

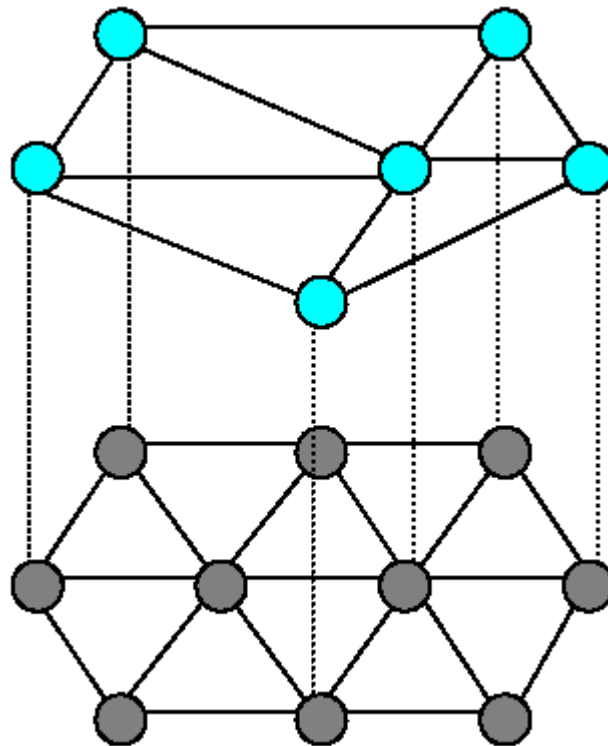
Overlay Networks

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Nov. 19, 2003

Introduction

- Overlay networks

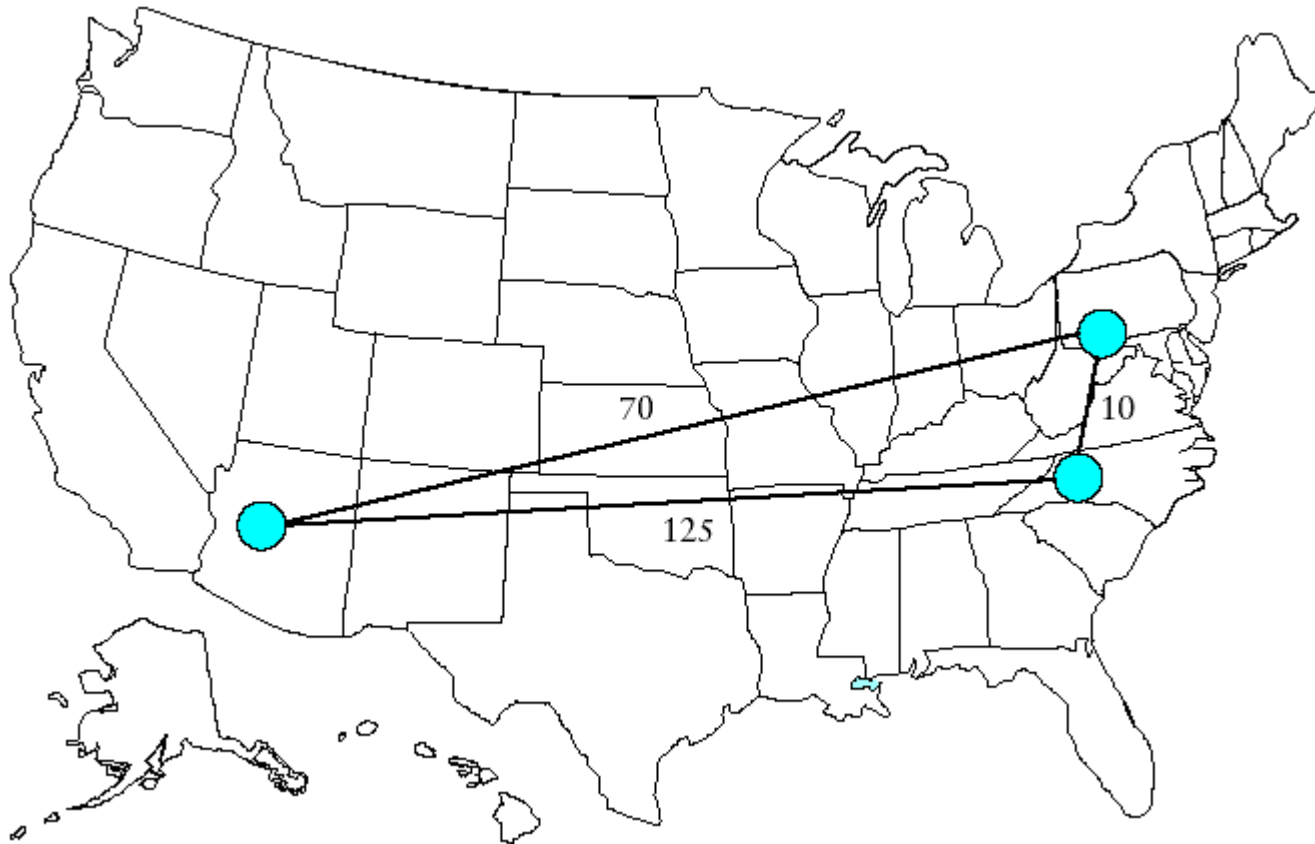


Introduction

- Routing overlays
 - MBone
 - 6-bone
- End system multicast
- Resilient Overlay Networks (RON)
- Peer-to-Peer Networks

Resilient Overlay Networks

- $N \times N$ strategy of closely monitoring

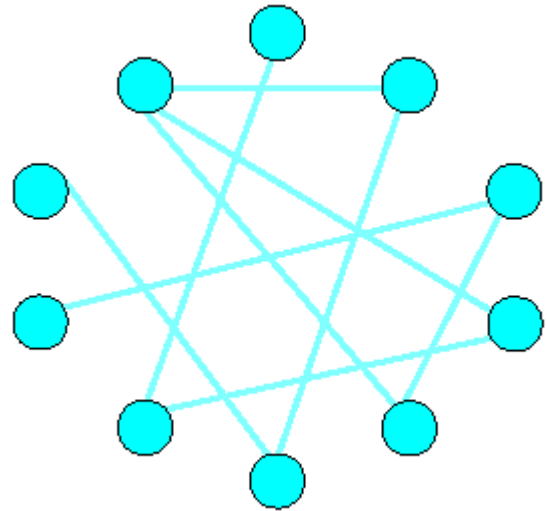


Peer-to-Peer Networks

- Architectures
 - Unstructured (Gnutella)
 - Structured (Pastry, Chord, CAN)
- Applications
 - File sharing
 - Media streaming
 - Multicast

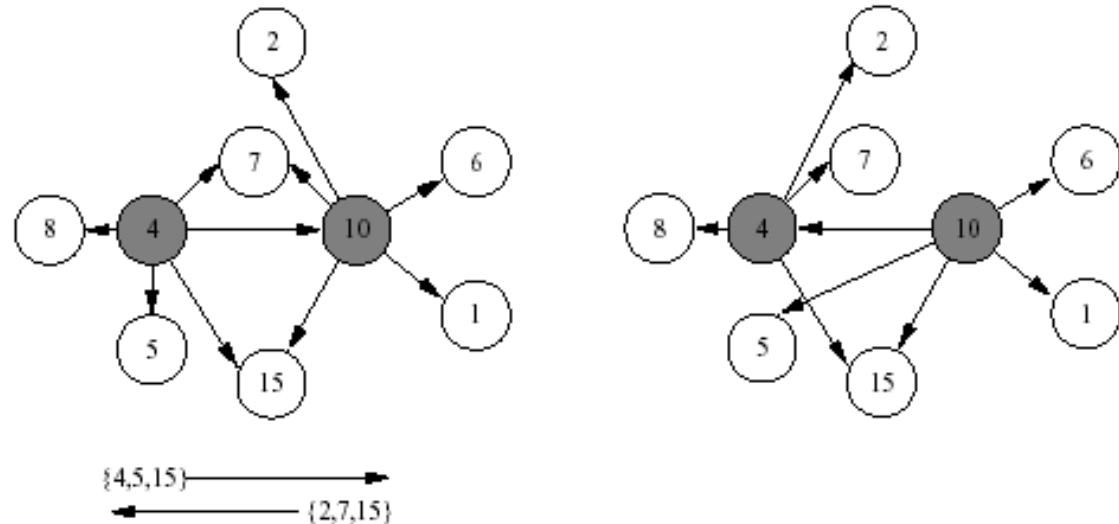
Guntella-like Systems

- Restricted flooding
 - TTL
 - QID
- Reverse path forwarding
 - Neighbor learning
 - Privacy



Guntella-like Systems

- Improvements of Gnutella-like systems
 - Random walk
 - Replicas
 - Routing indices
 - Shuffle

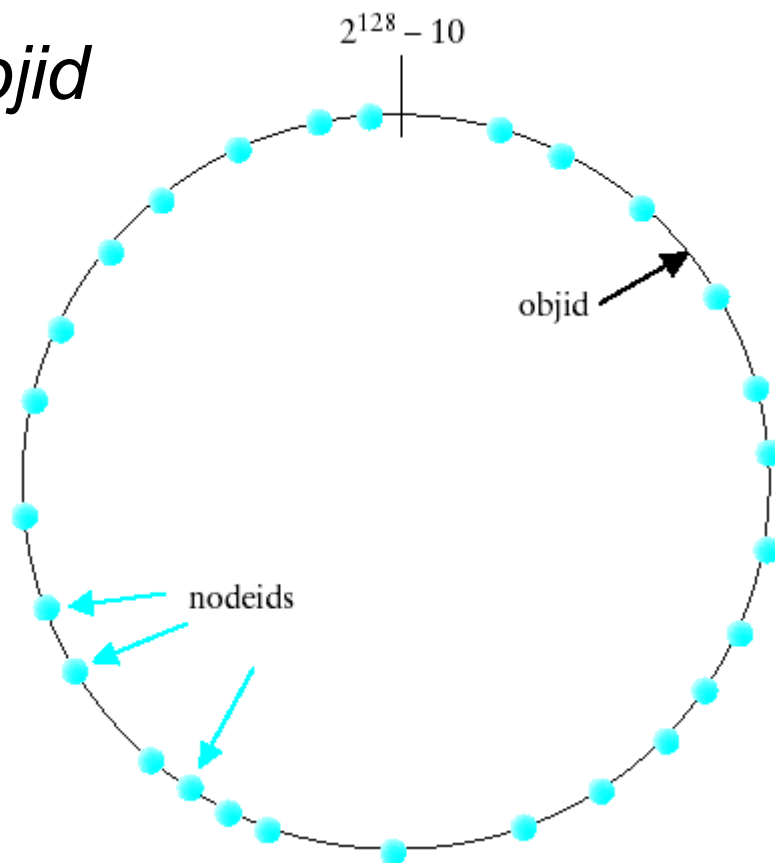


Structured Overlays

- Consistent hashing

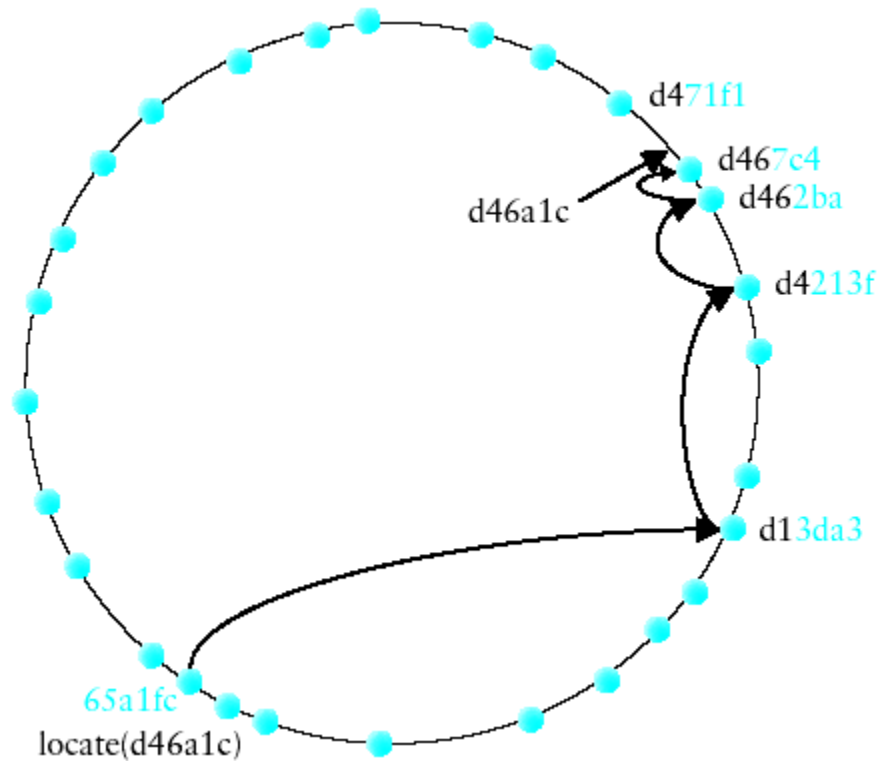
Hash(object_name) -> objid

Hash(IP_addr) -> nodeid



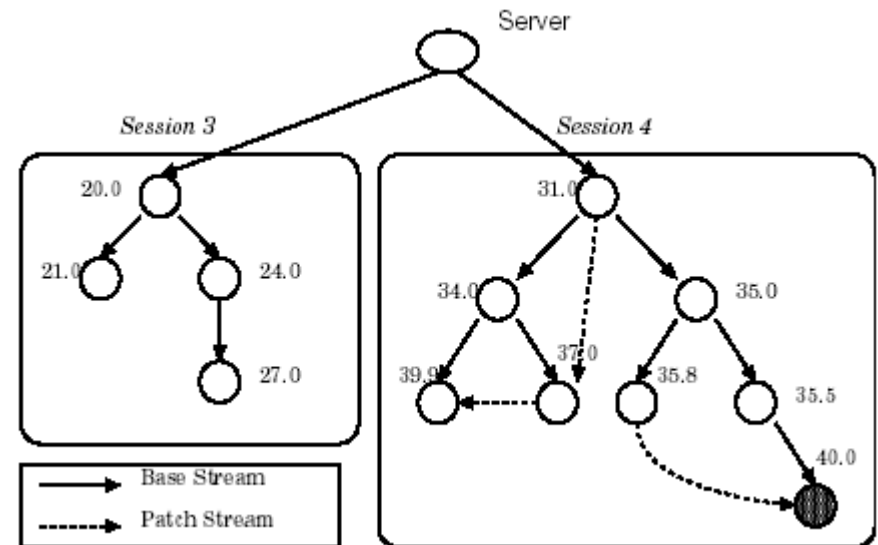
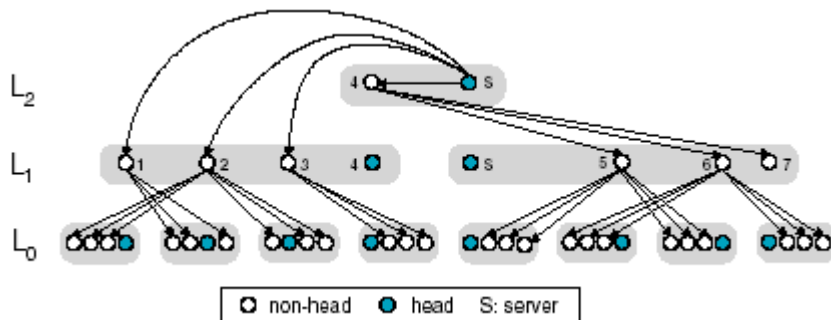
Structured Overlays

- Distributed hash tables (DHT)



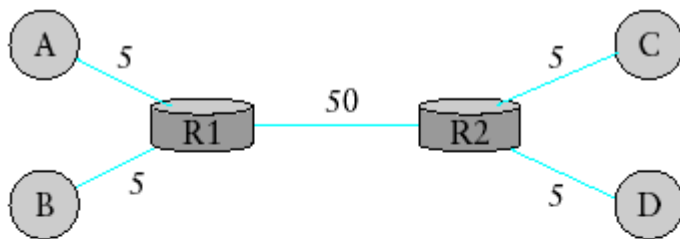
Media Streaming

- Distribute loads from the server to peers
 - ZIGZAG
 - P2Cast

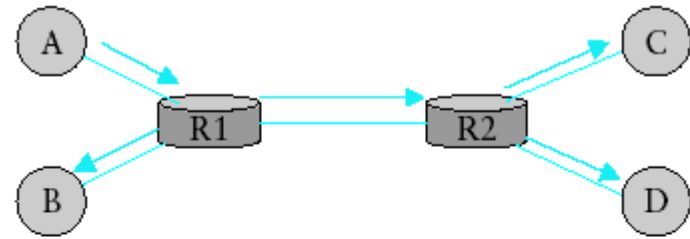


- Fault-tolerance and media segmentation

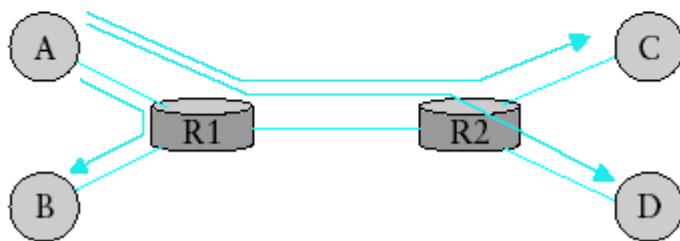
End System Multicast



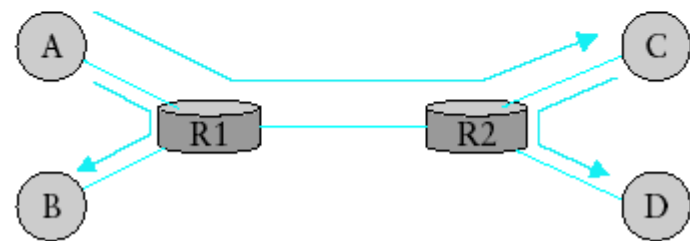
(a)



(c)



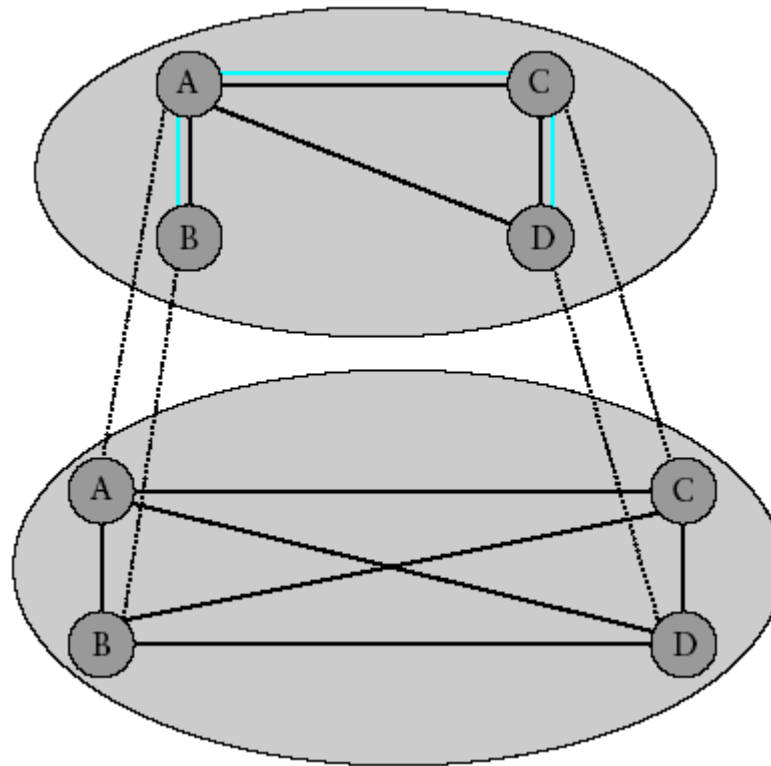
(b)



(d)

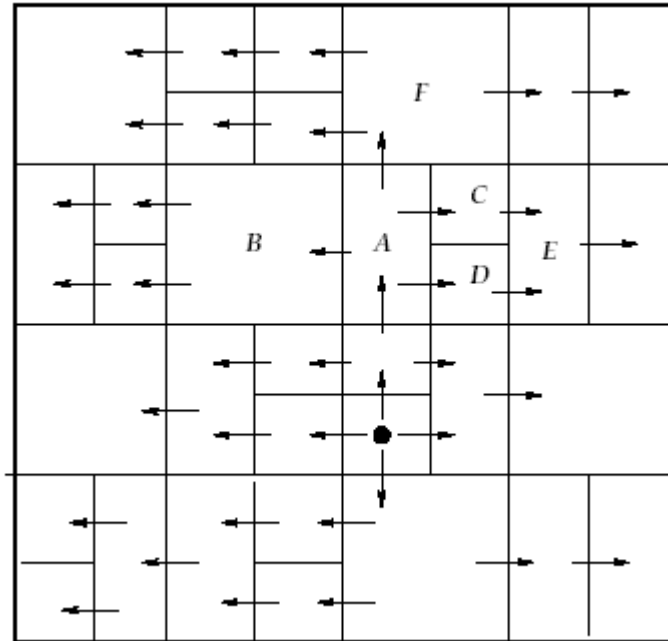
End System Multicast

- DVMRP on mesh overlay



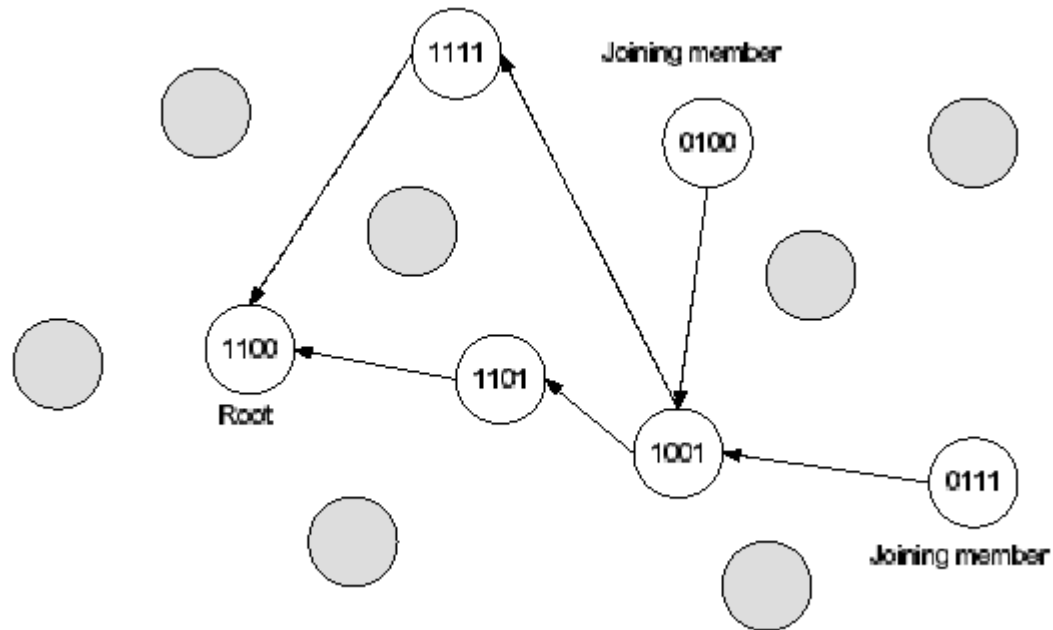
Multicast in CAN

- Mini CAN



Multicast in Pastry

- Scribe



Conclusions

- Overlays provide application-level network services independent of the standardization process.
- Overlays illustrate the concept that is central to computer networks in general: virtualization.