IPOP: Self-configuring IP-over-P2P Overlay-based Virtual Private Networking
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**Abstract**

We present IPOP (IP-over-P2P, http://www.ipop-project.org), an easy to deploy user-level system which uses a self-configuring peer-to-peer overlay to ensure private IP connections between virtual machines that can be physically distributed across multiple sites, but are logically interconnected by a virtual network. Our goal is to demonstrate that this overlay VPN technology can complement or supplant emerging cloud networking solutions such as Amazon VPC or Microsoft Azure’s upcoming software-defined-networking services, in a manner that allows user-defined inter-cloud virtual networks.

**Key Features**

- Chord-like structured P2P overlay
- Decentralized DHCP service through DHT
- Built-in packet encryption and support for IPSec
- Decentralized NAT traversal
- Fully decentralized with no single point of failure

**IPOP in the Cloud**

- Deployments in EC2, GoGrid, FutureGrid
- Delivers up to 98 Mbps on Amazon EC2
- Enables condor deployments across cloud providers

**Future Work**

- Exploring support for Openflow
- Autoconfiguration support for StrongSwan
- Built-in packet encryption and supports IPSec

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