GOSSIP

4.1 Multicast Problem

MULTICAST

Node with a piece of information
to be communicated to everyone

Distributed Group
of "Nodes" =

Processes at
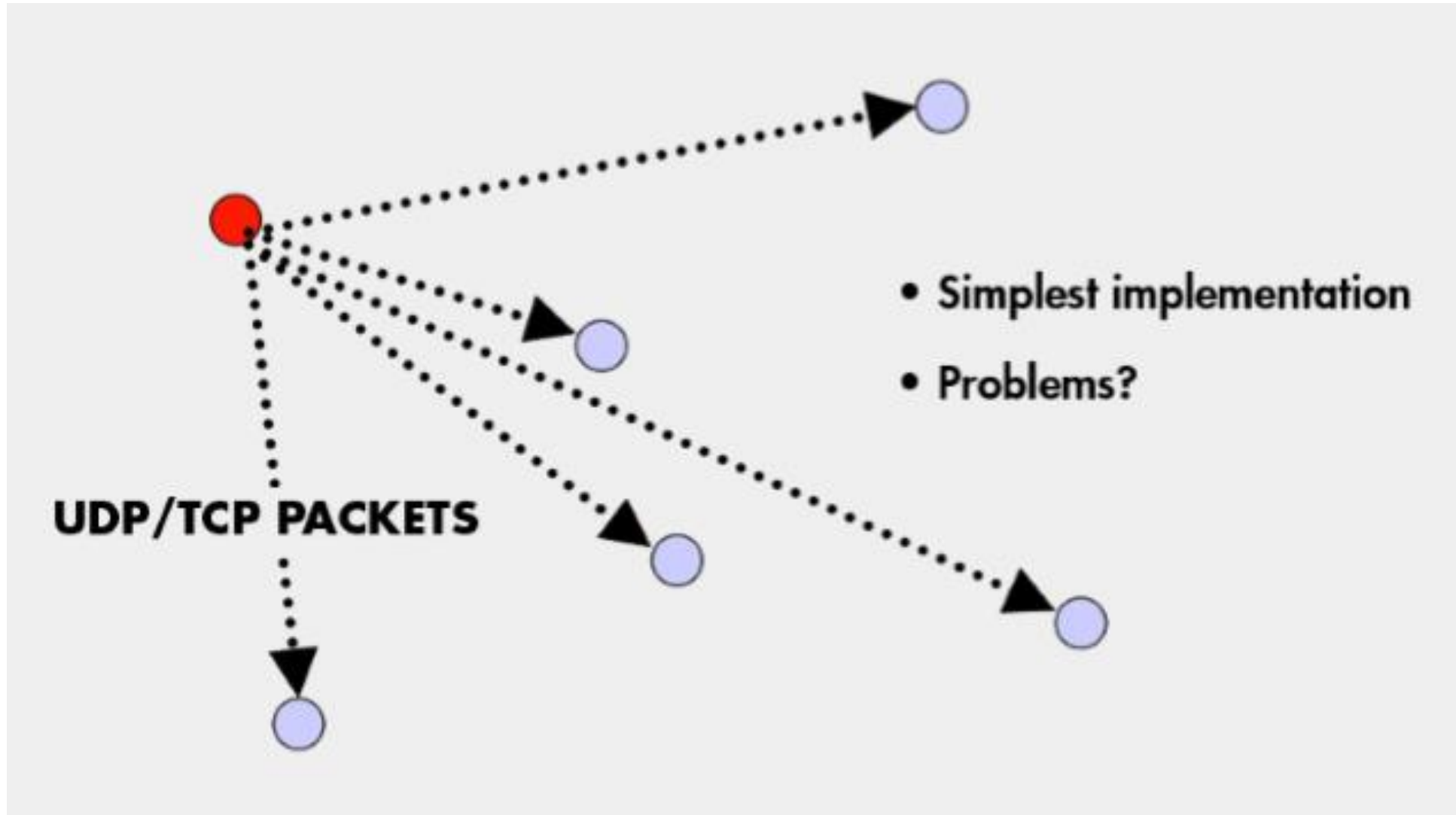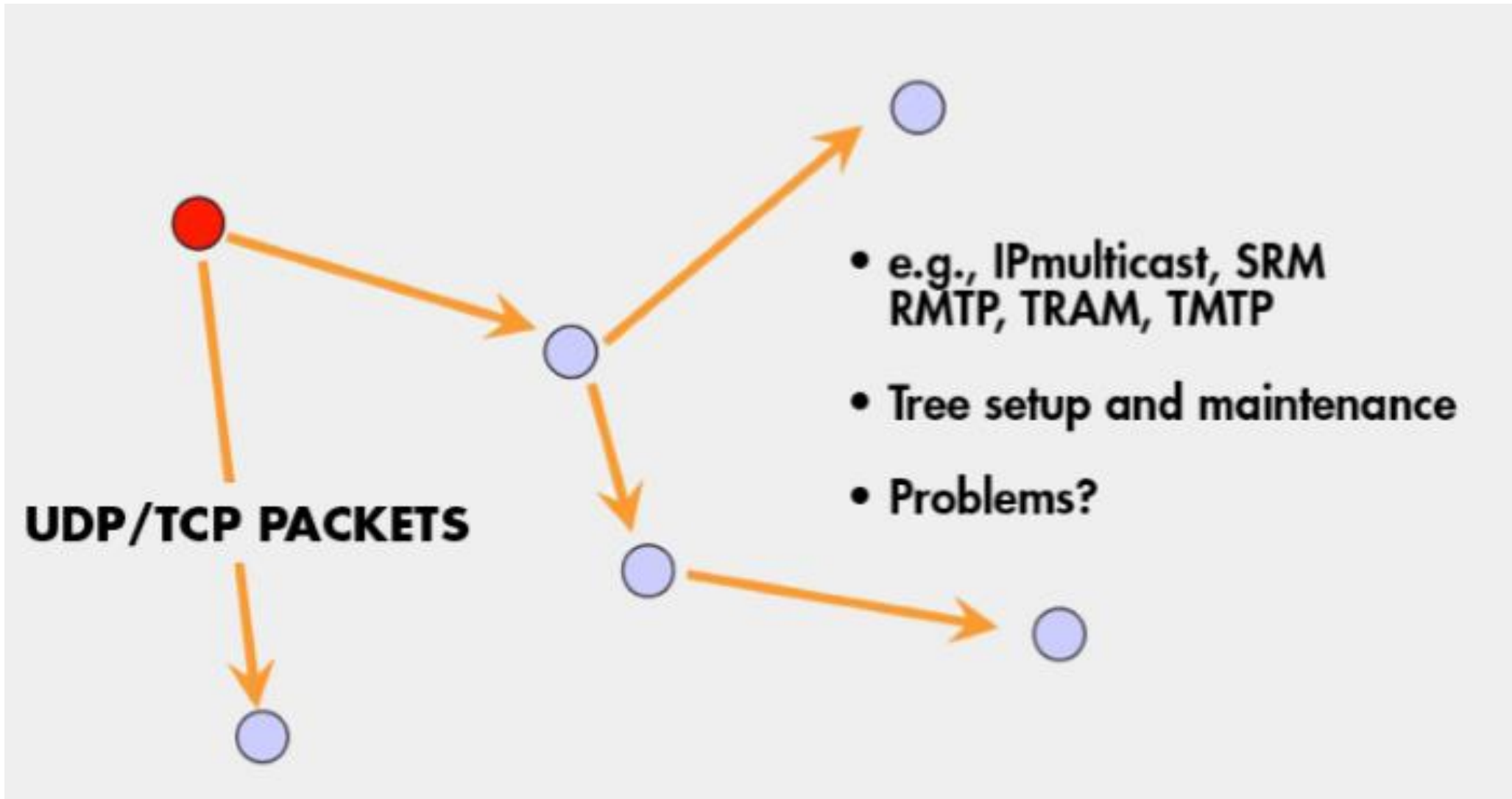Internet-based host
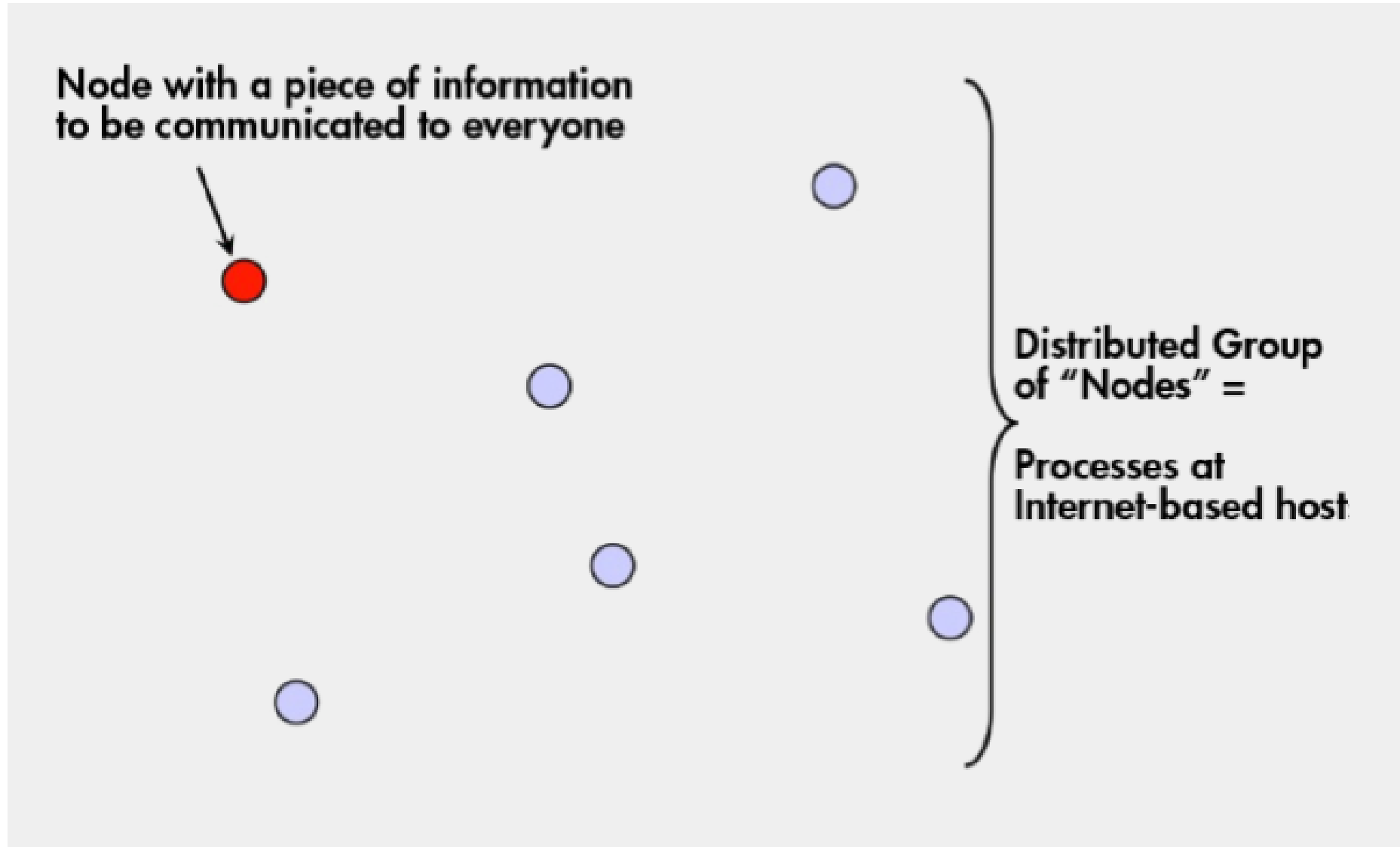
FAULT-TOLERANCE AND SCALABILITY

MULTICAST SENDER

- Nodes may crash
- Packets may be dropped
- 1000's of nodes

MULTICAST PROTOCOL

CENTRALIZED

UDP/TCP PACKETS

- Simplest implementation
- Problems?

TREE-BASED

UDP/TCP PACKETS

- e.g., IPmulticast, SRM RMTP, TRAM, TMTP

- Tree setup and maintenance

- Problems?
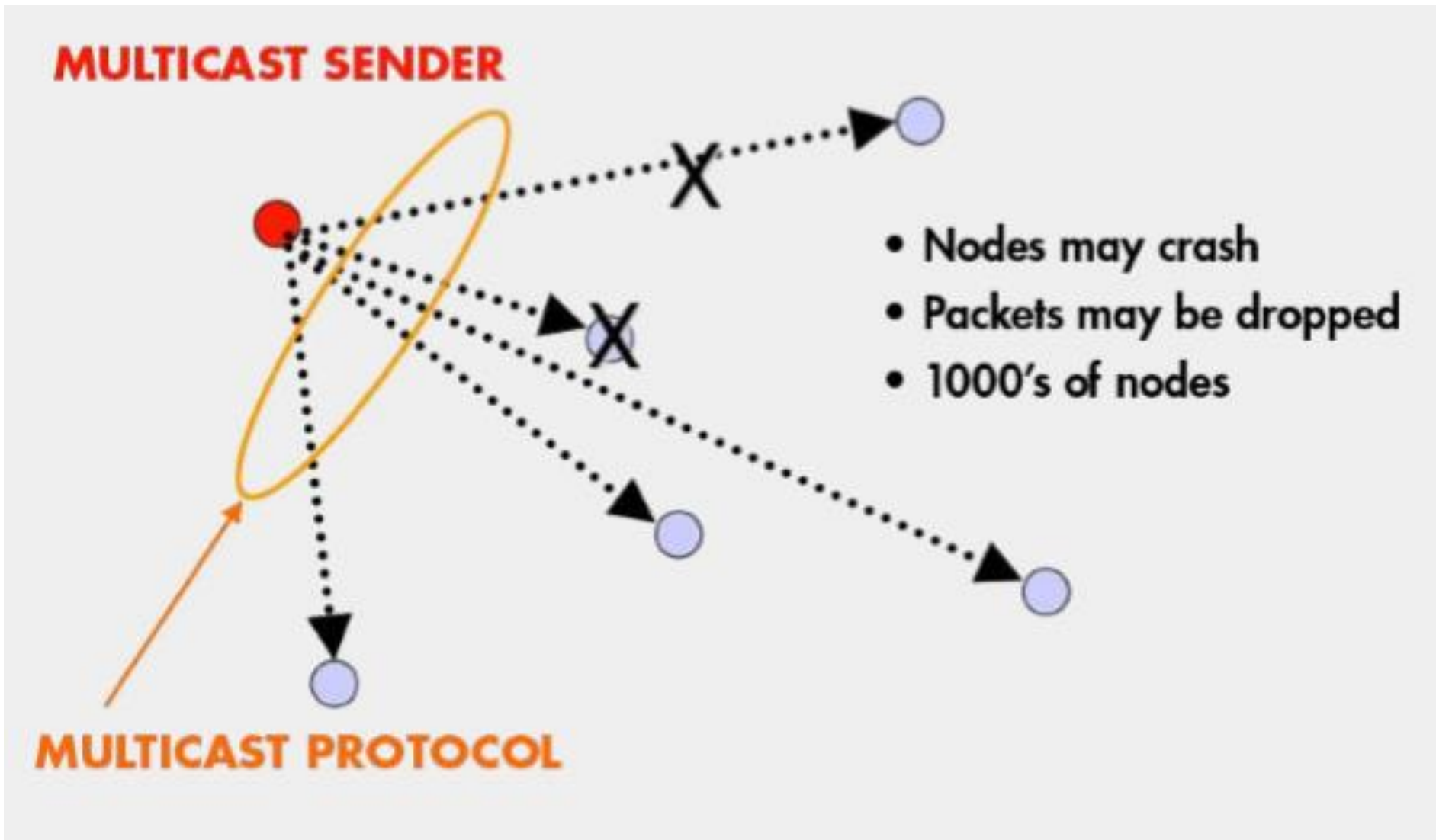
Distributed Computing - Dr. –Ing. Bilal Hameed

TREE-BASED MULTICAST PROTOCOLS

- Build a spanning tree among the processes of the multicast group

- Use spanning tree to disseminate multicasts

- Use either acknowledgments (ACKs) or negative acknowledgements (NAKs) to repair multicasts not received

- SRM (Scalable Reliable Multicast)
  - Uses NAKs
  - But adds random delays, and uses exponential backoff to avoid NAK storms

- RMTP (Reliable Multicast Transport Protocol)
  - Uses ACKs
  - But ACKs only sent to designated receivers, which then re-transmit missing multicasts

- These protocols still cause an O(N) ACK/NAK overhead

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- Cloud Computing Concepts, Coursera
  - Indranil Gupta, University of Illinois Urbana Champaign