**Motivation**

- Many attempts to improve the Internet:
  - i3: mobility, NAT traversal, anycast, multicast
  - DOA: middlebox support
  - OverQoS: quality of service
  - SIFF: resilience against DDoS attacks
- But still no widespread deployment…
- Problem: rewriting/porting popular applications for new architectures a daunting task!

**Goal**

- Support legacy applications (e.g. ssh, Firefox, IE) over new network architectures and overlays
  - Enable users to take advantage of new network functionality using their favorite applications!

**Which overlay to use?**

- IP address and port number:
  - Eg: Forward all packets sent to 128.32.132.223 port 22 over RON
- DNS name:
  - Eg: Forward all packets sent to berkeley.edu.ron over RON
  - Eg: Forward all packets sent to berkeley.edu.i3 over i3
Bridging Multiple Architectures
- Communication across overlays
- Stitch together functionality

Legacy Client Gateways – Demo
- Can access following links:
    g.html
    albums.php
    _10_Vodafone_UIUC/index.html

Legacy Client Gateways – Demo
- Clients need not run OCALA locally
- Gateway has special Legacy Client IP (LCIP) module

Overlay Convergence Architecture for Legacy Applications (OCALA)
- Interpose an Overlay Convergence Layer between transport layer and overlay networks

Legacy Server Gateways
- Server need not run OCALA locally
- Special OC-D module called Legacy Server IP (LSIP) at gateway
- LSIP behaves like a software NAT box

Setting up a new connection
- DNSreq(dlip3.ocalaproxynet)
- Name Res. Service (local addressbook, DNS, OpenDHT...)
- OC-Layer (TCP, UDP, ...)
Data Flow

Host A (ID_A)

OC-I

Legacy App. Transport Layer

IP data

OC-D

Host B (ID_B)

OC-I

Legacy App. Transport Layer

IP data

OC-D

Overlay (DTN, i3, RON)

Implementation

- Implemented as a proxy to be run by the user.
  - *tun* device used to capture packets
- Works on Linux and Windows XP/2000
  - Mac almost done...
- OC-D modules
  - Dynamically loadable libraries.
  - Implemented RON, i3, DOA, HIP OC-D modules.
    - 250 lines of glue code in case of RON.
    - HIP/DOA OC-D modules implemented by HIP/DOA researchers
- Configuration GUI

Conclusion

- Enables unmodified legacy applications to simultaneously access multiple overlays
- Stitch together functionality of different overlays
- Helps network researchers bring functionality of new network architectures to real users

Common functionality

- Functionality required by multiple overlays implemented in the OC-I layer

  - Example: Security
    - Similar to SSL
    - Modifications for supporting middleboxes