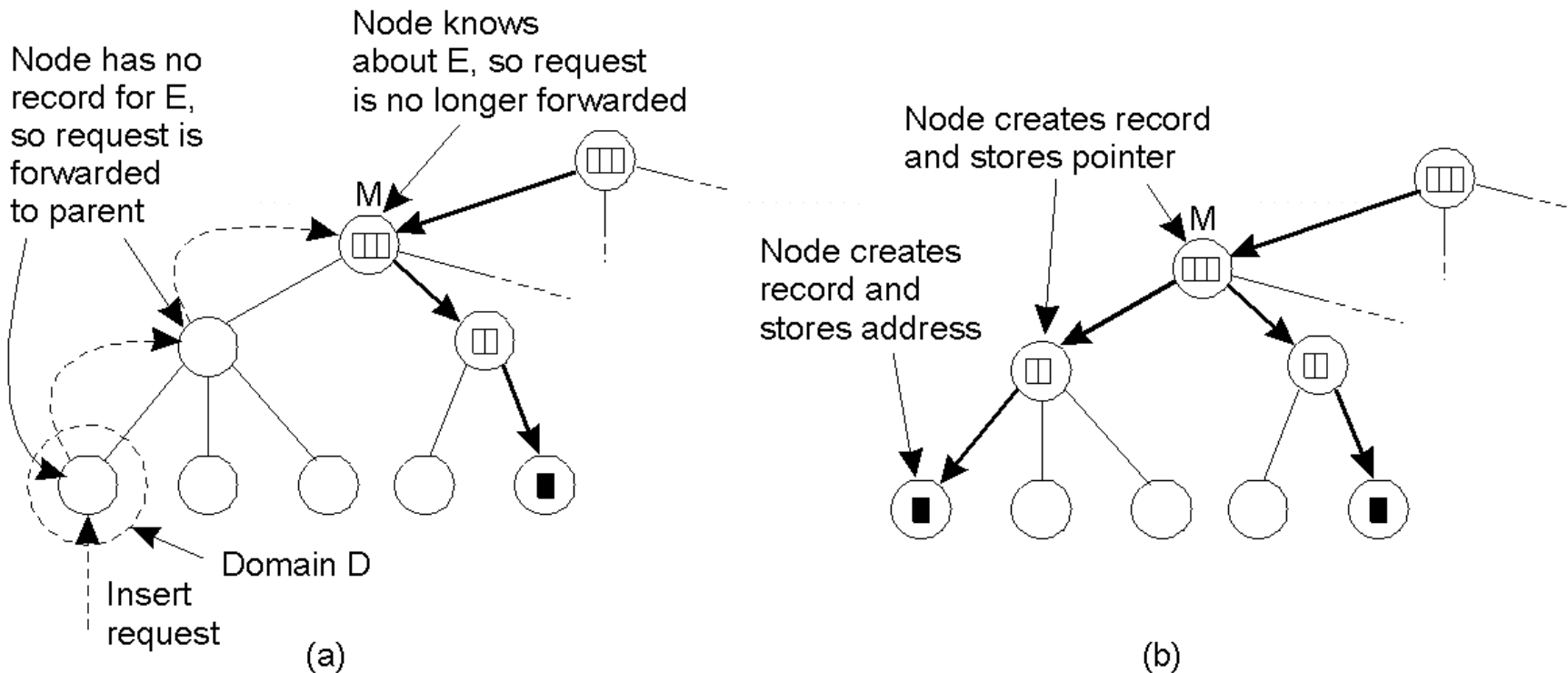domains, each having an associated directory node.

Hierarchical Approaches (2)

Field for domain
dom(N) with
pointer to N

Field with no data

Location record
for E at node M

M

N

Location record
with only one field,
containing an address

Domain D1

Domain D2

An example of storing information of an entity
having two addresses in different leaf domains.

Hierarchical Approaches (3)

Node knows about E, so request is forwarded to child

Node has no record for E, so that request is forwarded to parent
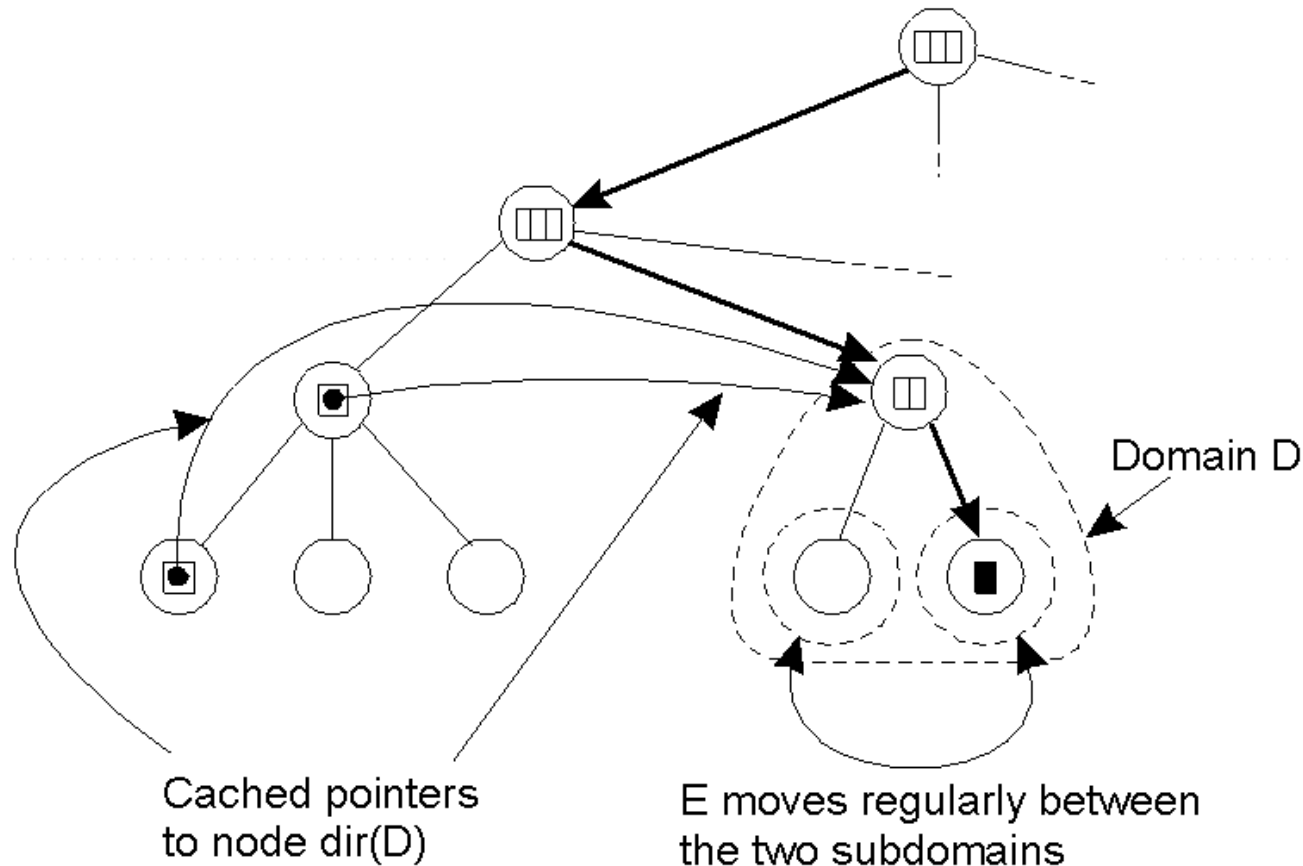
M

Look-up request

Domain D

Looking up a location in a hierarchically organized location service.
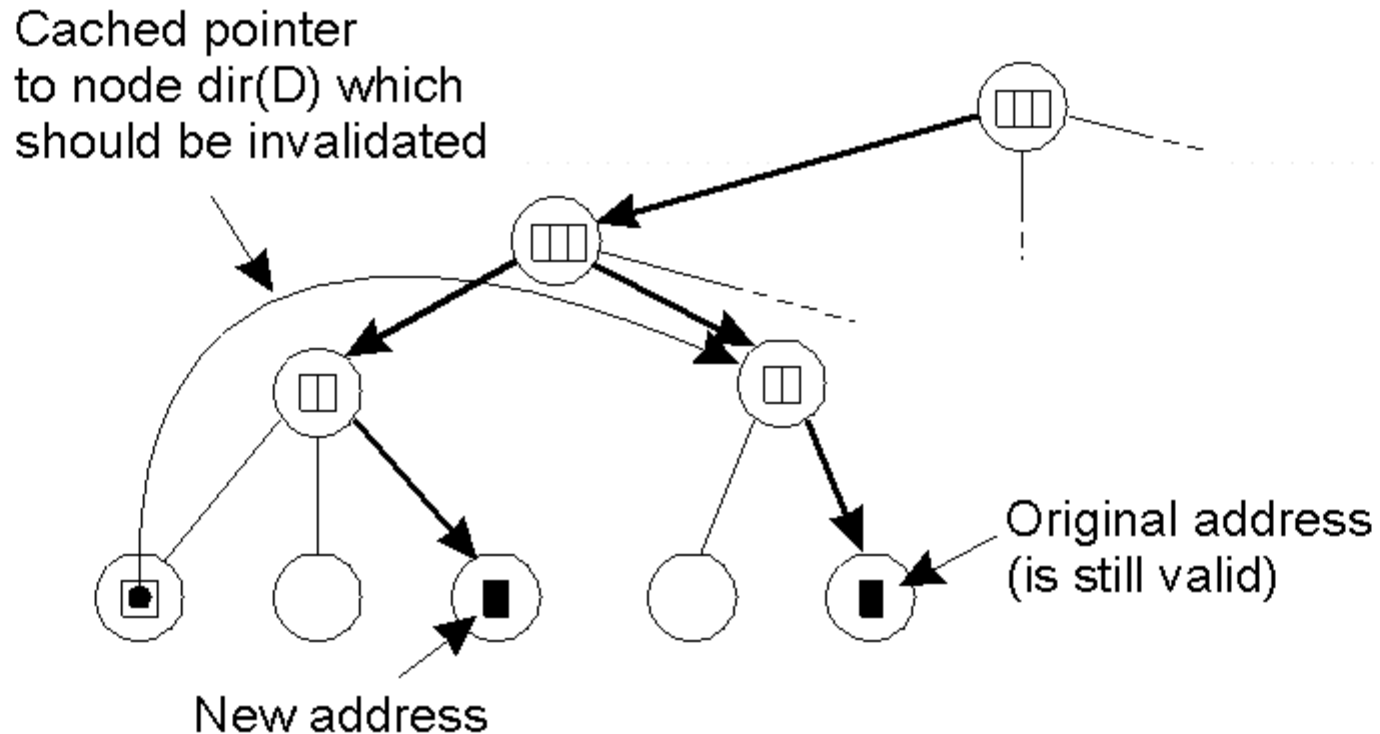
Hierarchical Approaches (4)

a) An insert request is forwarded to the first node that knows about entity *E*.

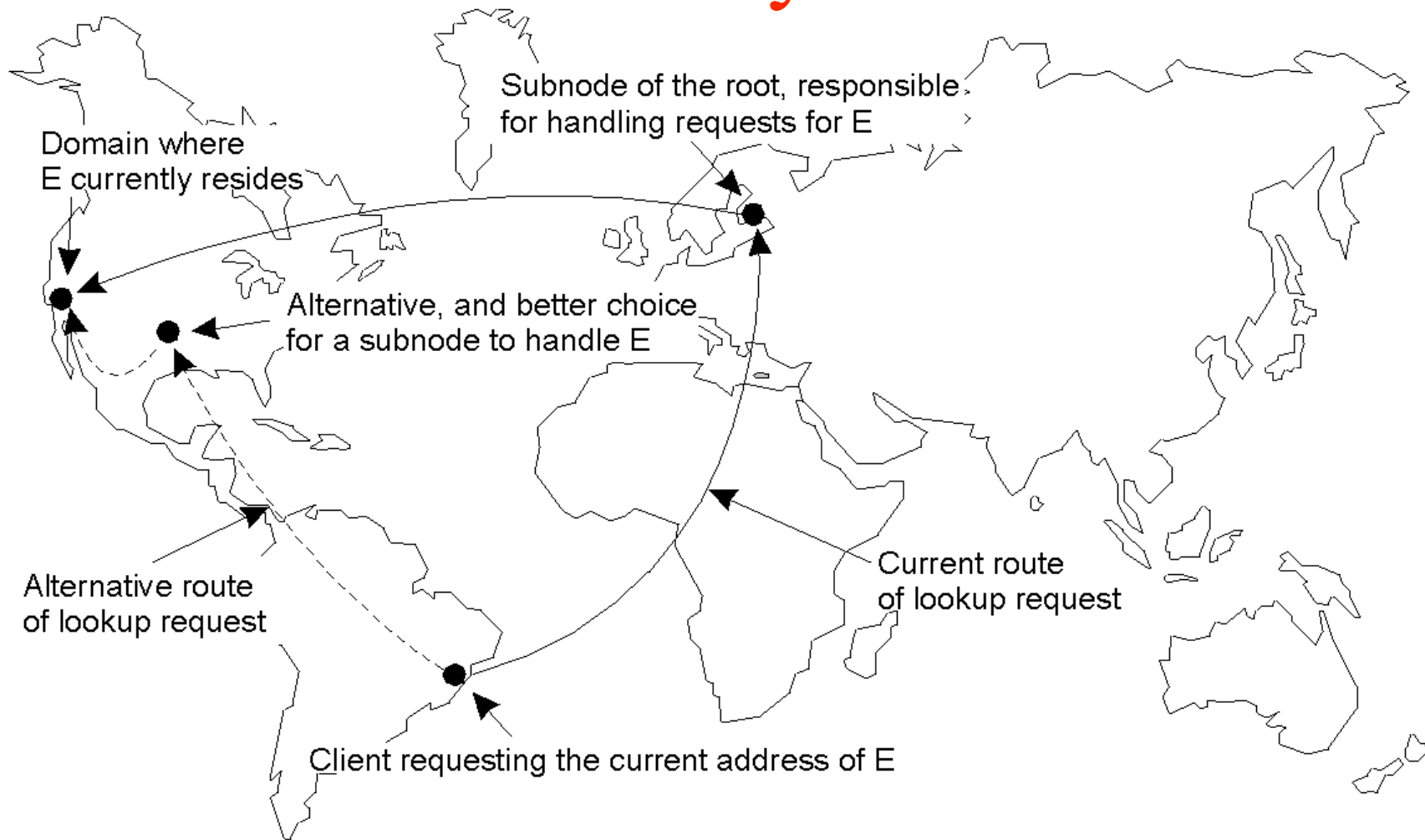b) A chain of forwarding pointers to the leaf node is created.

Pointer Caches (1)

Domain D

Cached pointers
to node dir(D)

E moves regularly between
the two subdomains

Caching a reference to a directory node of the lowest-level
domain in which an entity will reside most of the time.

Pointer Caches (2)

Cached pointer
to node dir(D) which
should be invalidated

Original address
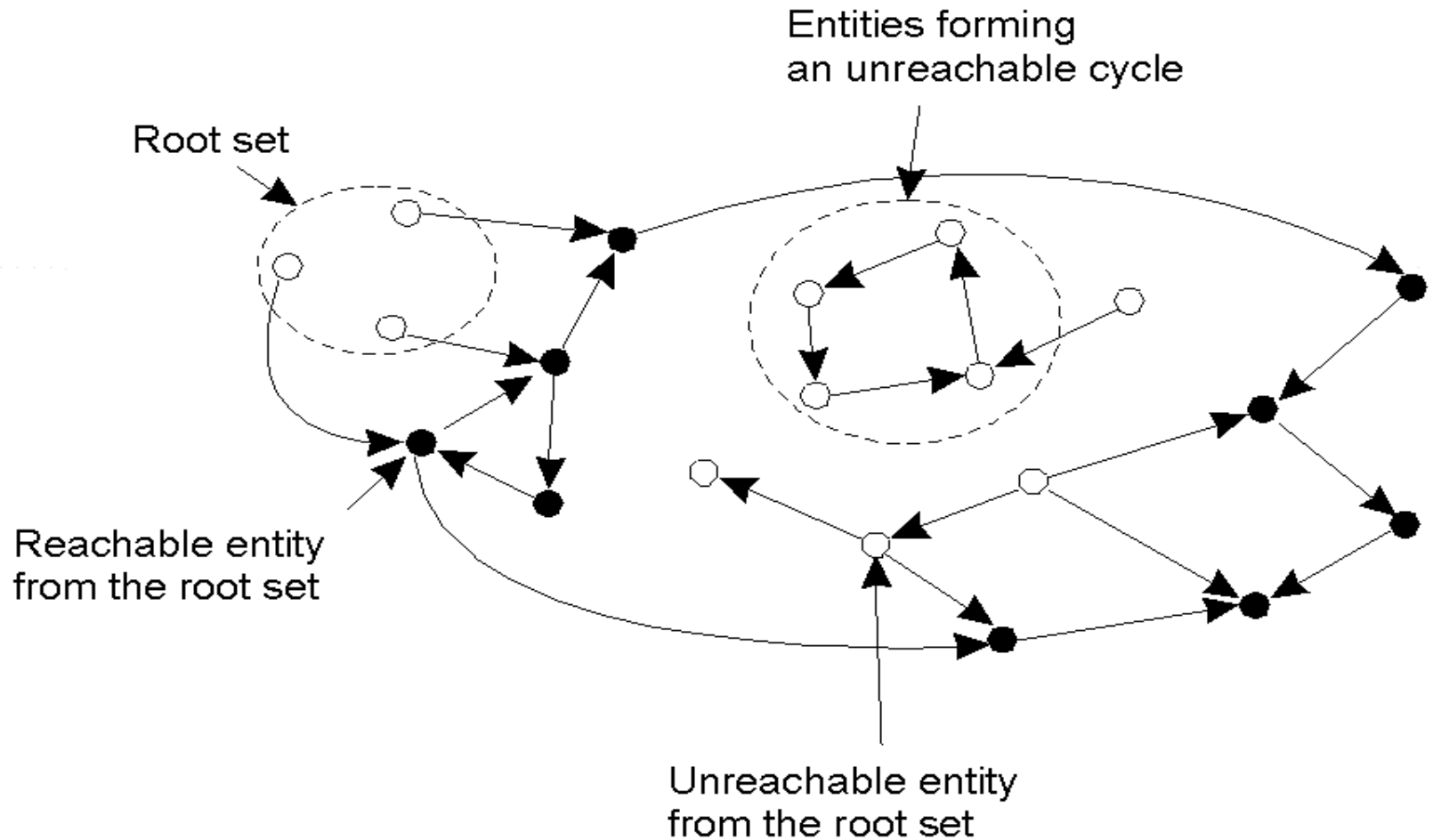(is still valid)

New address

A cache entry that needs to be invalidated because it returns a
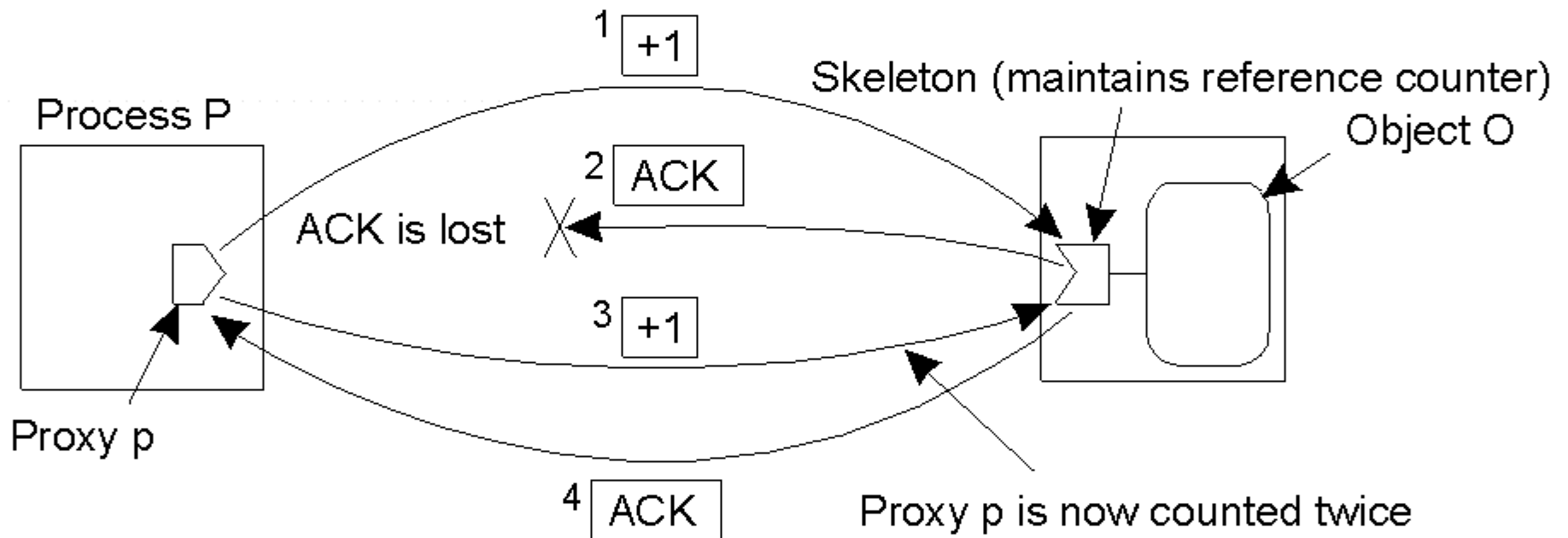nonlocal address, while such an address is available.

Scalability Issues

The scalability issues related to uniformly placing subnodes of a
partitioned root node across the network covered by a location
service.

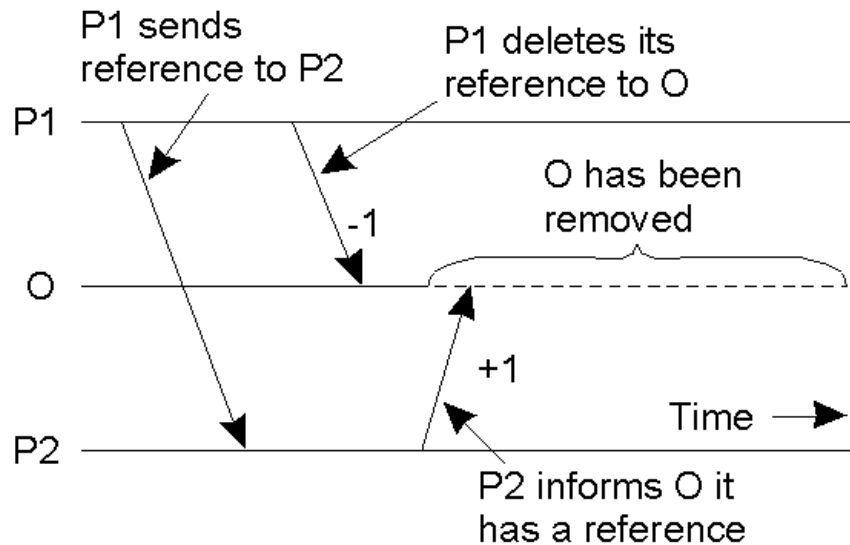# The Problem of Unreferenced Objects

An example of a graph representing objects containing references to each other.
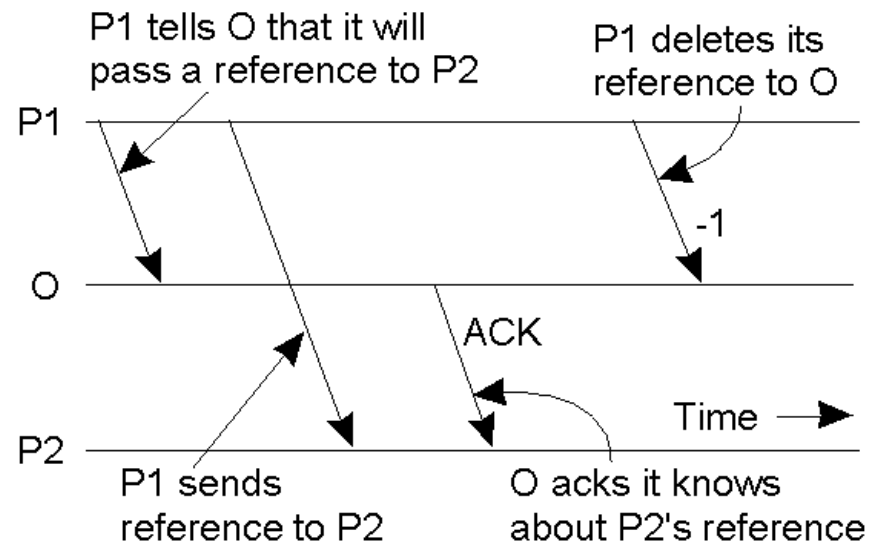
Reference Counting (1)

The problem of maintaining a proper reference count in the presence of unreliable communication.
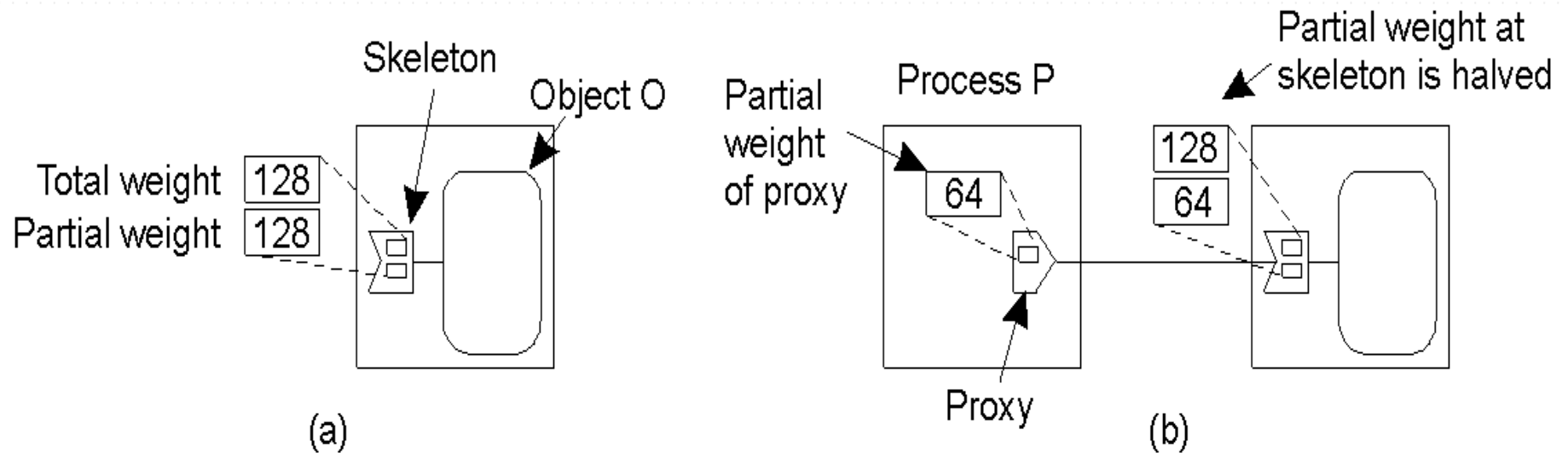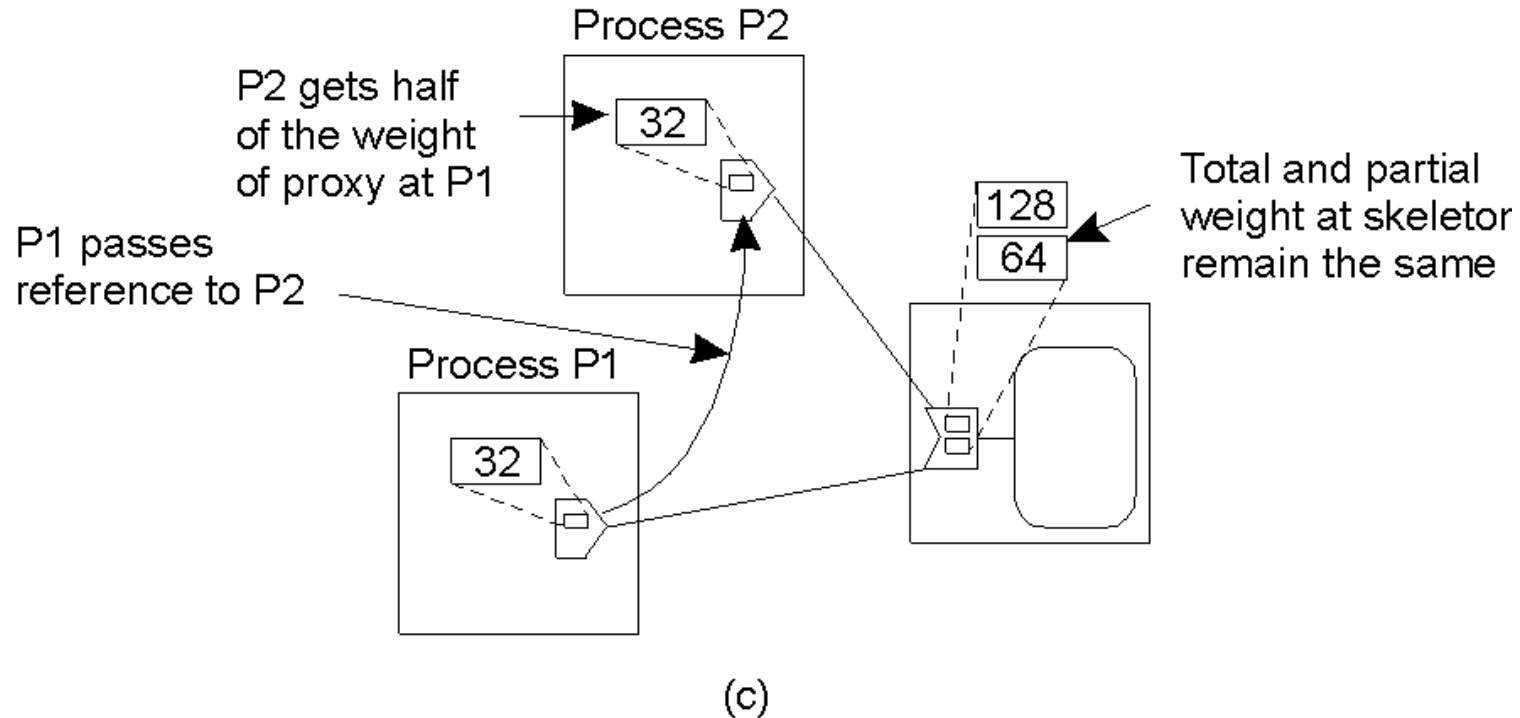
Reference Counting (2)

a) Copying a reference to another process and incrementing the counter too late

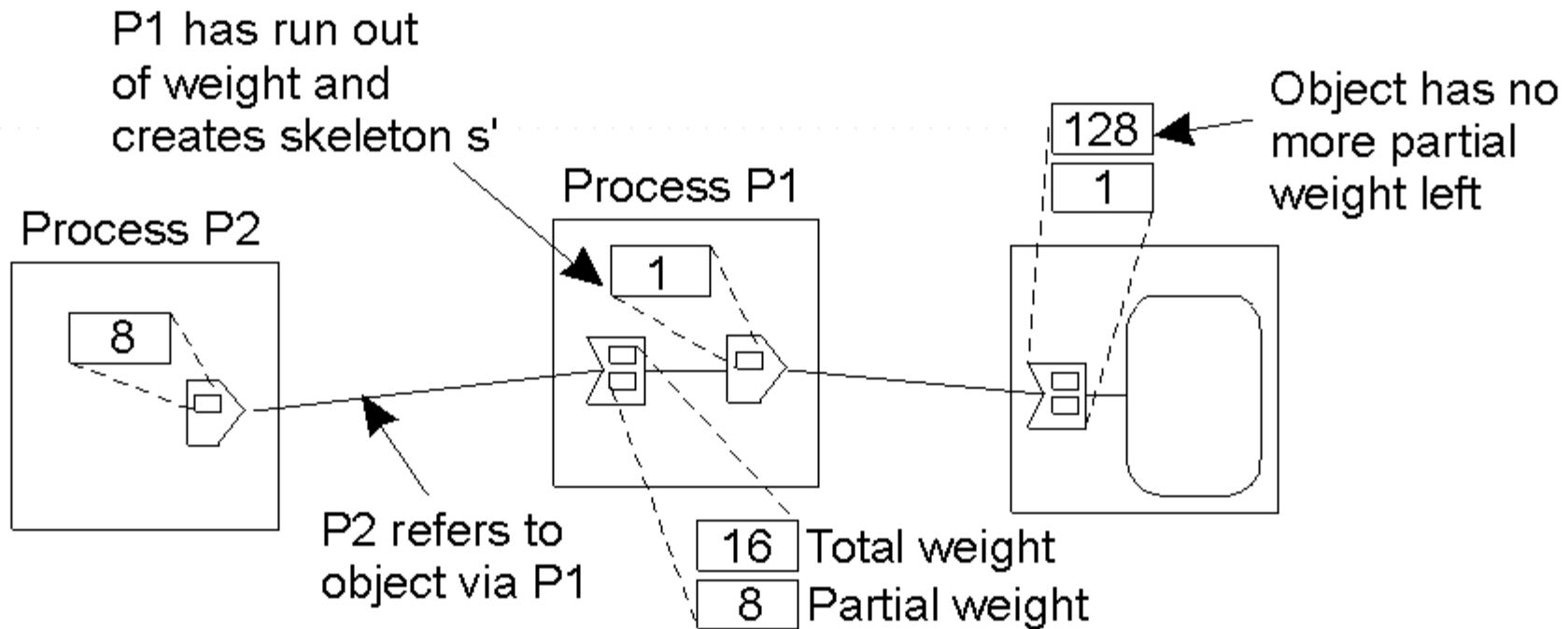b) A solution.

Advanced Referencing Counting (1)

a)   The initial assignment of weights in weighted reference counting

b)   Weight assignment when creating a new reference.
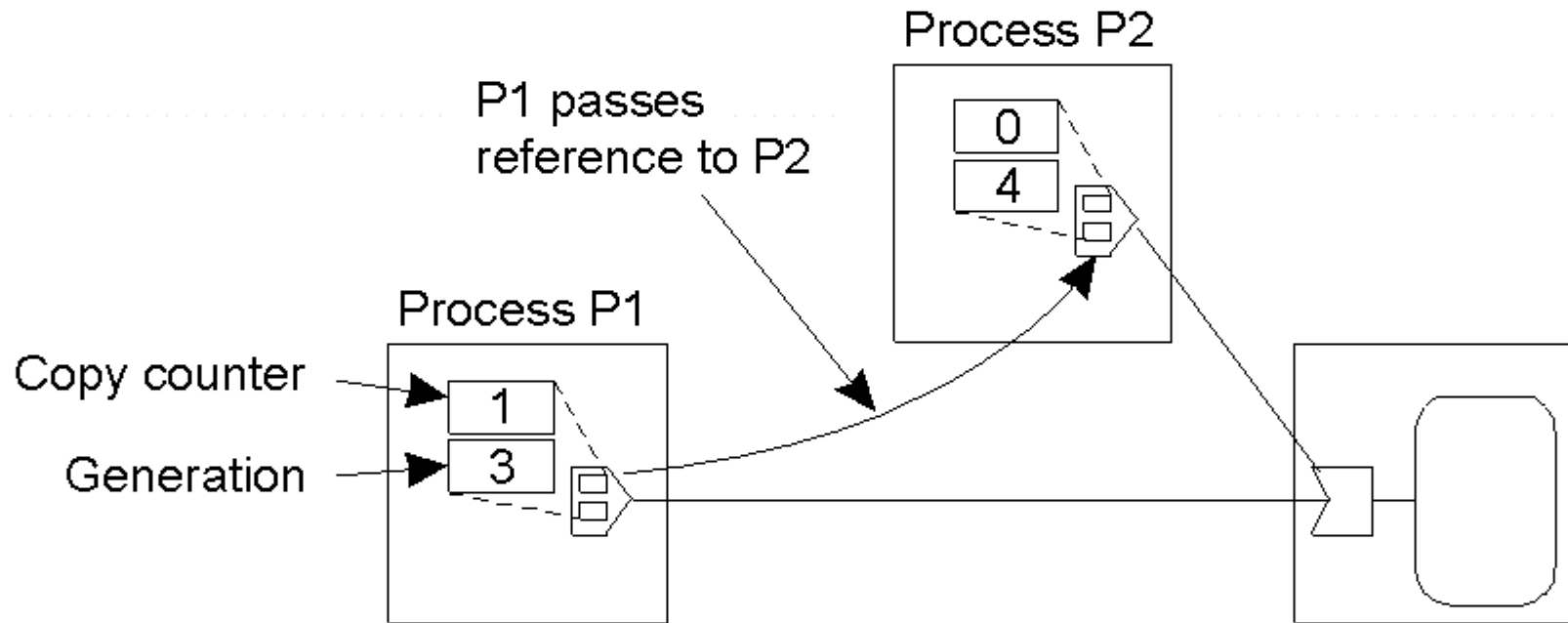
Advanced Referencing Counting (2)

(c)

c) Weight assignment when copying a reference.

Advanced Referencing Counting (3)

P1 has run out
of weight and
creates skeleton s'

Process P2

Process P1

128 Object has no
more partial
weight left

1

8

1

P2 refers to
object via P1

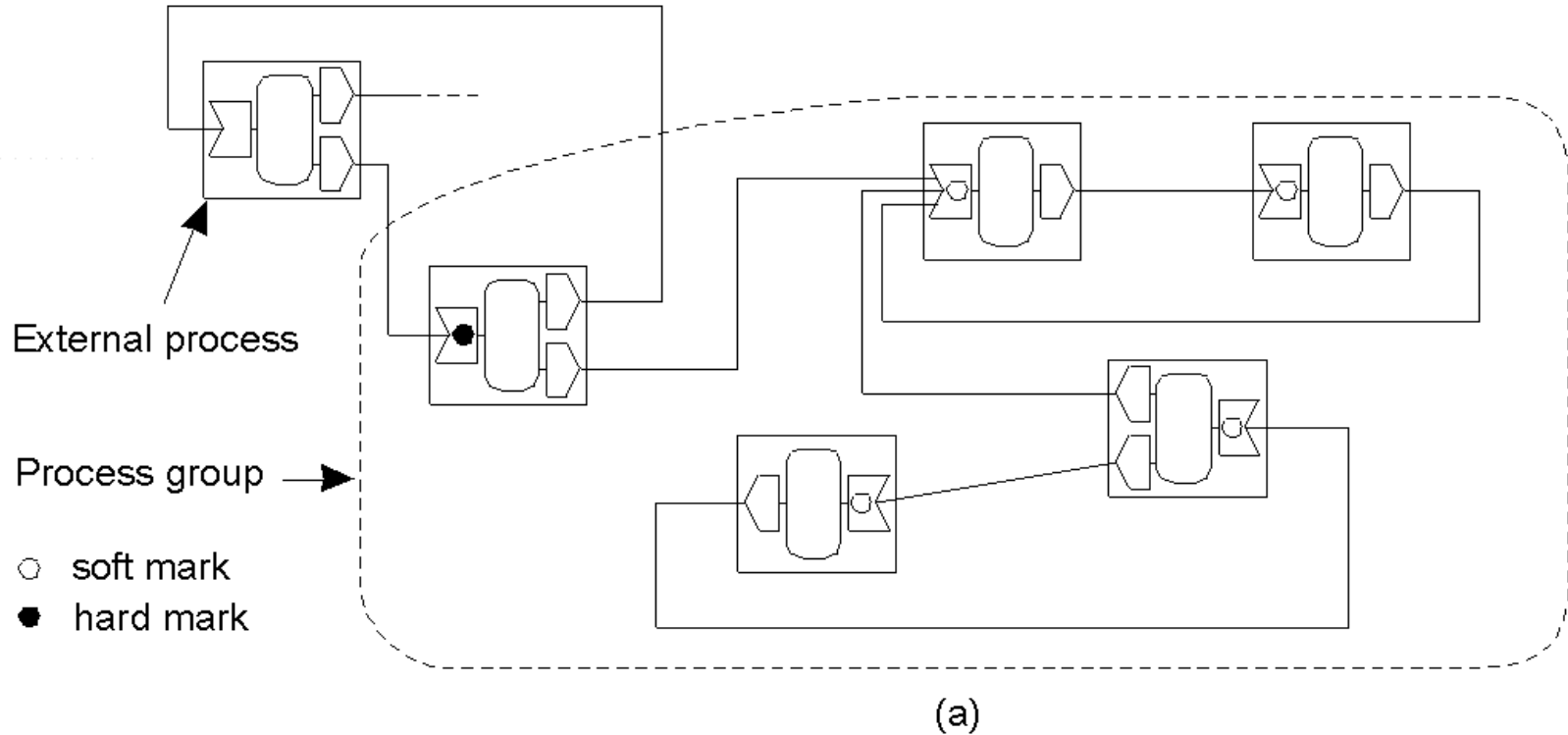16 Total weight
8   Partial weight

Creating an indirection when the partial weight of a
reference has reached 1.

Advanced Referencing Counting (4)

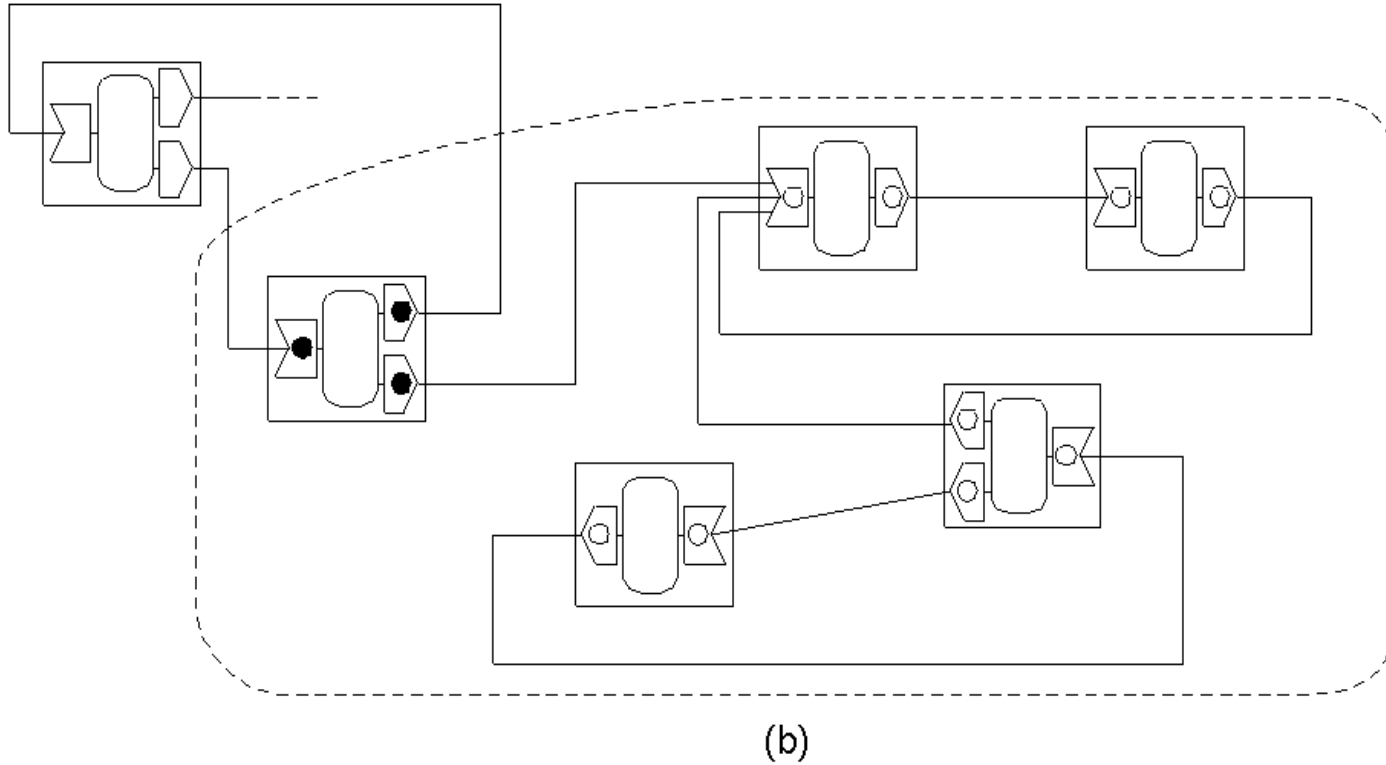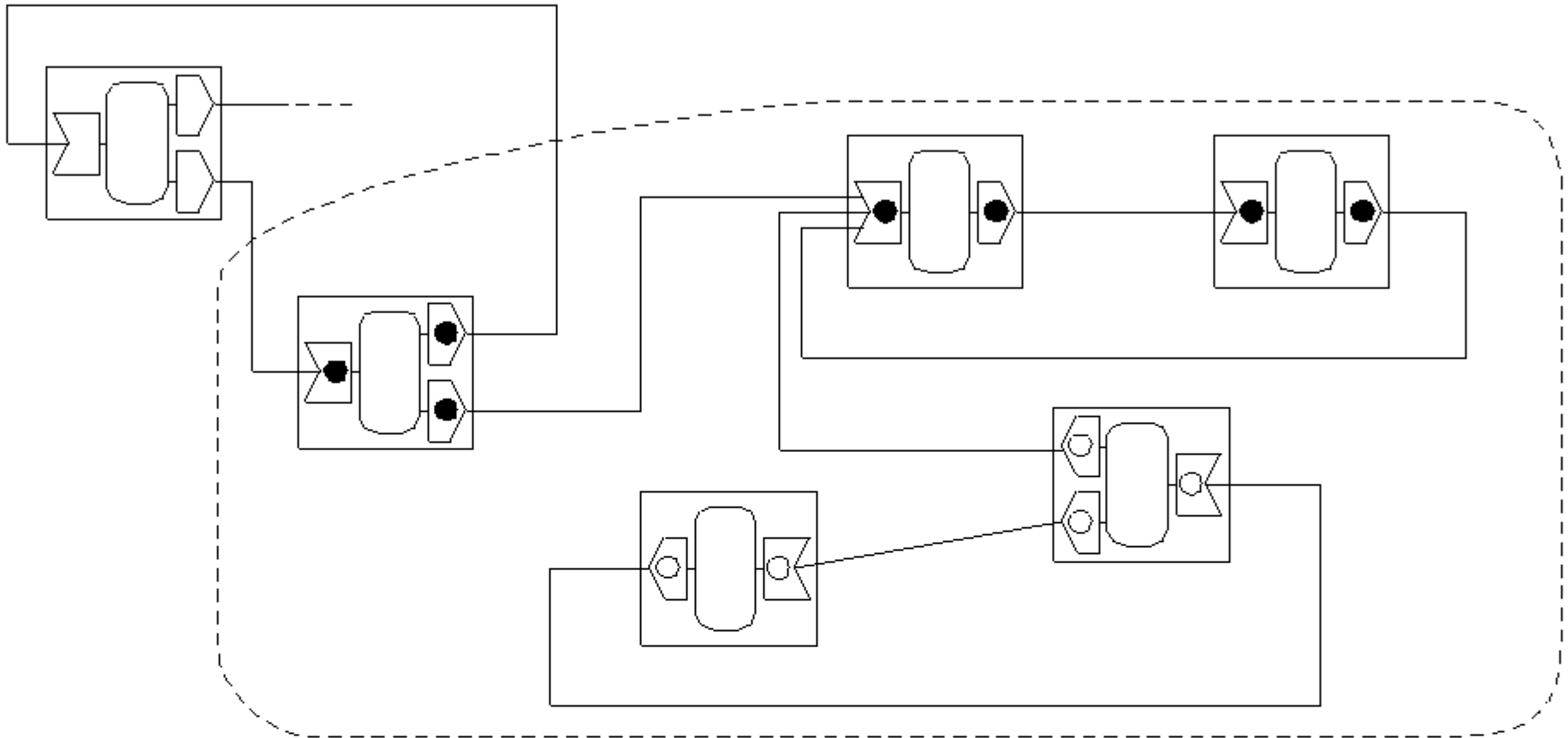Creating and copying a remote reference in generation reference counting.

Tracing in Groups (1)

External process

Process group

○ soft mark
● hard mark

(a)

Initial marking of skeletons.

Tracing in Groups (2)

(b)

After local propagation in each process.

Tracing in Groups (3)

(c)

Final marking.