

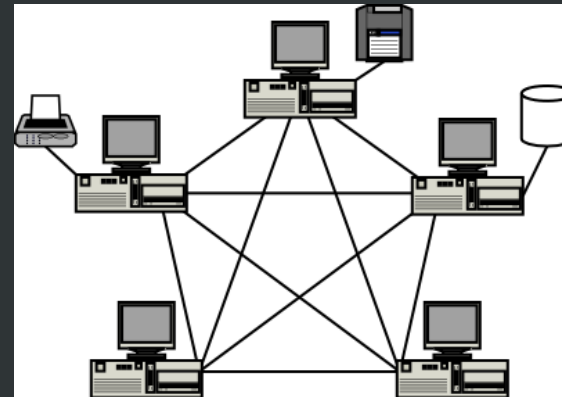
Latest Peer-to-Peer Technologies II

Outline

- Last presentation
- Intro
- Peer-to-Peer SIP
- TCP Traversal
- Conclusions

Last Presentation

- P2P Systems
 - Structured
 - Centralized
 - Decentralized
 - Unstructured
 - Pure P2P
 - Hybrid
- Technologies
 - Distributed Hash Table
 - Super-peer
 - Distributed Cache



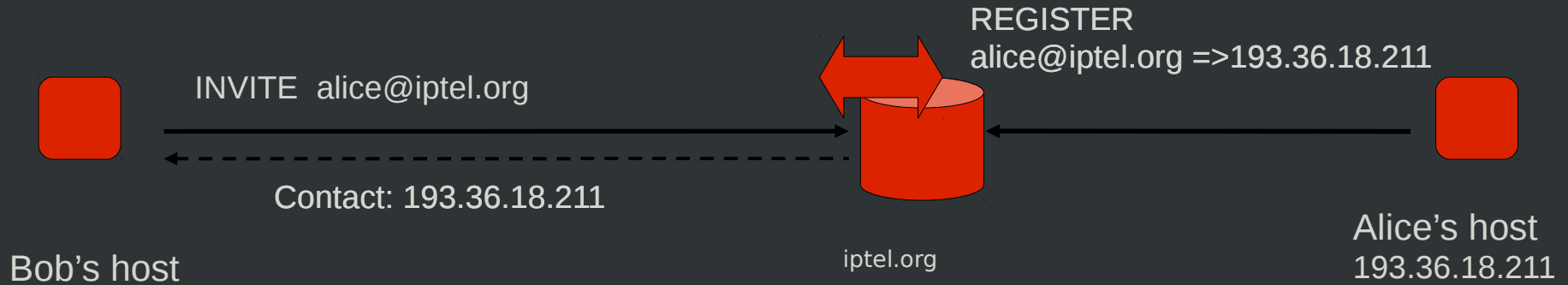
Introduction

- Centralized Services -> P2P
 - SIP -> Peer-to-Peer SIP
 - DNS -> Peer-to-Peer NS
- Networking
 - TCP Traversal
- F2F ?
 - No demo today

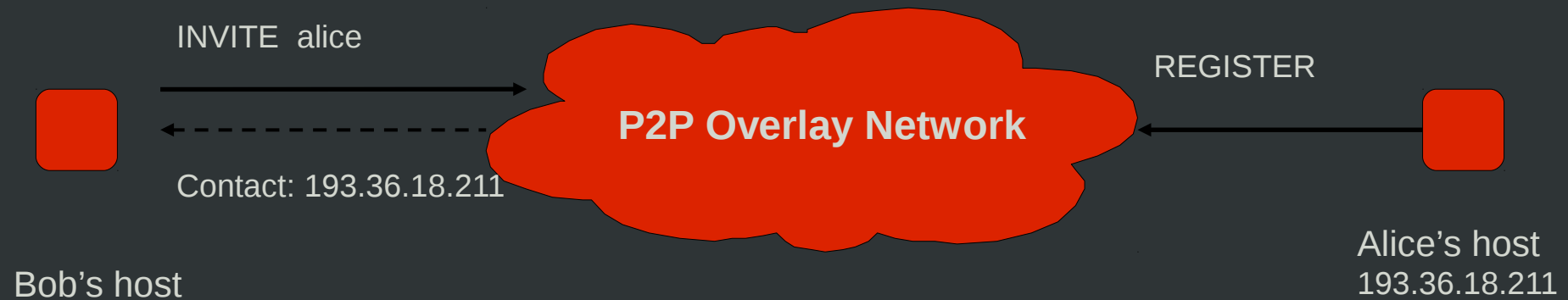
Peer-to-Peer SIP (P2P-SIP)

- Centralized SIP
 - Registrar servers, User Agents (Clients)
 - Clients register on server
 - Clients request contacts using server DB
- P2P-SIP
 - Registrar servers -> P2P Overlay Network
 - Clients register on some node in p2p network
 - Clients request contacts using distributed DB

Peer-to-Peer SIP (P2P-SIP)



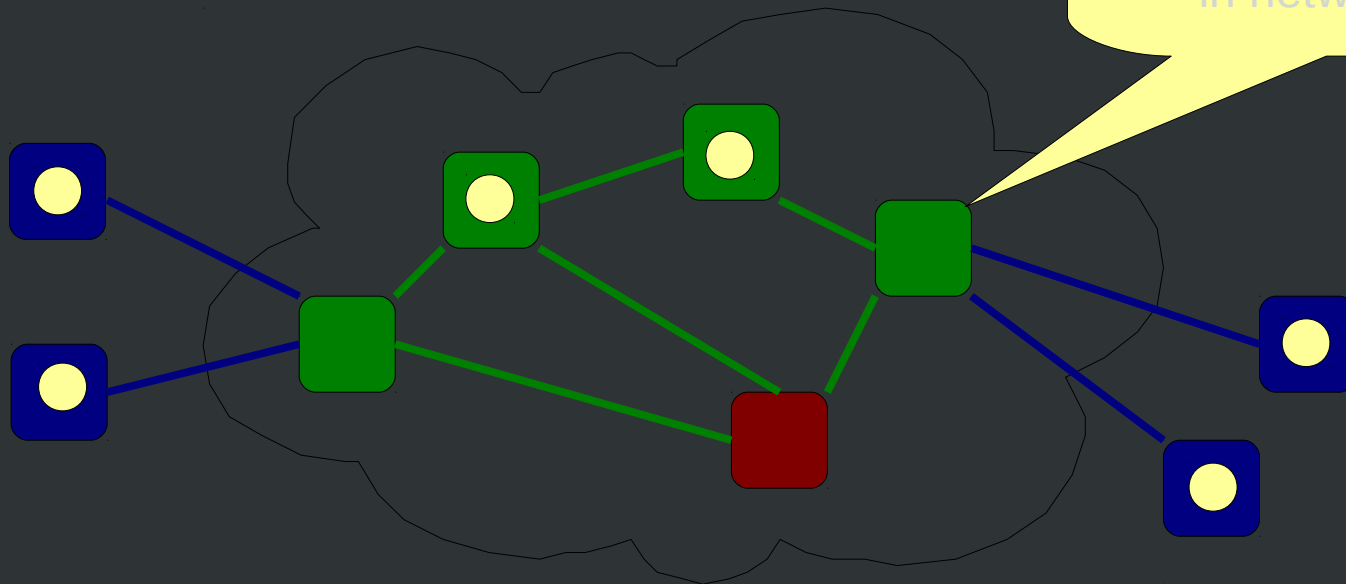
- GOOD: maintenance, configuration, controlled infrastructure, Quick search -> quick invite responses
- BAD: not scalable, single point of failure



- GOOD: scalable, fail-tolerant
- BAD: slow search -> delay in invite responses

Overlay Network

User/Resource records are distributed over peers in network (DHT)



P2PSIP Client



P2PSIP Peer



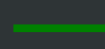
P2PSIP Bootstrapping
Peer



User Agent



Client Protocol

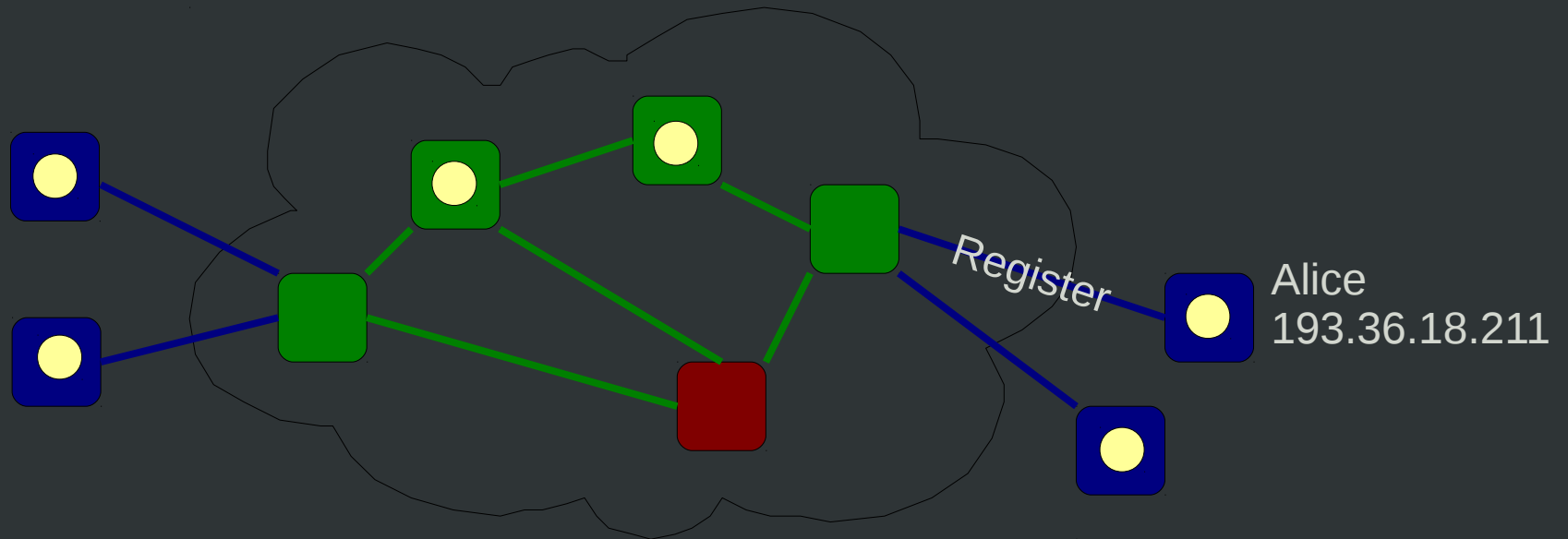




Peer Protocol


P2PSIP Peers

- Hold part of user/resource records
 - (remember DHT: Chord, DHT Tree)
 - Add/Remove records in DHT
 - Look-up for resources
- Serve one or multiple clients (super-node)
 - Registrar server (sip-register, sip-invite, ...)
 - Proxy/redirect
 - Gateway
 - Signaling
 - Media relay



Register/Invite



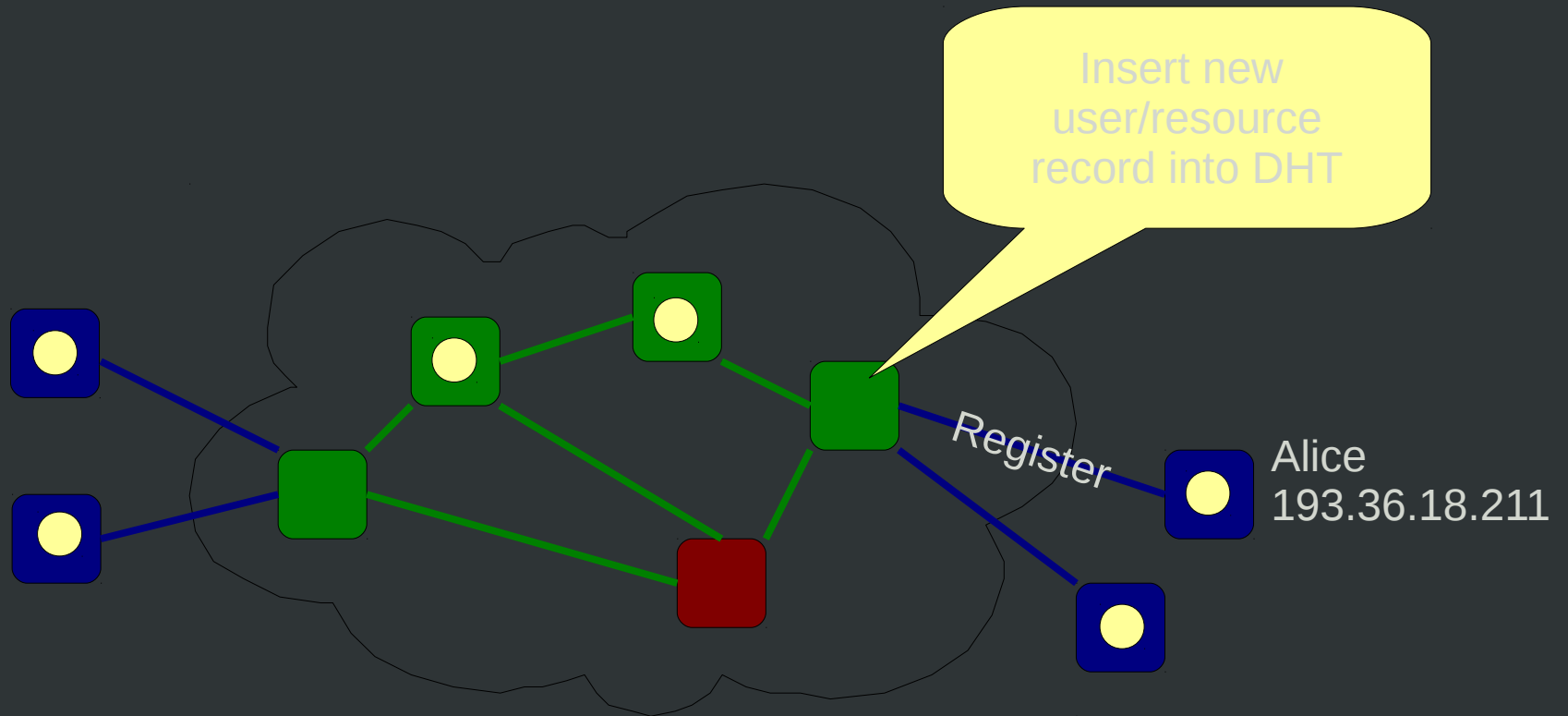
 P2PSIP Client
 P2PSIP Peer



 P2PSIP Bootstrapping Peer


 User Agent


 Client Protocol
 Peer Protocol



Register/Invite



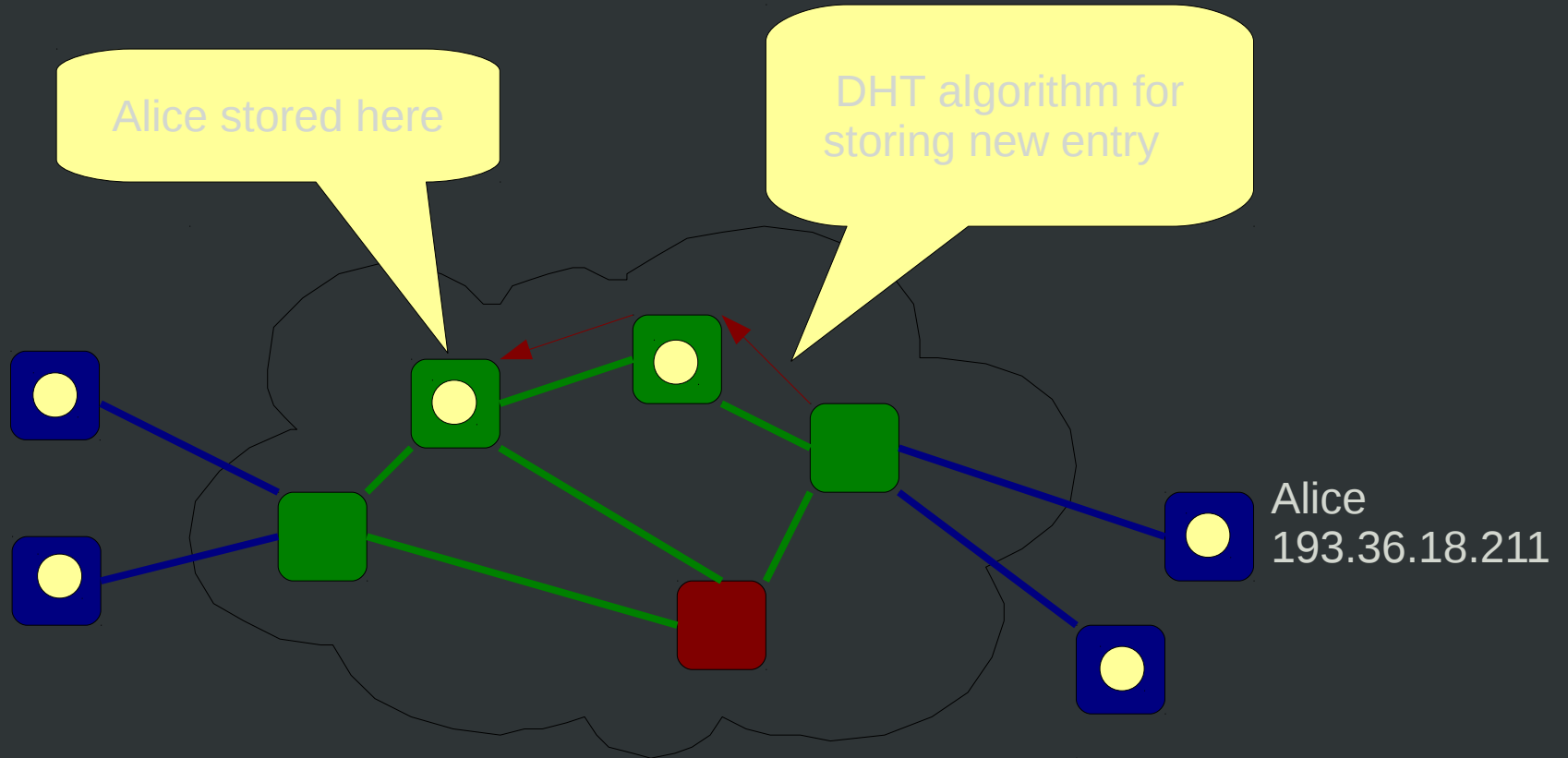
 P2PSIP Client
 P2PSIP Peer



 P2PSIP Bootstrapping Peer


 User Agent


 Client Protocol
 Peer Protocol



Register/Invite



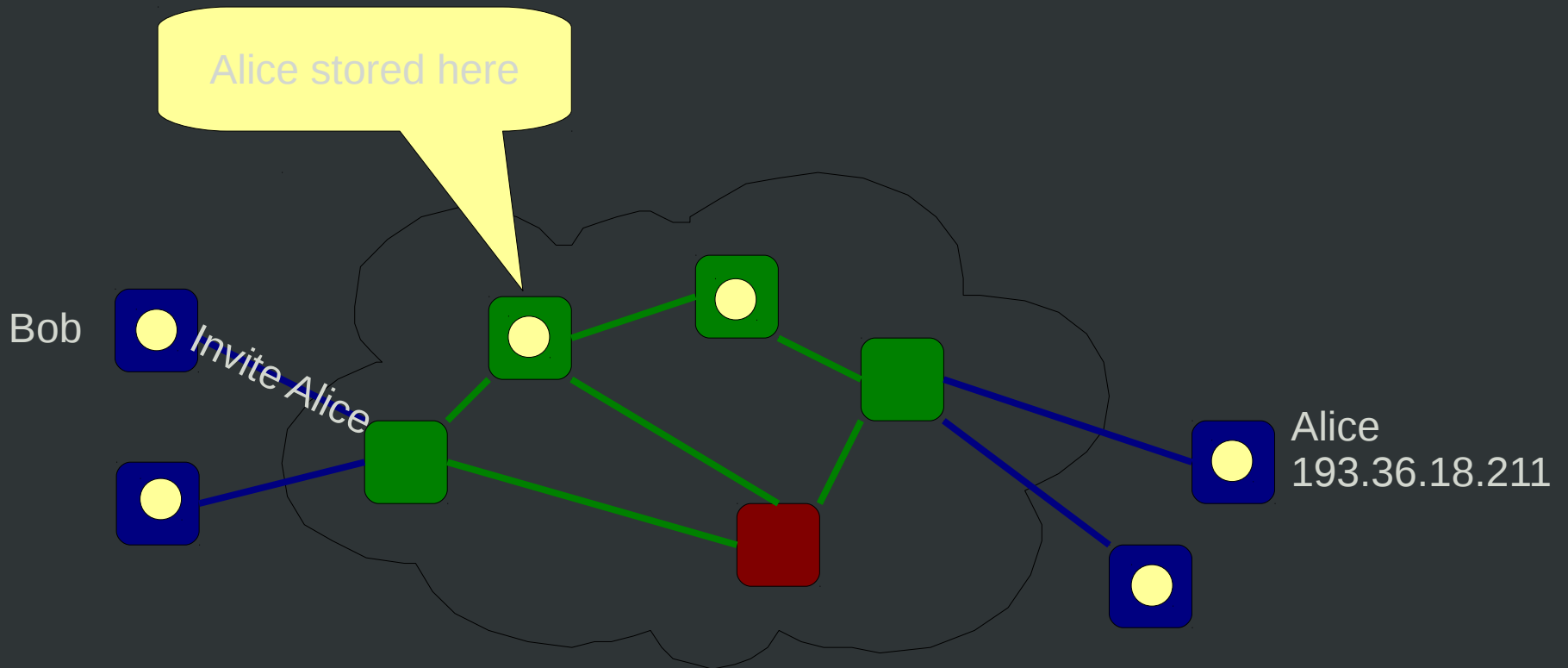
 P2PSIP Client
 P2PSIP Peer



 P2PSIP Bootstrapping Peer


 User Agent

 Client Protocol
 Peer Protocol



Register/Invite



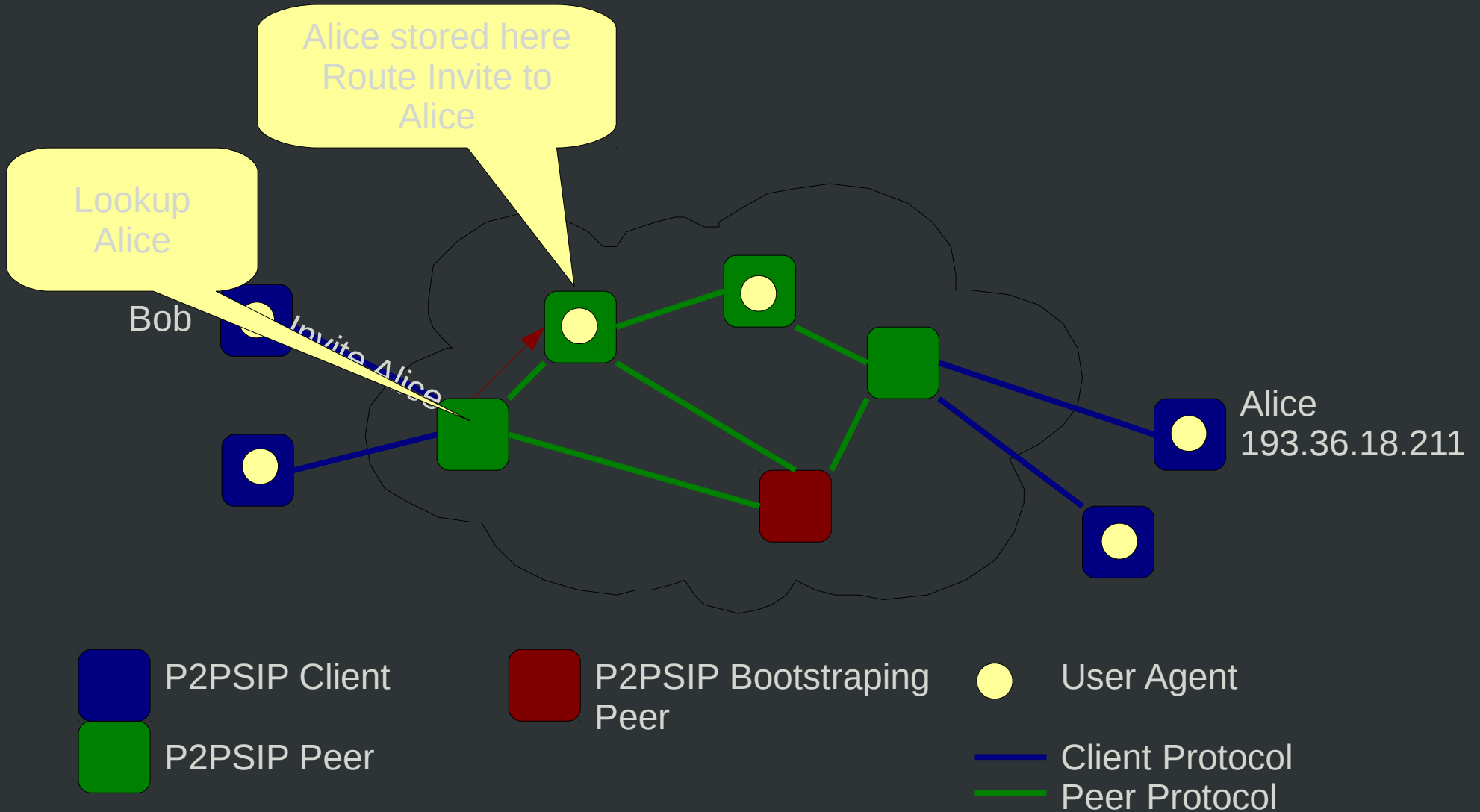
 P2PSIP Client
 P2PSIP Peer

 P2PSIP Bootstrapping Peer

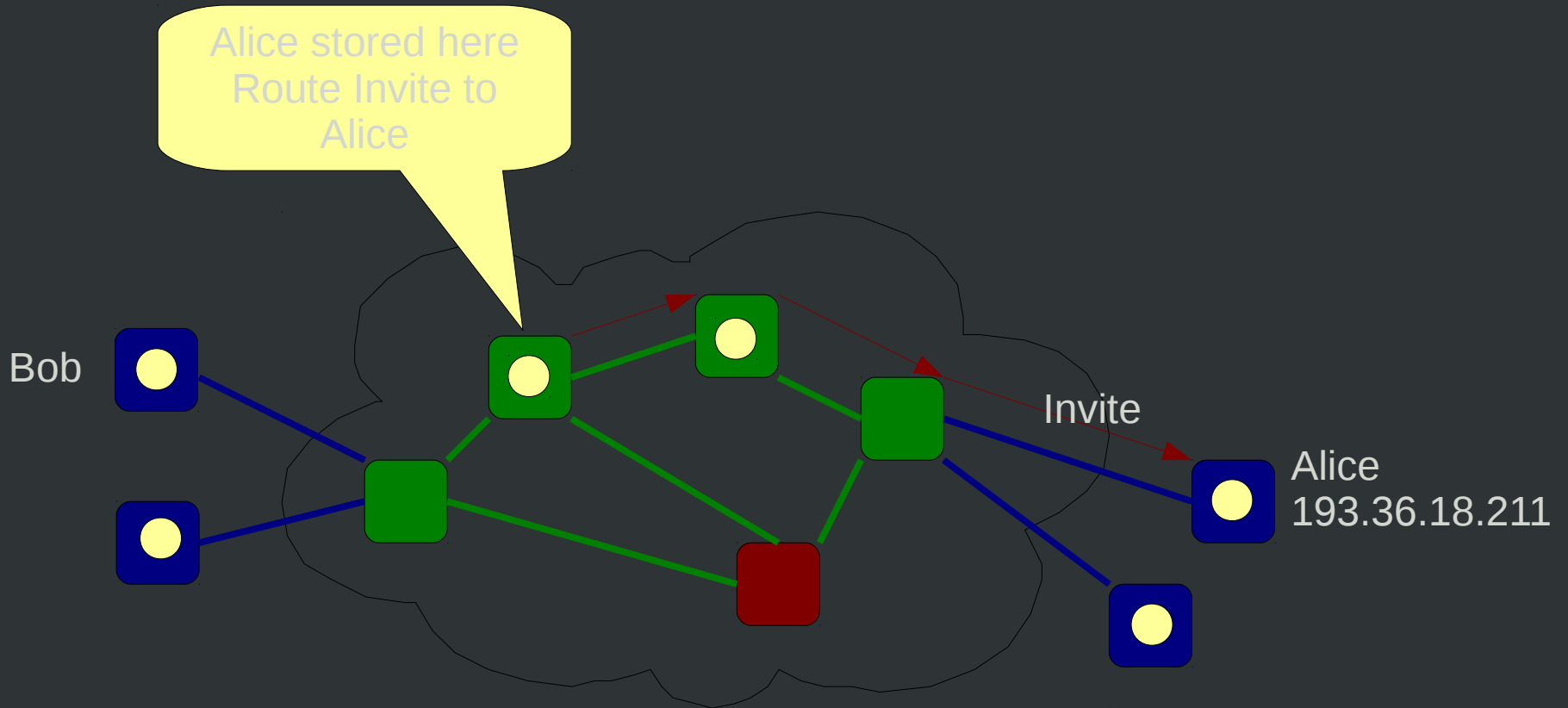
 User Agent



 Client Protocol
 Peer Protocol


Register/Invite






Register/Invite



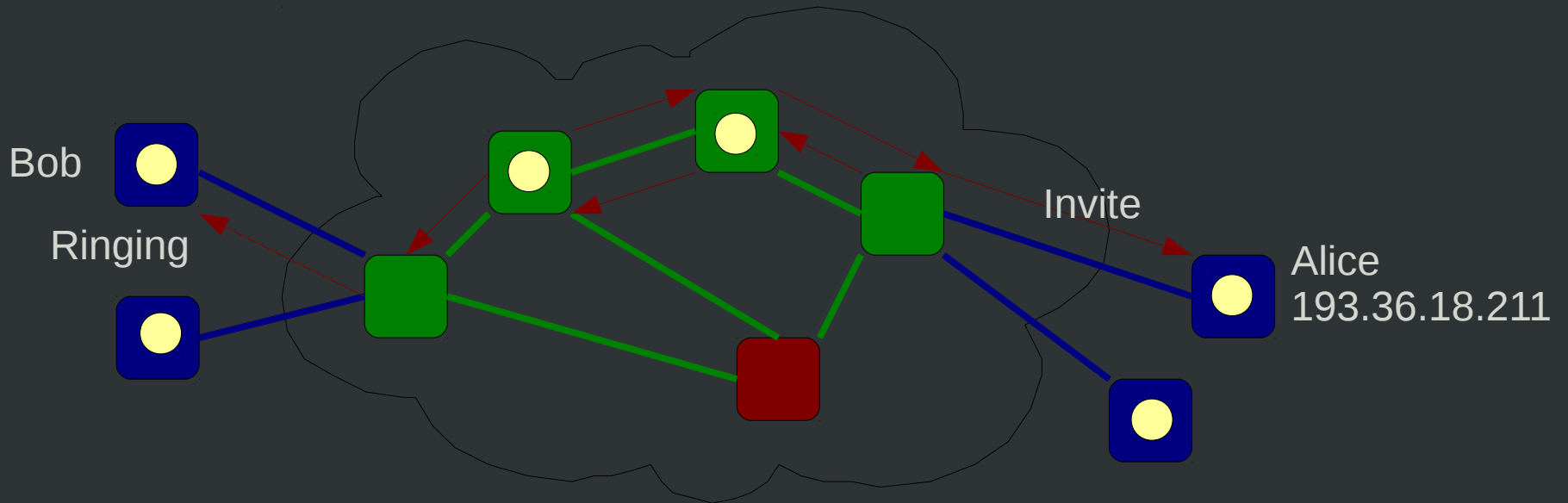
 P2PSIP Client
 P2PSIP Peer



 P2PSIP Bootstrapping
Peer


 User Agent


 Client Protocol
 Peer Protocol



Register/Invite



 P2PSIP Client
 P2PSIP Peer

 P2PSIP Bootstrapping Peer

 User Agent

 Client Protocol
 Peer Protocol

Signaling/Media Relay

- Blackboard ...

Questions about P2P-SIP

Networking

- NAT Traversal
 - By controlling device
 - NAT-PMP, UpnP
 - By discovering behaviour
 - UDP Traversal
 - STUN, UDP Hole Punching
 - TCP Traversal
 - STUNT
 - NATBlaster
 - P2PNat

TCP Traversal

- Basics of STUNT approach
 - Similar to STUN for UDP traversal
 - Public server
 - Mediating host A and B to establish direct connection from behind the NAT devices
 - Spoofing the TCP seq# in packet headers

Questions about TCP Traversal

Conclusions

- P2P is advancing in the area of Client-Server
 - DNS -> P2P-NS, SIP -> P2P-SIP
- Pirate Bay switched to fully DHT (no tracker)
 - Bootstrap ?
 - Magnet links ?
- Pirate Search engine
 - Uses a peer connected to bitTorrent network

References

- [1] *SIP PEER: A Session Initiation Protocol (SIP)-based Peer-to-Peer Internet Telephony Client Adaptor** 2005 Kundan Singh and Henning Schulzrinne
Department of Computer Science, Columbia University
{kns10,hgs}@cs.columbia.edu
- [2] *Characterization and Measurement of TCP Traversal through NATs and Firewalls* Saikat Guha, Paul Francis. Cornell University
{saikat,francis}@cs.cornell.edu
- [3] <http://www.piratebay.org>

Questions?

