

Decentralized and Autonomous Bootstrapping for IPv6-based Peer-to-Peer Networks

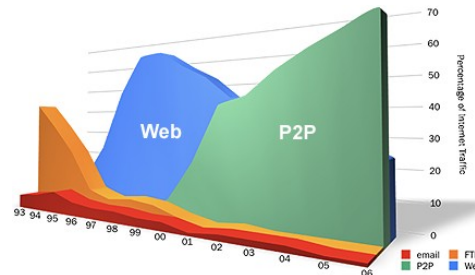


Dr. Roland Bless, Dr. O. Waldhorst,
Ch. Mayer, H. Wippel, and many more colleagues
Institute of Telematics, Universität Karlsruhe (TH)

IPv6 Contest – 2nd German IPv6 Summit
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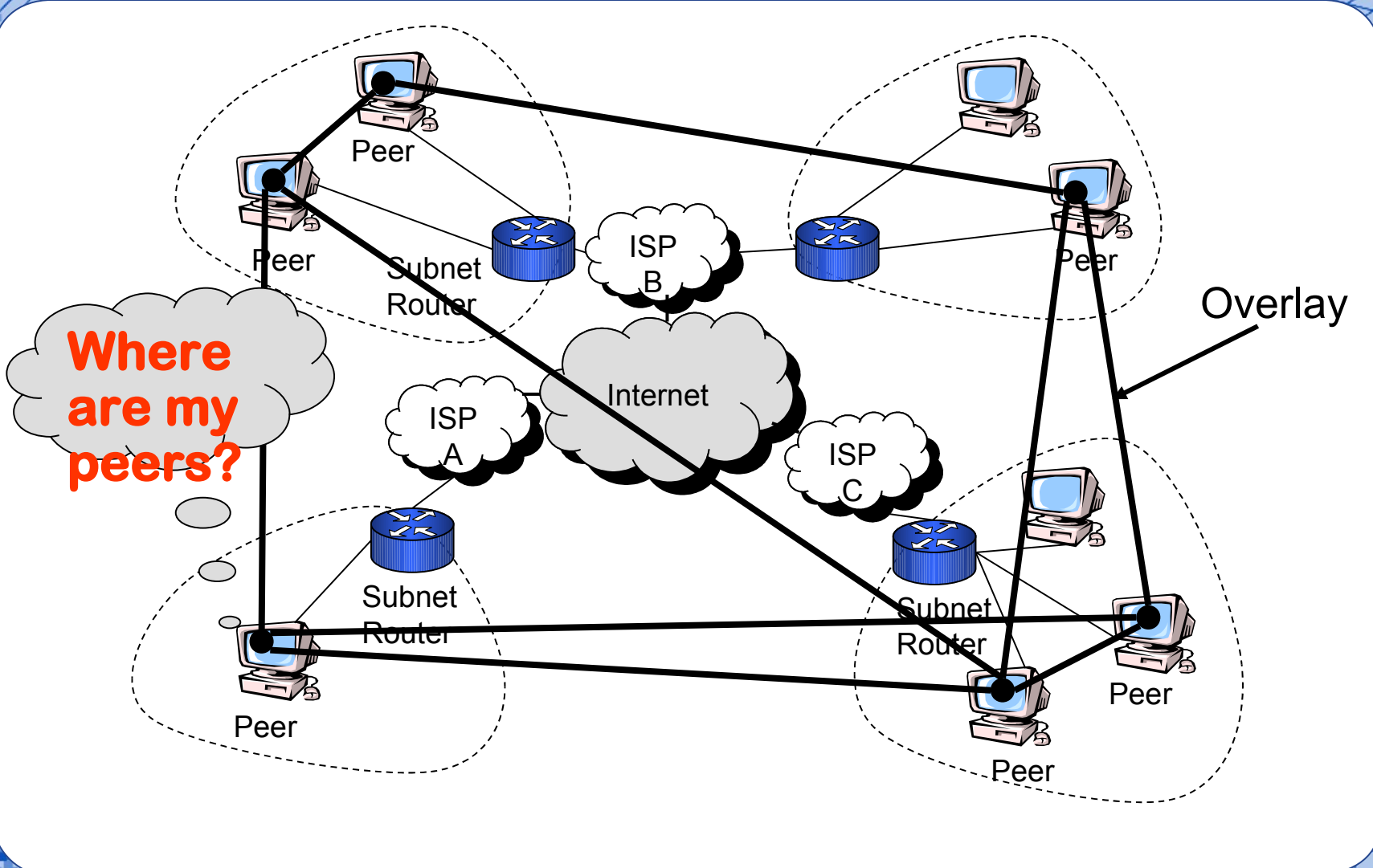


- Innovation through P2P-based overlays
 - file sharing, streaming videos, Internet telephony, multicast
 - decentralized, scalable
 - self-organizing, autonomous (not depending on servers)
 - seamless deployment, end-system based



Source: www.openp4p.net

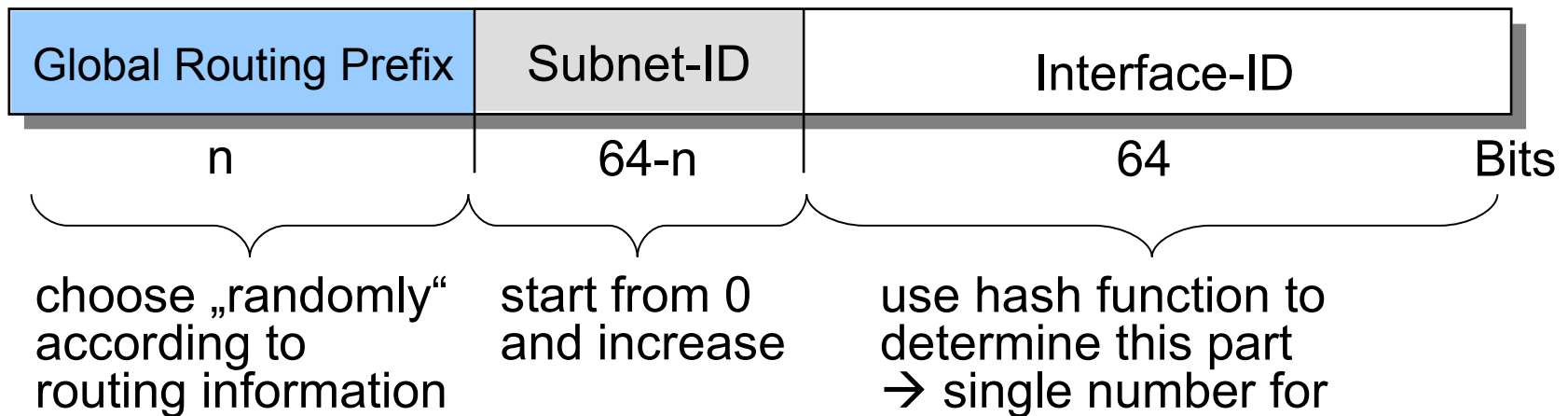
- One problem still insufficiently solved
 - **Bootstrapping**: process of initially finding a peer for joining of the P2P network
 - how to find nodes that are already part of the overlay?
→ often only centralized part in decentralized P2P networks



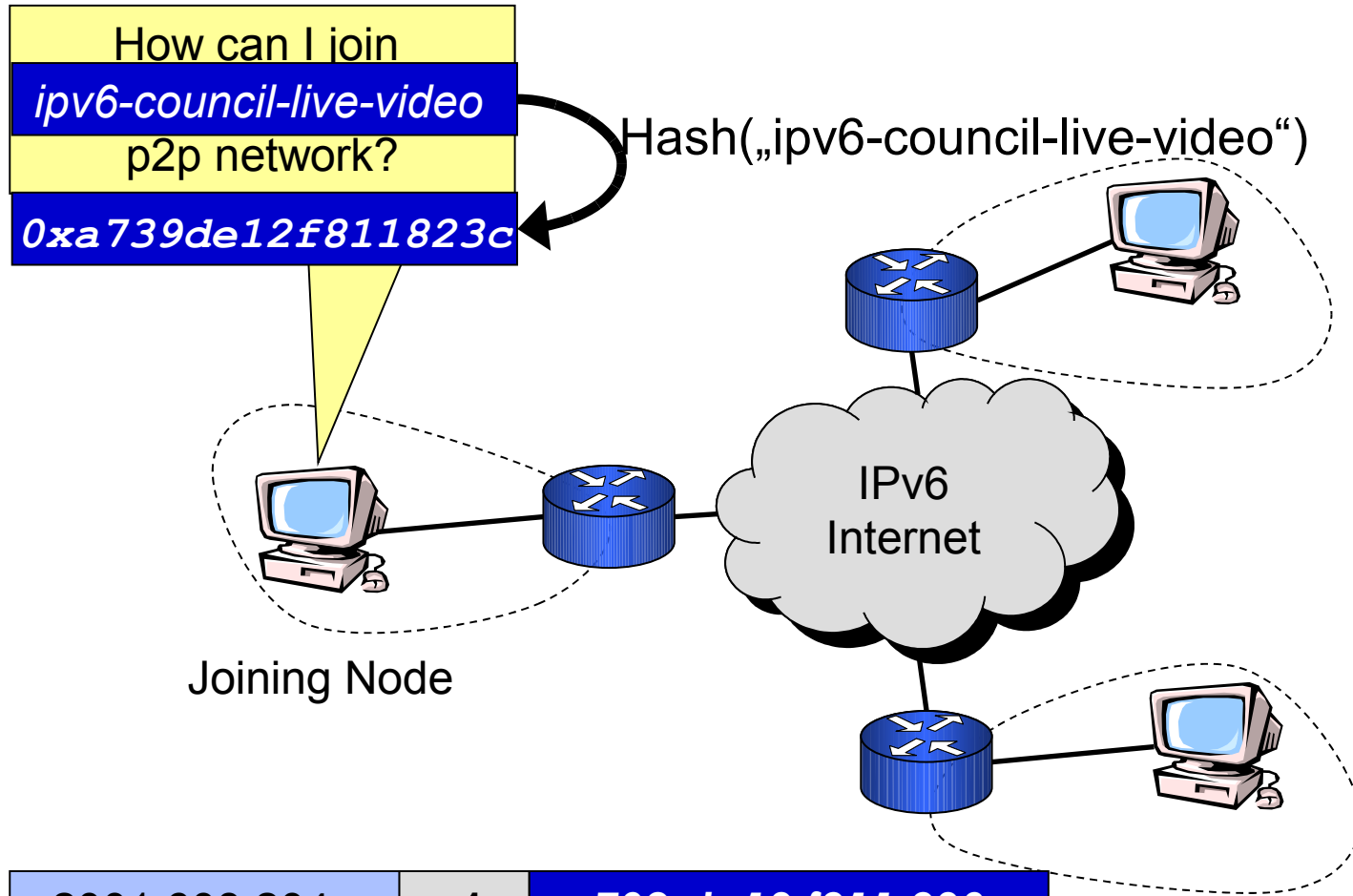
- **Bootstrapping IPv4-based P2P networks**
 - **server-based peer list**: download active peer list
 - **host caches**: connect to last-known hosts
 - **random address probing**: actively find peers
- **Exemplary Problems**
 - no well-defined or standardized approach
 - hard for small P2P networks
 - limited reachability of hosts due to **NAT**

Decentralized and autonomous
bootstrapping is an unsolved problem
→ IPv6 provides new possibilities!

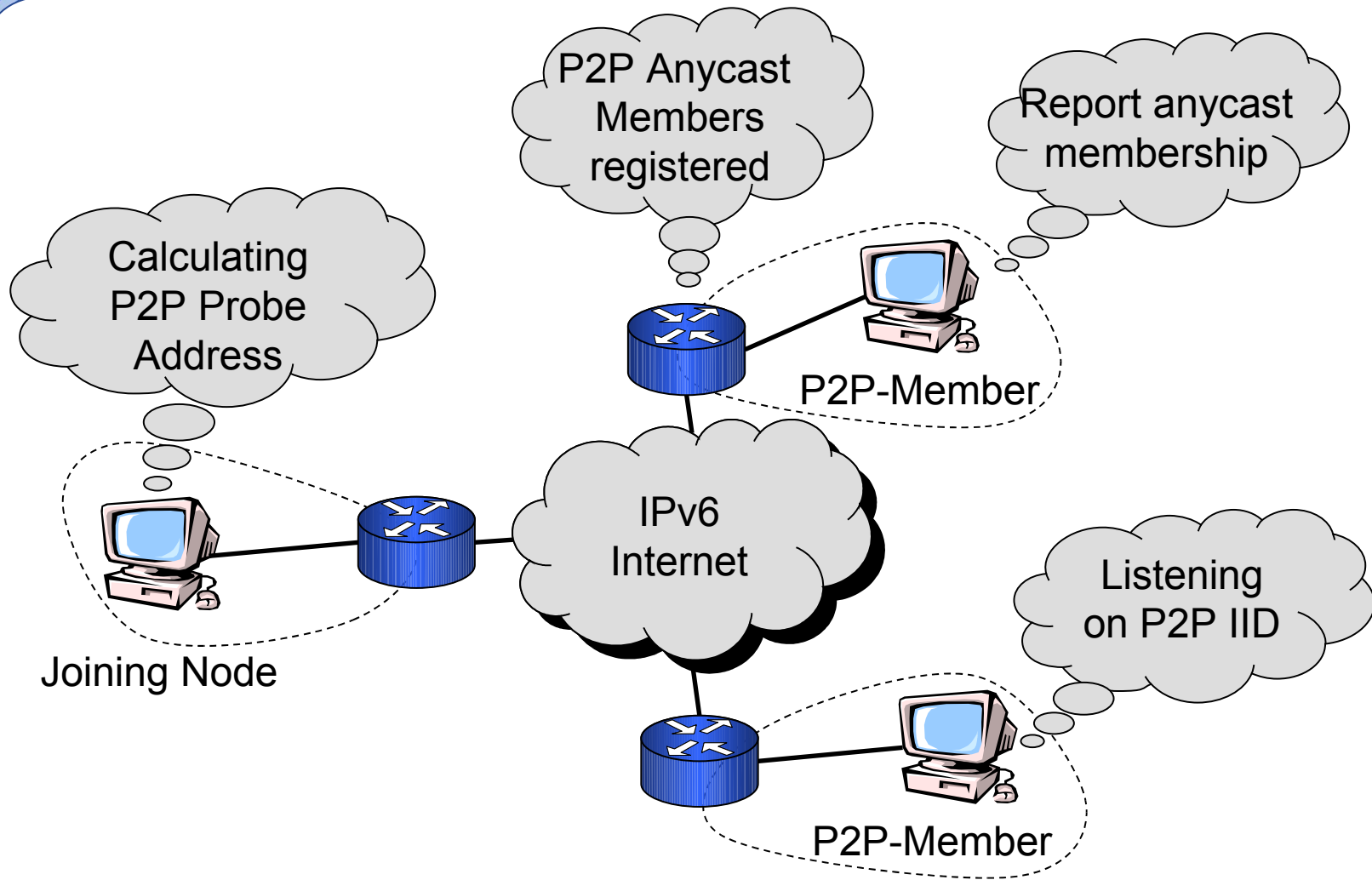
- Use **targeted random address probing** for IPv6
 - exploit the large IPv6 address space
 - probe network part „randomly“
 - probe host part deterministically



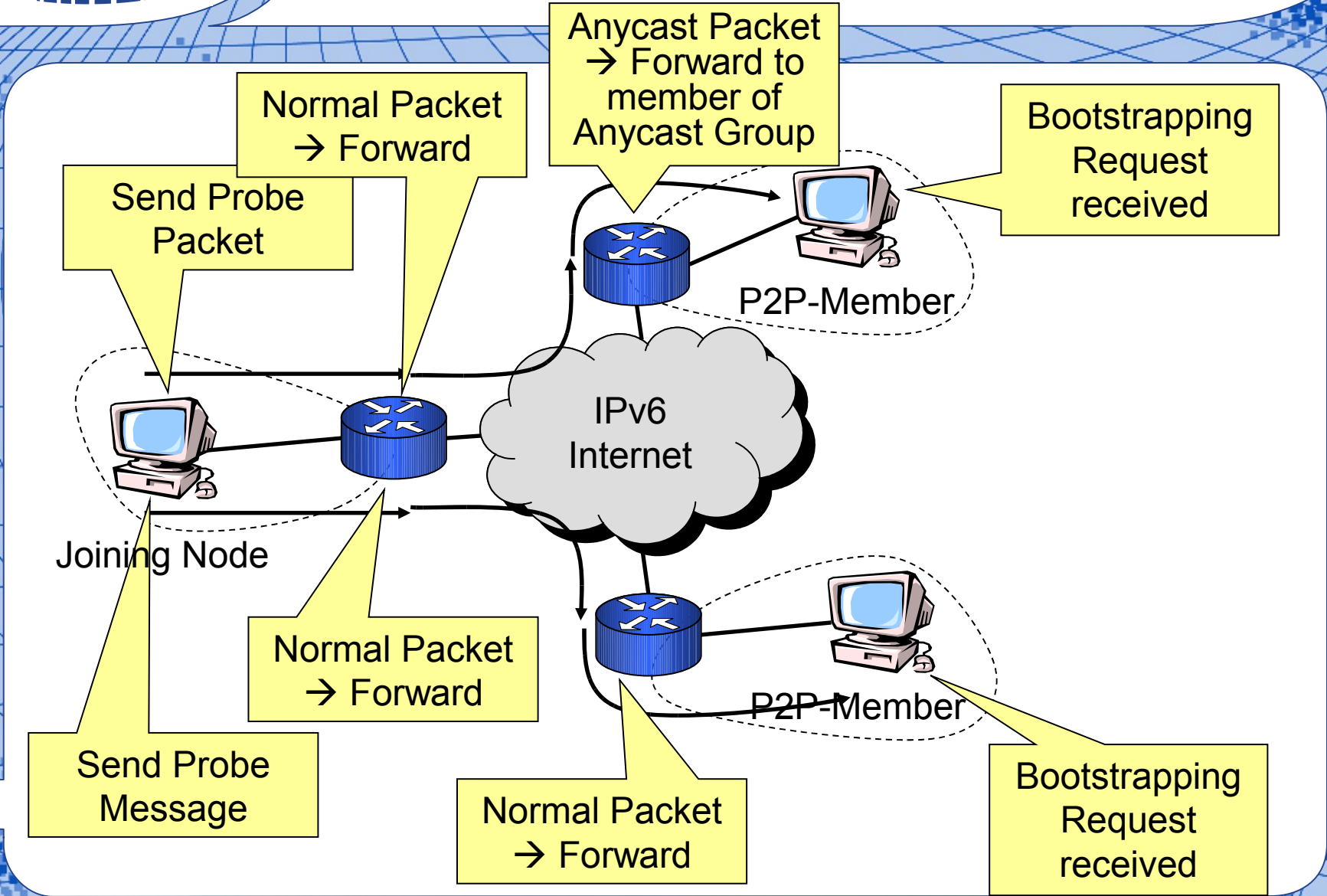
- Connected peers will register this address as
 - **unicast** address (simple approach), or
 - **anycast** address (advanced approach)



2001:608:204: :1 a739:de12:f811:823c



Peer Discovery



- Really decentralized and autonomous bootstrapping makes P2P networks more robust
- Uses IPv6 features
 - larger addresses
 - end-to-end reachability
- Deployment via two approaches
 - simple approach: register unicast address
 - advanced approach: register anycast group
 - ▶ we will work towards standardization in IETF

Thanks! Questions?



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