

ME
MYSELF
&
|

EPITA'07 / LSE

Microprocessors Architecture Theory

Operating System Principles

k

kaneton

UPMC'07

PASTIS

UNIVERSITY OF CAMBRIDGE'10

INFINIT



UNIVERSITY OF
CAMBRIDGE



THE CHALLENGE

PROVIDE A FILE SYSTEM SERVICE ASSURING
RELIABILITY
AVAILABILITY
SECURITY
INTEGRITY
GIVEN A SET OF
UNTRUSTWORTHY COMPUTERS

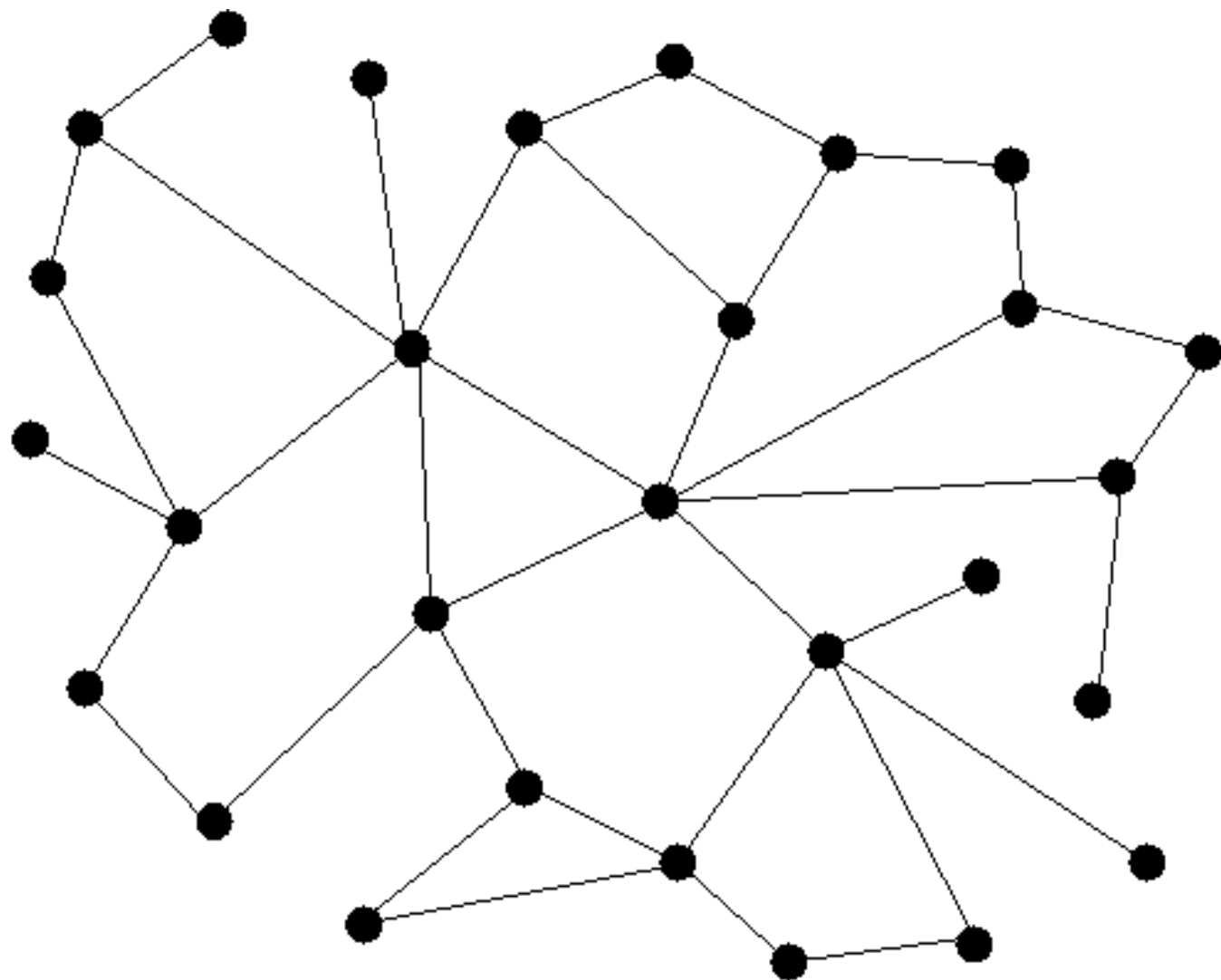
THE LAYERS

OVERLAY NETWORK
ADDRESSING & ROUTING
DISTRIBUTED HASH TABLE
DURABILITY
PEER-TO-PEER FILE SYSTEM
INTEGRITY & SECURITY

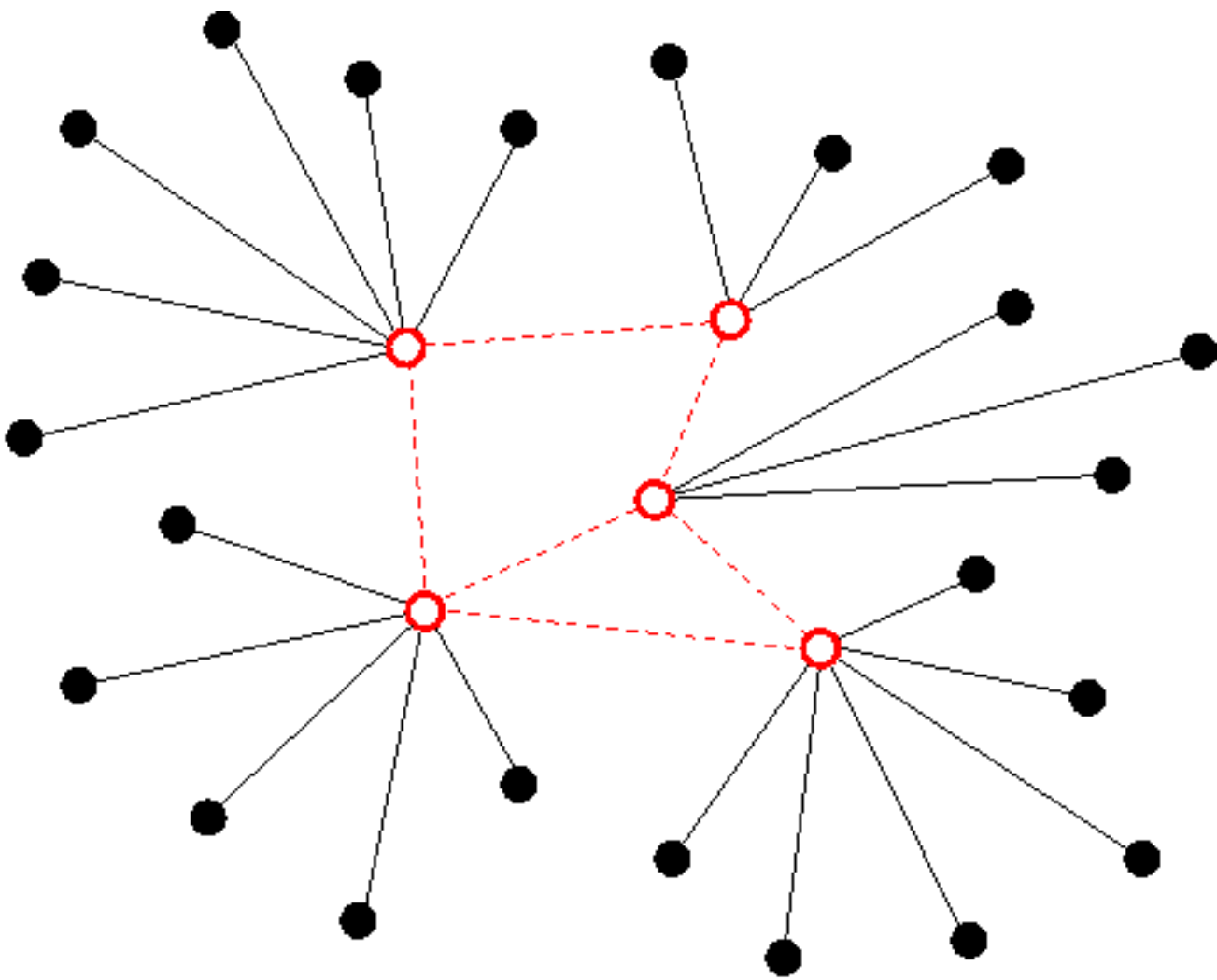
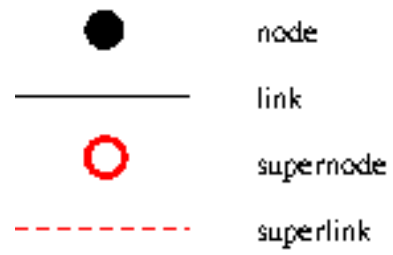
OVERLAY NETWORK

HOW TO FIND THE NODE
RESPONSIBLE FOR AN IDENTIFIER

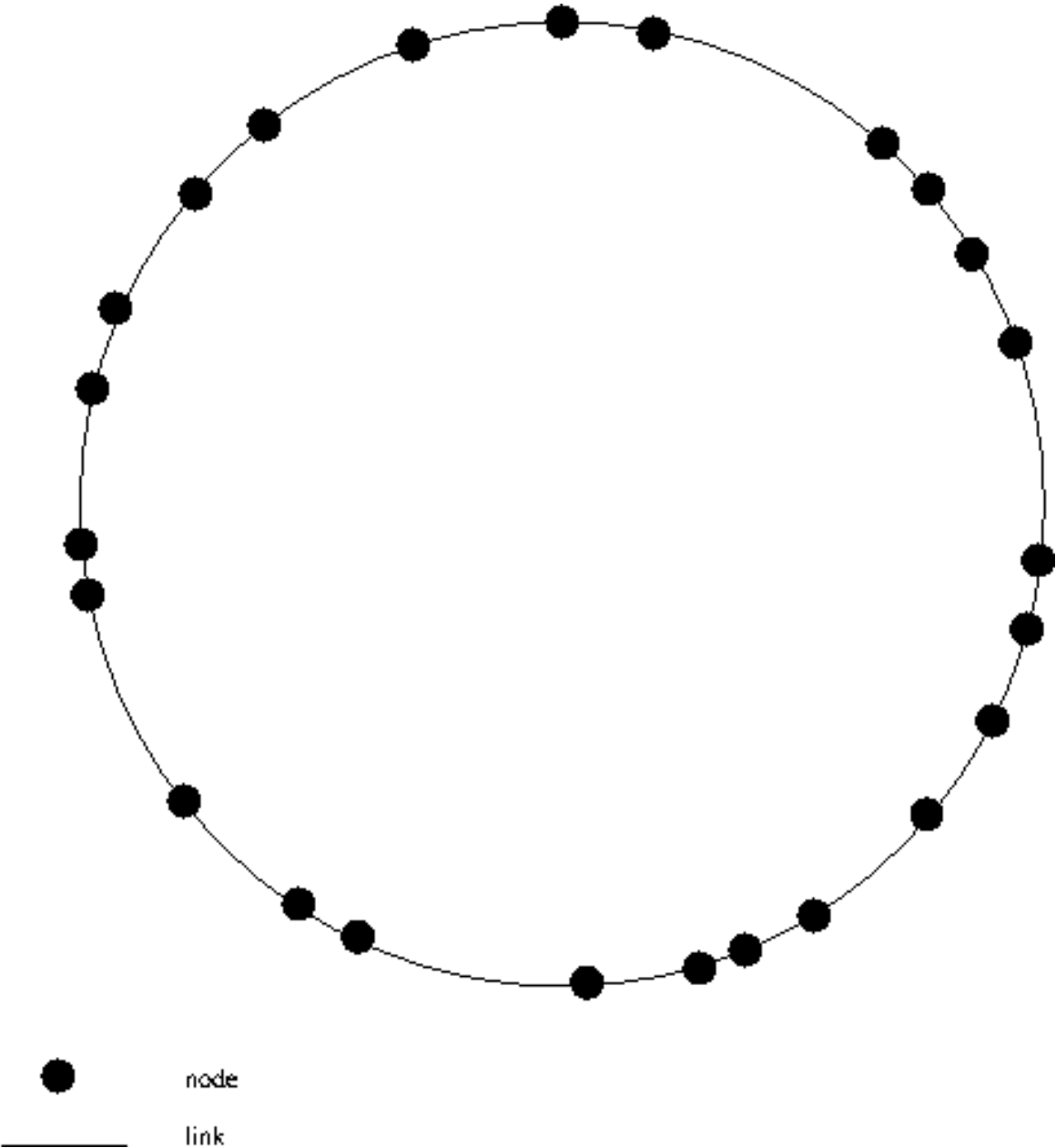
FLAT OVERLAY NETWORK



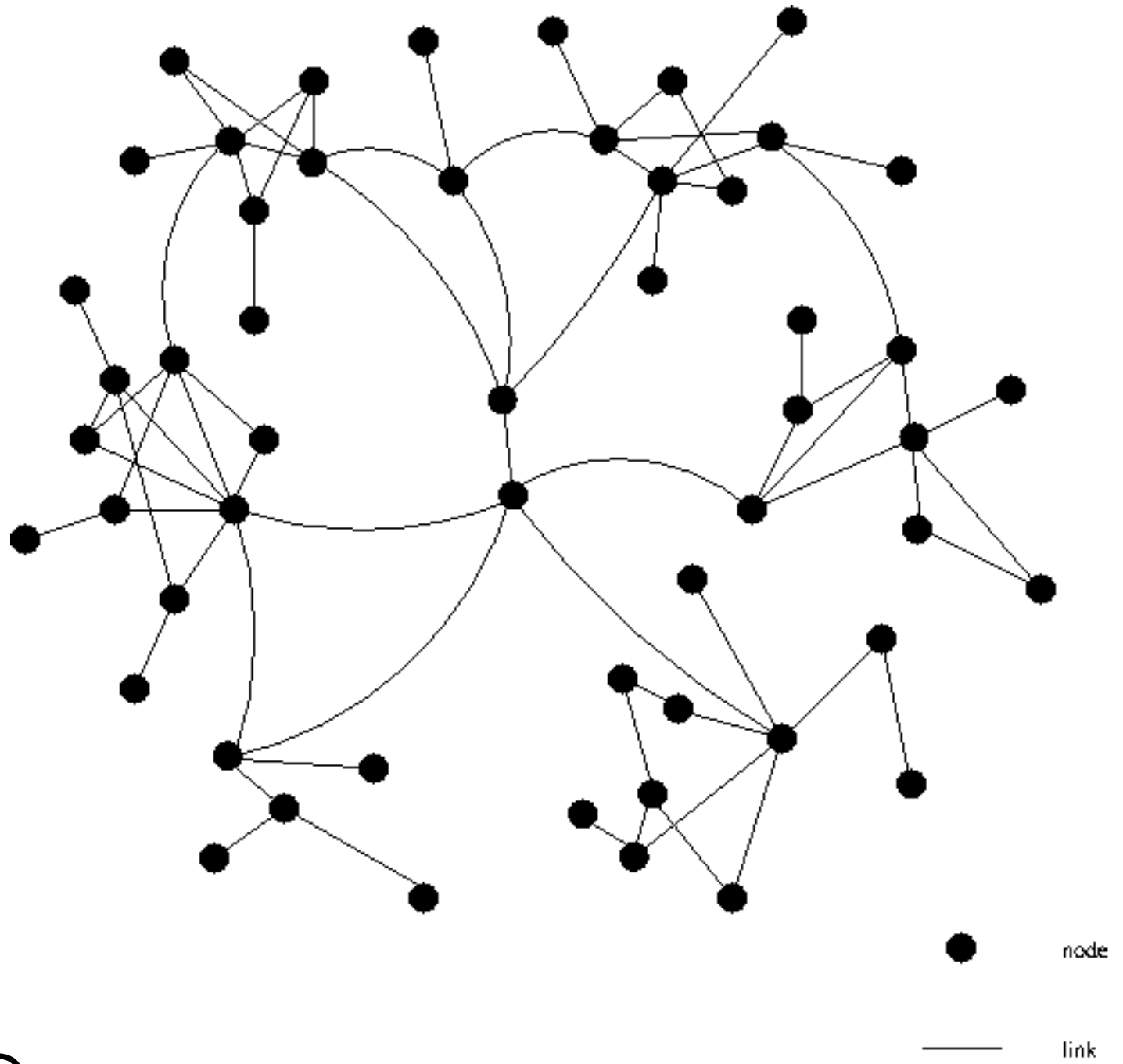
HYBRID OVERLAY NETWORK



STRUCTURED OVERLAY NETWORK



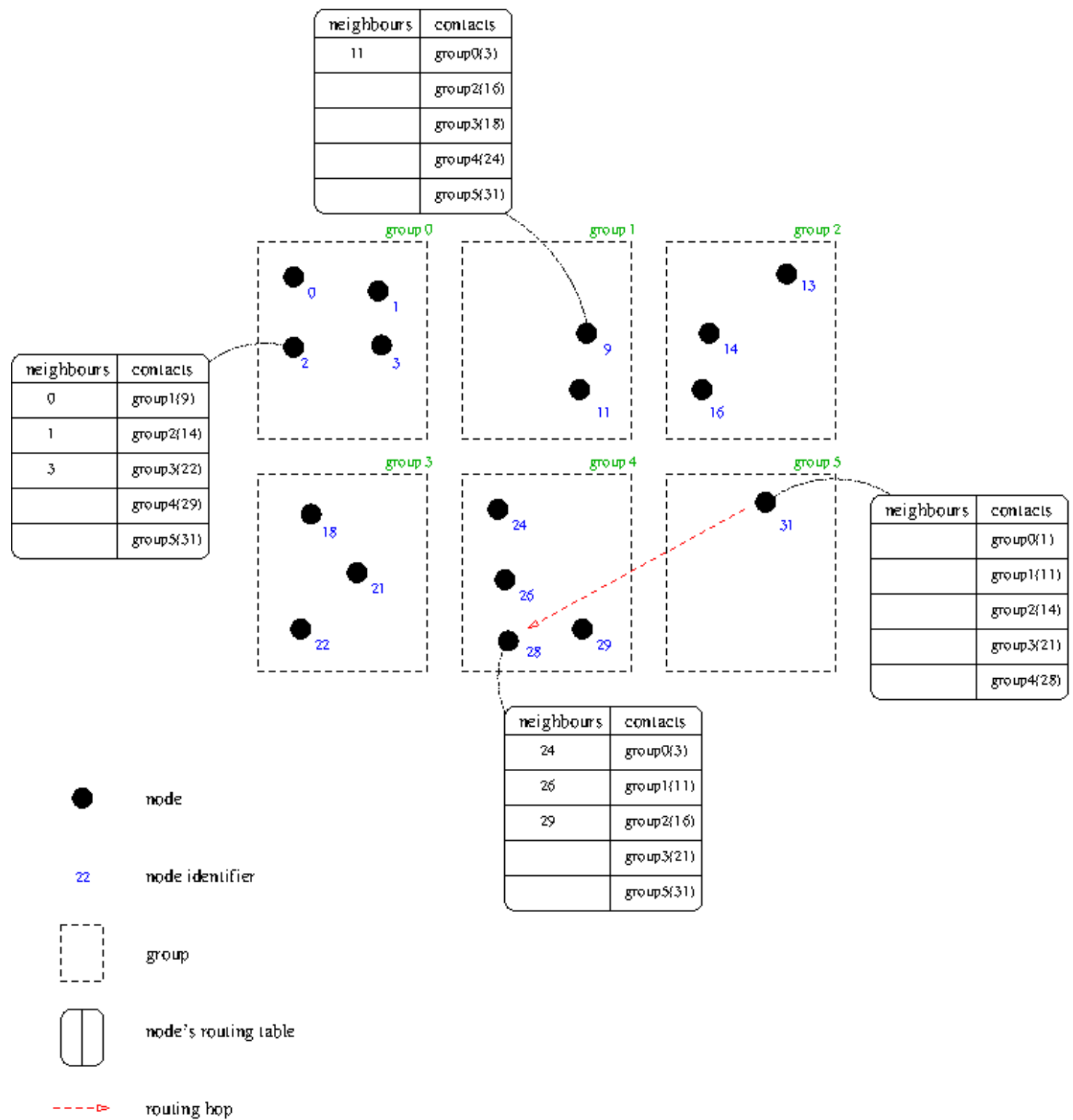
SMALL WORLDS



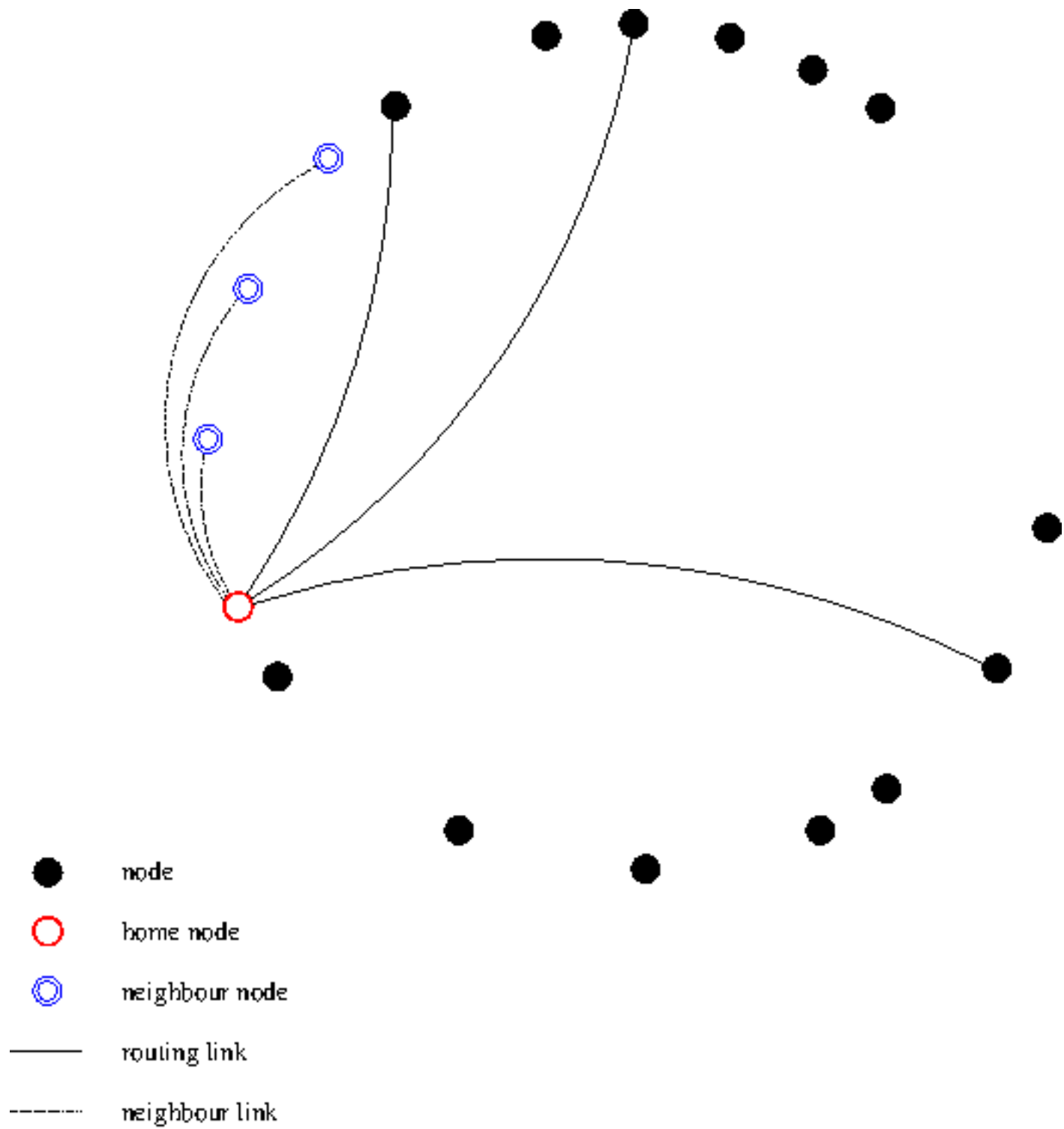
DISTRIBUTED HASH TABLE

HOW TO ABSTRACT A HASH TABLE
PUT / GET INTERFACE
RELIABILITY / AVAILABILITY
REPLICATION
NETWORKING CODING

KELIPS

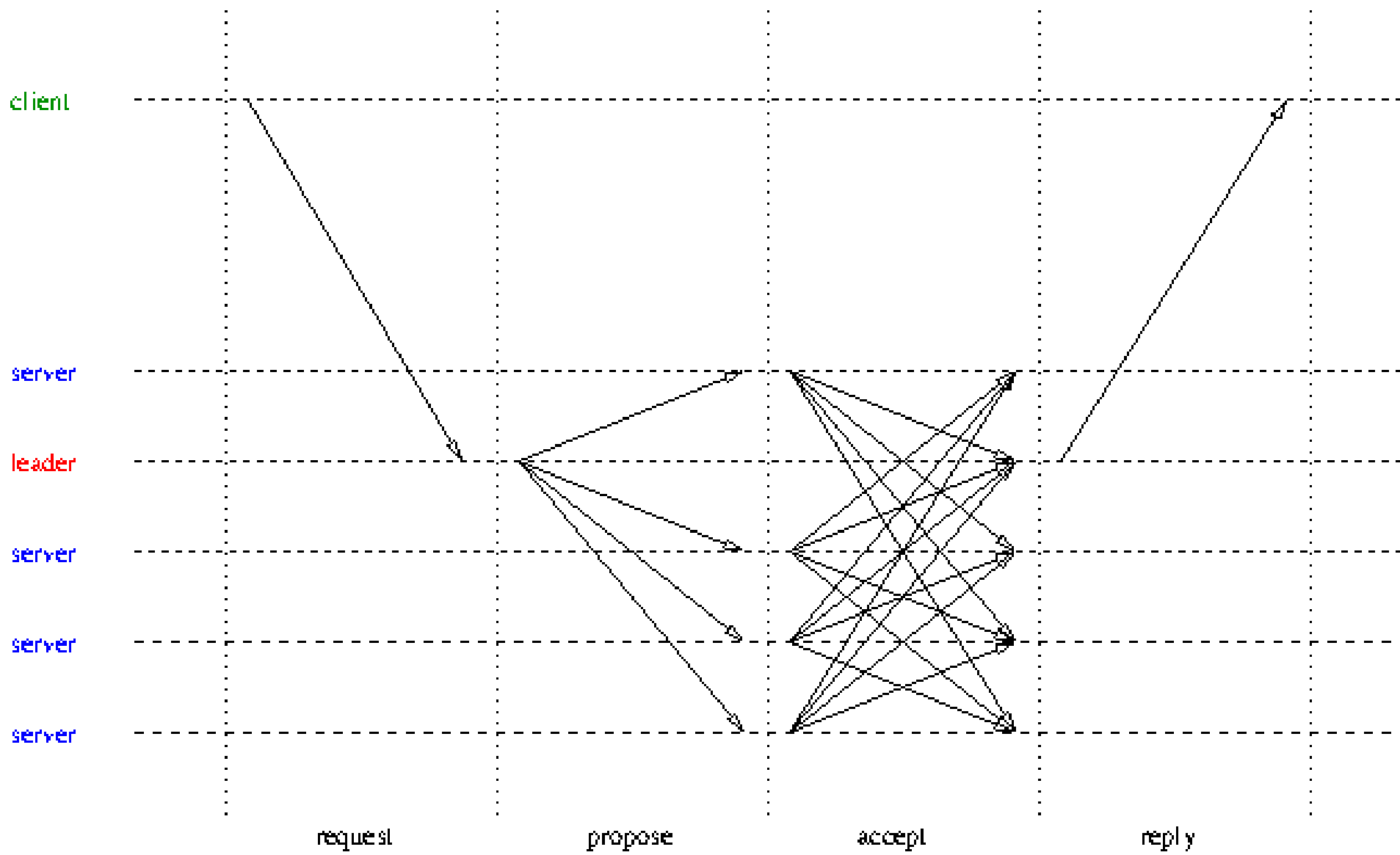


CHORD

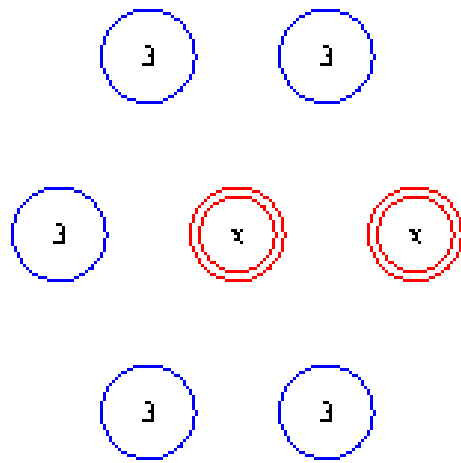


BYZANTINE
FAULT
TOLERANCE

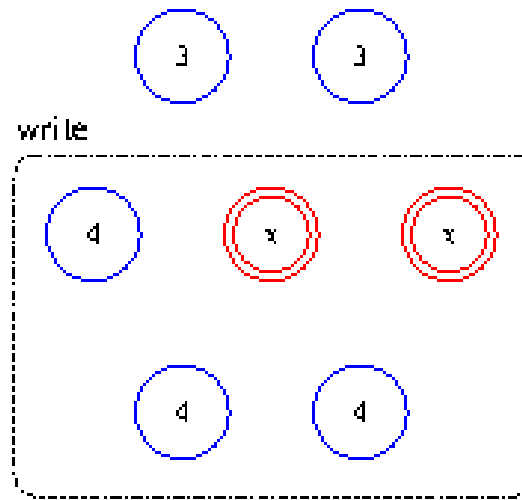
HOW TO COPE WITH UNCERTAINTY
PAXOS
QUORUMS



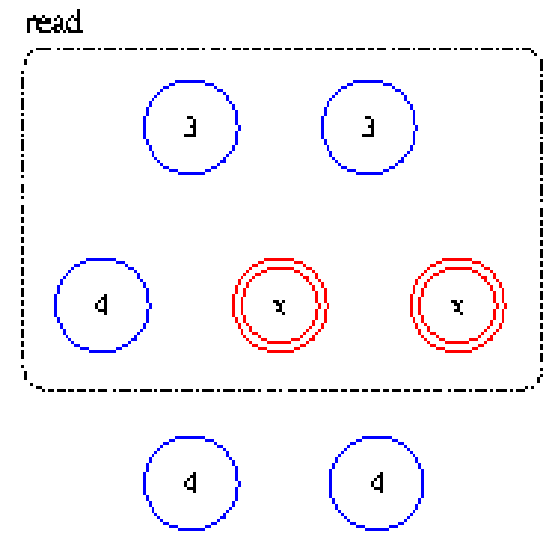
PAXOS



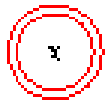
(i)



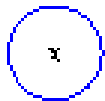
(ii)



(iii)



Byzantine node



non-Byzantine node



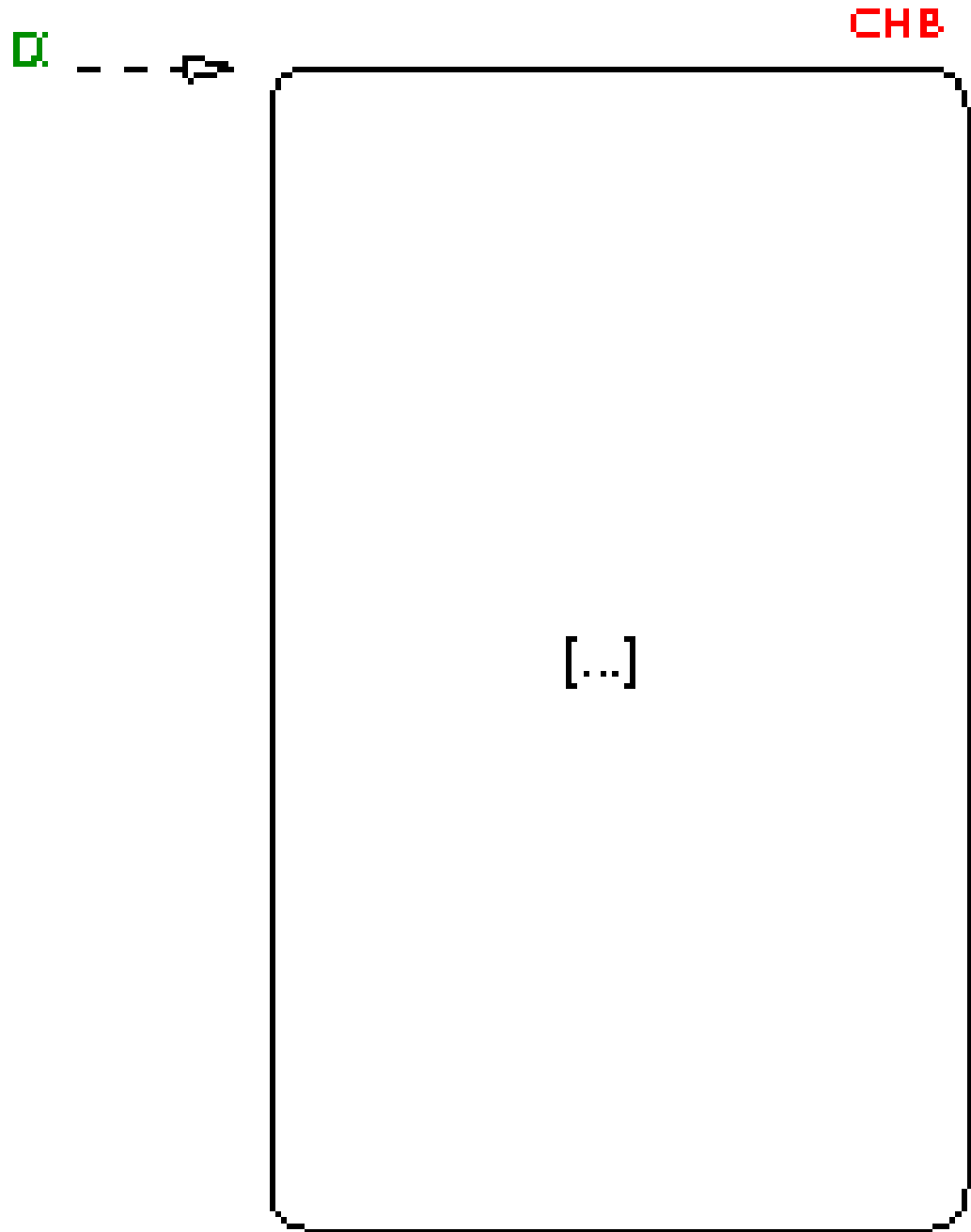
quorum

QUORUMS

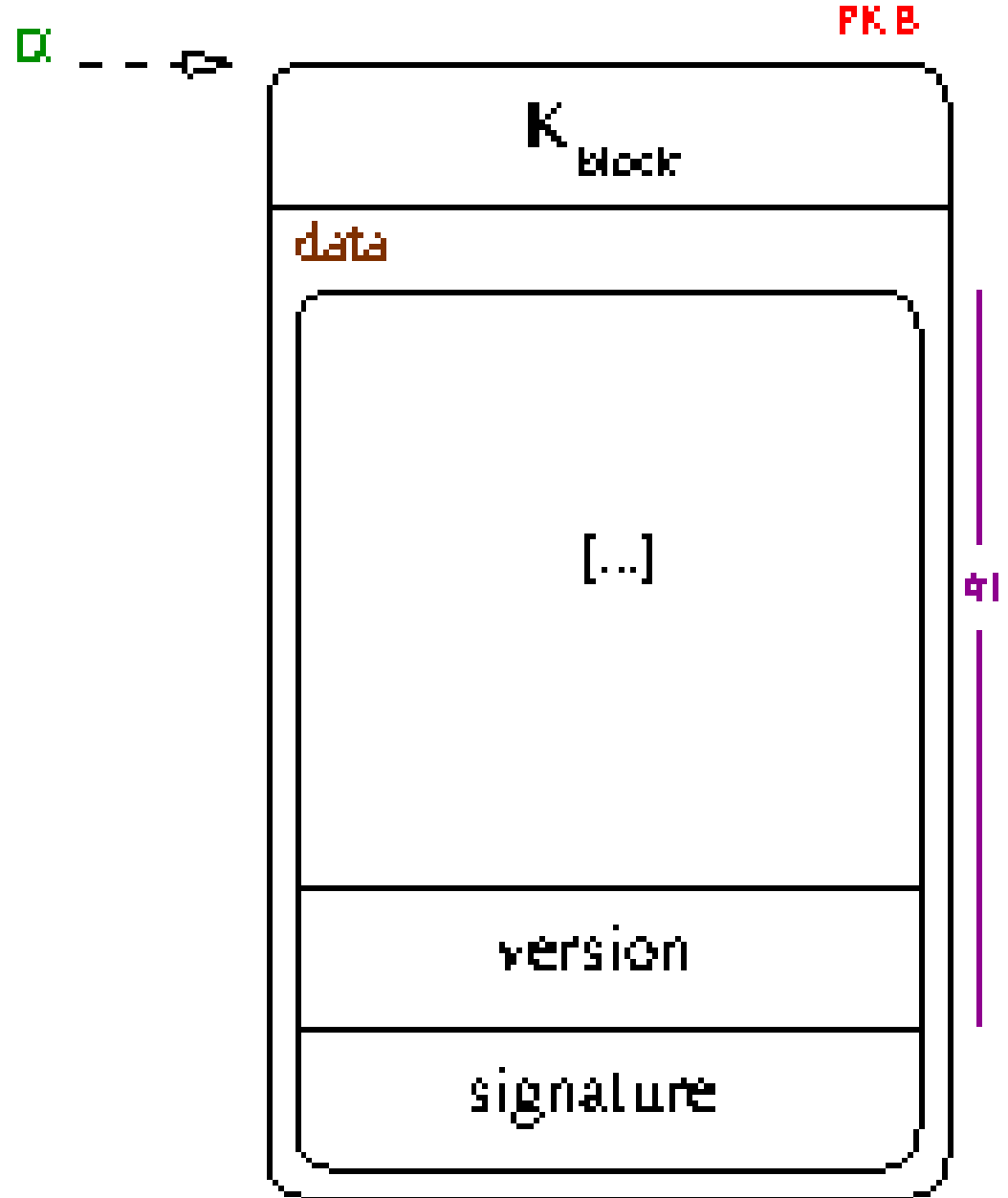
PEER-TO-PEER FILE SYSTEMS

SCALABLE
UNTRUSTWORTHINESS & SYMMETRY
EQUALLY UNPRIVILEGED NODES
CHURN
NO CONNECTIVITY GUARANTEE
SELF-CERTIFICATION

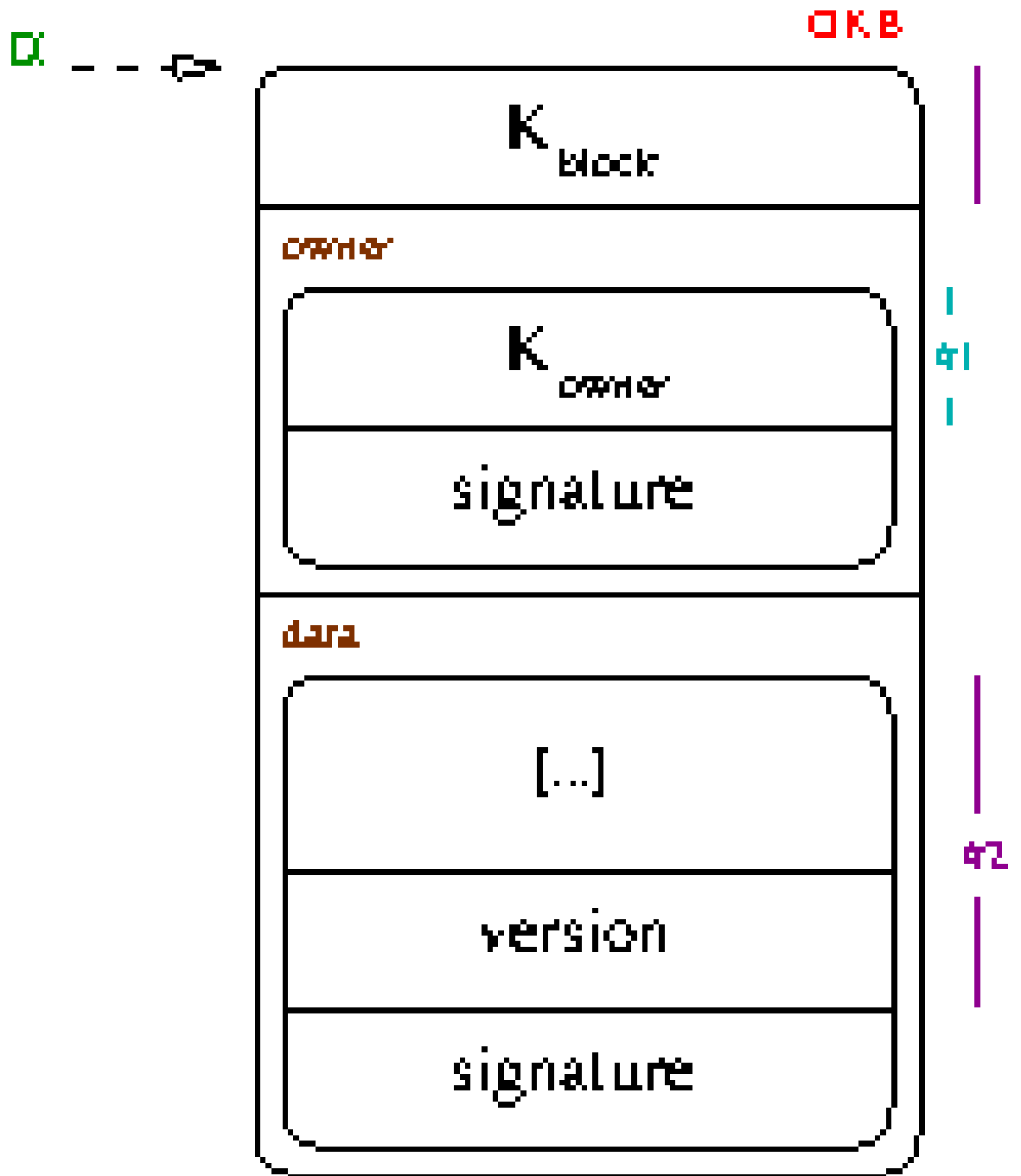
CONTENT
HASH
BLOCK



PUBLIC KEY BLOCK



OWNER
KEY
BLOCK



AND
(A LOT)
MORE

SECURITY
ADMINISTRATION
ANONYMITY
VERSIONING
STORAGE BALANCING
POPULARITY
CONFLICT RESOLUTION
ETC.

THE FUTURE

THIRD FUND RAISING ROUND

AVAILABLE POSITIONS

INTERN / FULL-TIME / PHD

SUBJECTS

CORE FILE SYSTEM

MAC OS X UI

WINDOWS PORT

MOBILE DEVELOPMENT

P2P PROTOCOL OPTIMISATION

ETC.



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