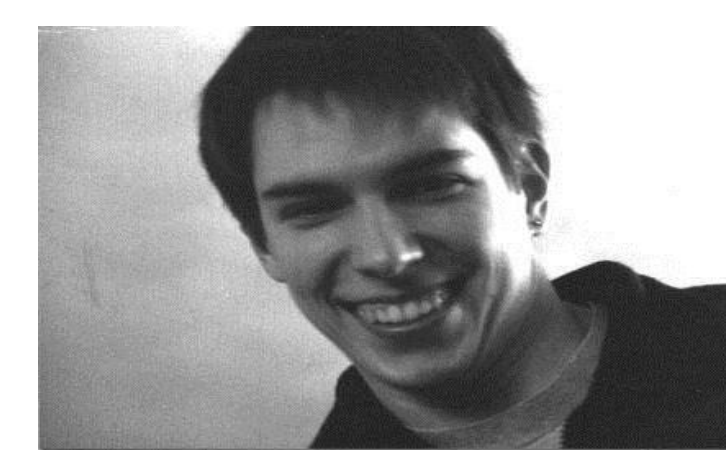


# Self-configuring Wide-area Virtual Networks and Applications: SocialVPN and Grid Appliances

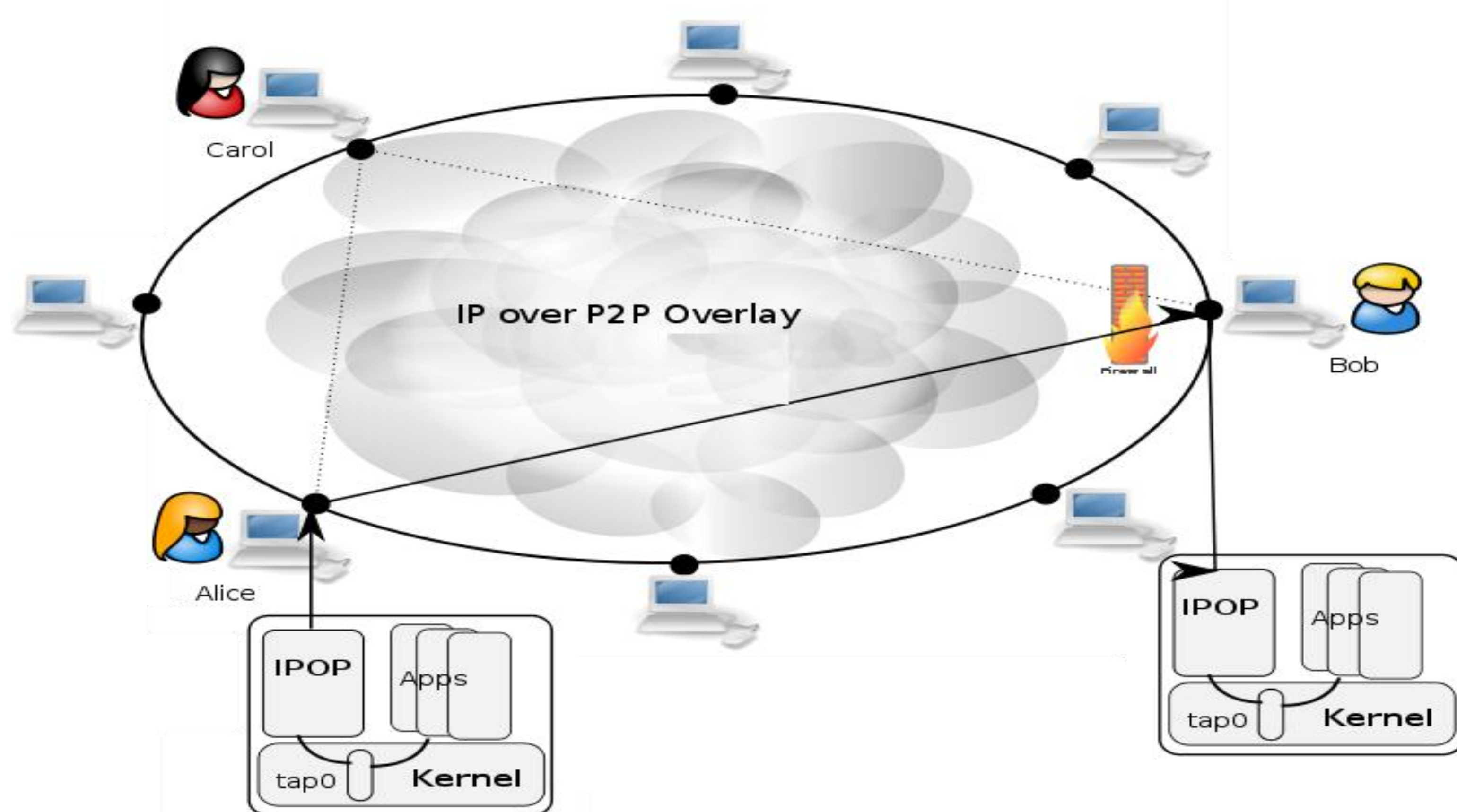


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## Abstract

The deployment of secure collaborative environments across multiple institutions requires **significant administration to establish and maintain trust, and manage access to computational resources across multiple organizations**. This management overhead often hinders collaboration among individuals from different organizations. Our system **integrates social networking, and self-configuring peer-to-peer overlay networks to allow for self-managing wide-area virtual private networks**. The open-source software has been used in projects including high-throughput computing (Virtual Machine-based Grid appliances) and social networks (SocialVPN)

## IP-over-P2P (IPOP) Overlay Architecture

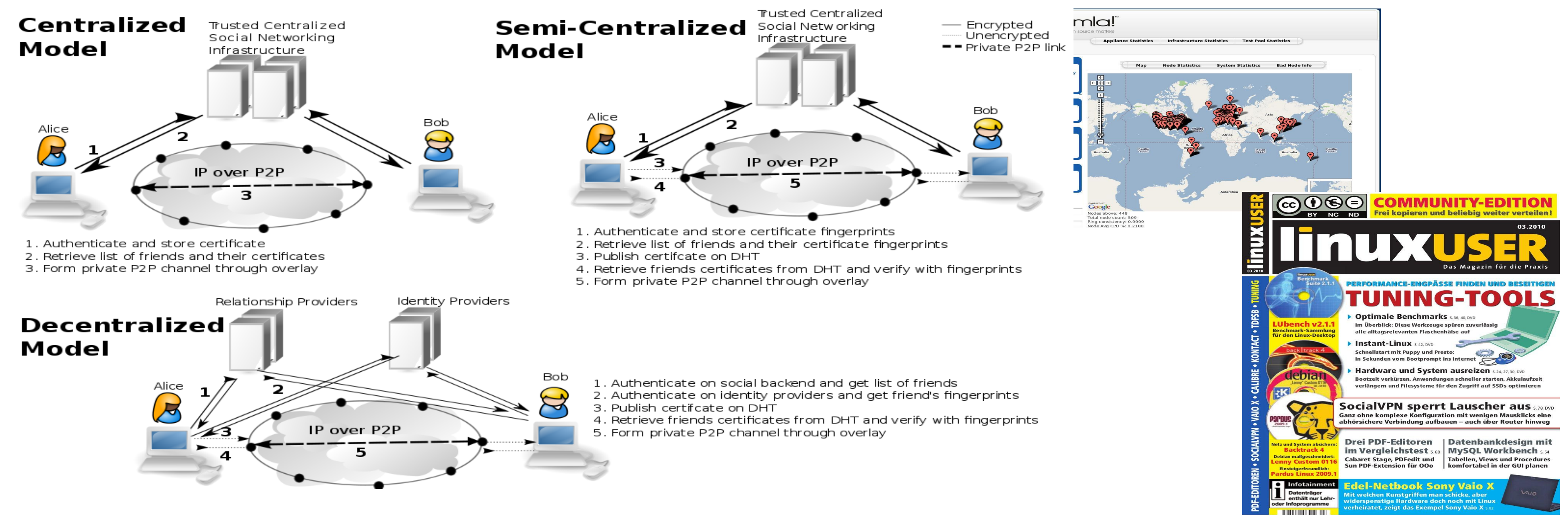


- Structured peer-to-peer virtual private networking overlay
- Open-source user-level router built upon Brunet (C#)
- IP tunneling over UDP, TCP, and the P2P overlay
- Autonomic – self configuring, organizing, and healing
- Point-to-Point and End-to-End security
- Latency overhead: .25 ms
- Support for TCP, UDP, and multicast applications
- Supports decentralized NAT traversal (STUN)
- Supports decentralized dynamic IP allocation (DHCP over DHT)
- Supports multiple namespaces – multiple isolated IP VPNs

## For more information and downloads

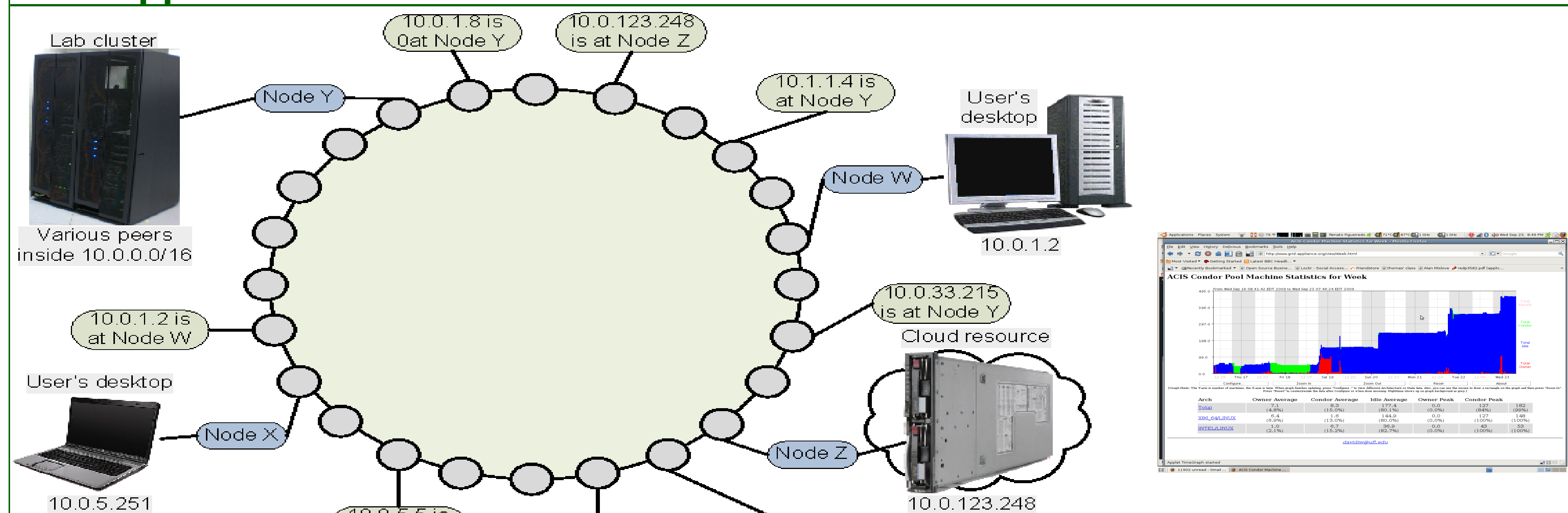
- Grid Appliance – <http://www.grid-appliance.org>
- IPOP – <http://www.ipop-project.org>
- Social VPN – <http://www.socialvpn.org>
- Archer – <http://www.archer-project.org>
- Git repository – <http://www.github.com/acisp2p>

## SocialVPN



- Leverages social networks to exchange host certificates and configure VPN
- Leverages IPOP to route data end-to-end among trusted peers
- IP address space unique for each user
- Dynamic mapping - no VPN IP address collisions
- Open-source software based on XMPP (e.g. Google Chat, Jabber)

## Grid Appliances



- Virtual machine appliance encapsulating all software needed to bootstrap virtual private clusters for high-throughput computing (LAN or WAN)
- Same image, multiple environments:
  - VMware, KVM, VirtualBox
  - Deployment on multiple platforms: physical clusters, clouds, desktops
- Self-configuring grid middleware stacks: Hadoop, Condor, MPI
- Uses Group-oriented VPN (GroupVPN) for connectivity
- Uses DHT for self-configuration/organization
- Simple to deploy and use ad-hoc virtual private clusters
- Used actively by external groups
  - Archer – computer architecture research and education
  - FutureGrid education and outreach



This material is based upon work supported in part by the National Science Foundation under Grants No. 0758596 (CAC), 0751112 (Archer), and 0910812 (FutureGrid)

