

## Week #7 Lecture Notes – First Half

May 14, 2002

Nate Baum

### Wireless Networking

An emerging area, many answers are still unclear

- where do you put the different pieces?
- In what layers do things go? (i.e. Multicast – which layer?)
- How is real-time supported?

### Wireless Goals

Transparent application support if there is a handoff between physical networks would be nice, but this is extremely hard.

Applications to consider:

- telnet – transparent or re-login
- Outlook – reconnect periodically
- Chat room
- Compilation database
- Voice over IP

### Solutions

a. Multiple active IP addresses - prenegotiate

Should support be in:

- Application layer? (system services)
- TCP/IP?
  - Transaction atomically and completely
  - File system
  - Disconnection aware

b. DNS-aware

name – IP address mapping is already there, so you could just add support to handle relocations as part of this process

c. application-aware

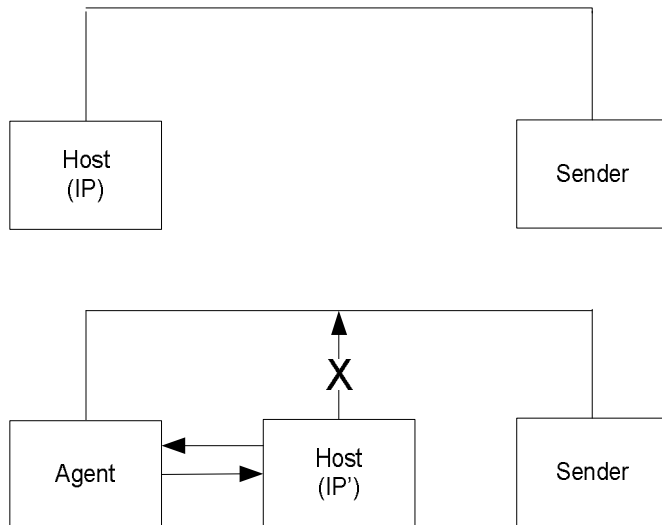
- Needs something better than TCP socket returns error on disconnect
- Application-level retry (painful)
  - better API than sockets
  - Needs Q of S info
  - rerouting
  - disconnection

- d. TCP-aware
- e. IP-aware – app/server needs visitability (wireless, phone call)  
Is TCP-aware or IP-aware better?

### Design Principles for Mobile Computing

- Everything must be aware
- Visibility or transparency
- On demand at each mobile layer

One possibility is to have a forwarding agent that acts as a fixed host and forwards to the mobile host. The problem here is that the host at IP' must send back through the agent for everyone to see packets coming from IP. The top drawing shows the initial connection – the bottom shows how things work when the host moves to IP'. The agent assumes control of the initial IP.



### Cell Phones

- single address (\$50/month)
- forwarding agent

### TCP-aware

- new IP address
- re-establish connection
- re-forwarded by agent

### Name routing

- constant name
- transient IP
- (i3) -> mailboxes

- scalability issues
- issues routing through agent

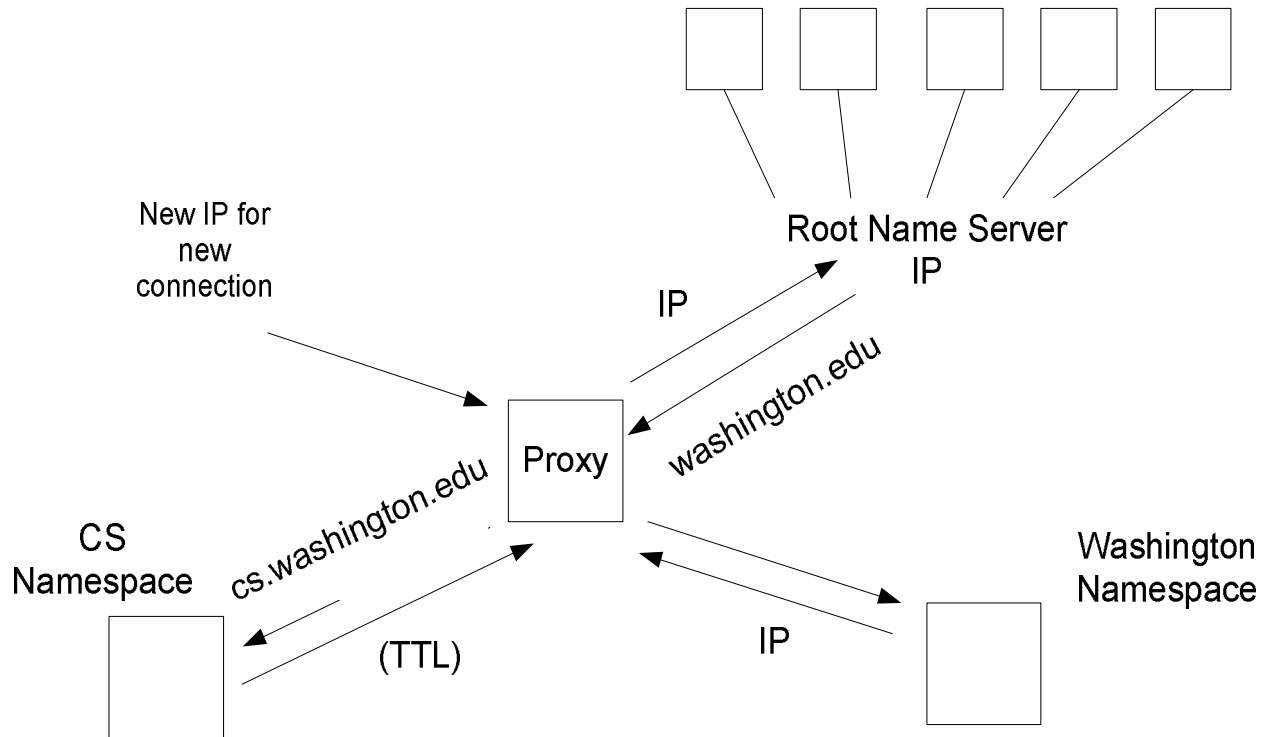
DNS Design Issues

There are a few root nameservers at UW that handle the Washington.edu

Sub-domains are handled by local nameservers

Name service gateways cache addresses to reduce load – but this can cause issues for mobile addresses

One idea to resolve this is to have the address expire (TTL = 0) but this causes a great deal of load



Cell phone discussion on Japan's cell phone model

- Applications are mobile
- In Japan, the charge is per packet