

# Email, DNS, and P2P Protocols

Tom Kelliher, CS 325

Feb. 7, 2011

## 1 Administrivia

### Announcements

### Assignment

Written assignment.

Review examples, in notes and textbook, of using telnet to exchange protocol messages with application services.

See me if you don't remember your phoenix username/password.

### From Last Time

Application layer, HTTP, and FTP.

### Outline

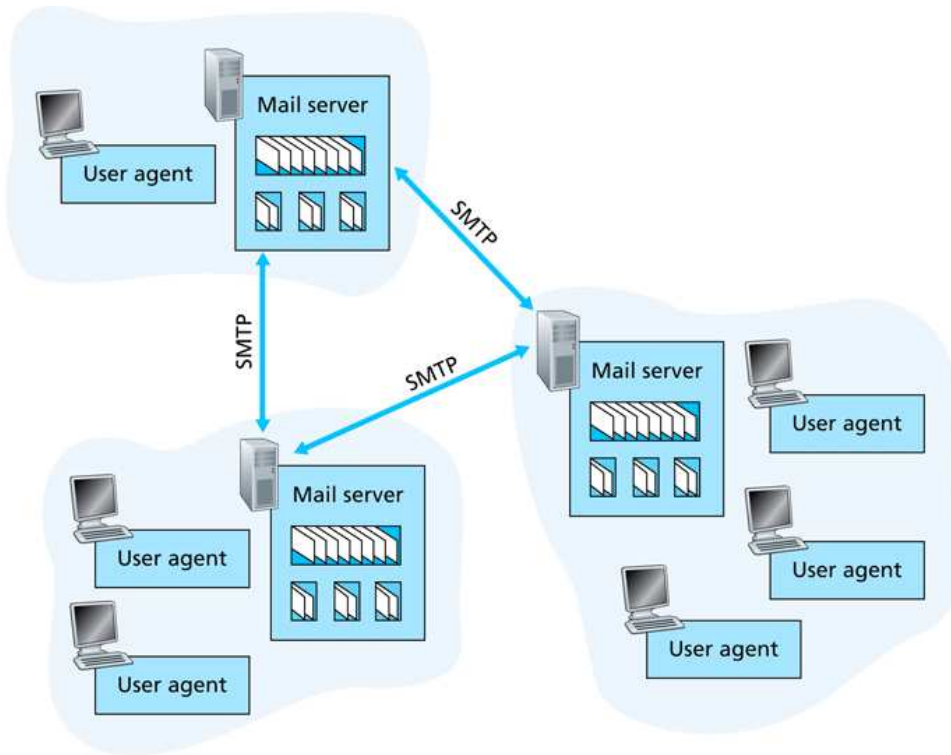
1. SMTP, POP, and IMAP protocols.
2. DNS.
3. P2P.

Coming Up

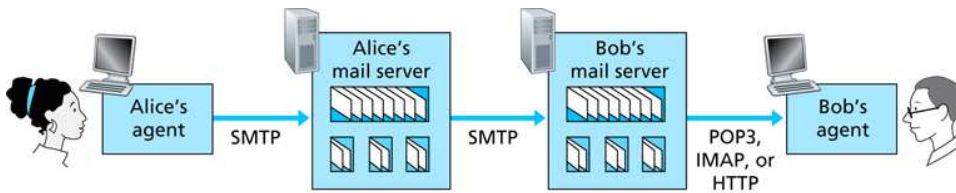
Protocols lab.

## 2 Email protocols

The overall model:



Sending email:



1. Email service in the traditional Unix model.

2. Email service with a standalone GUI client: POP and IMAP.
3. Email service with a web-based GUI client.
4. Email service with a Blackberry device.
  - (a) Push vs. pull architectures.
  - (b) What are the design models we could consider?
  - (c) What model does RIM use?
5. Use of MX records.

### 3 DNS

Historical context:

1. How was name resolution initially performed?
2. What was wrong with that?

Features of today's DNS:

1. A FQDN and its components: `bluebird.goucher.edu`.
2. Hierarchy.
3. Delegation of authority.
4. Redundancies: multiple root servers; primary and secondaries.
5. Two components: the resolver and DNS service. Finding a DNS server.

How the hosts file is used.

6. Caching servers. Priming the cache.

TTL field.

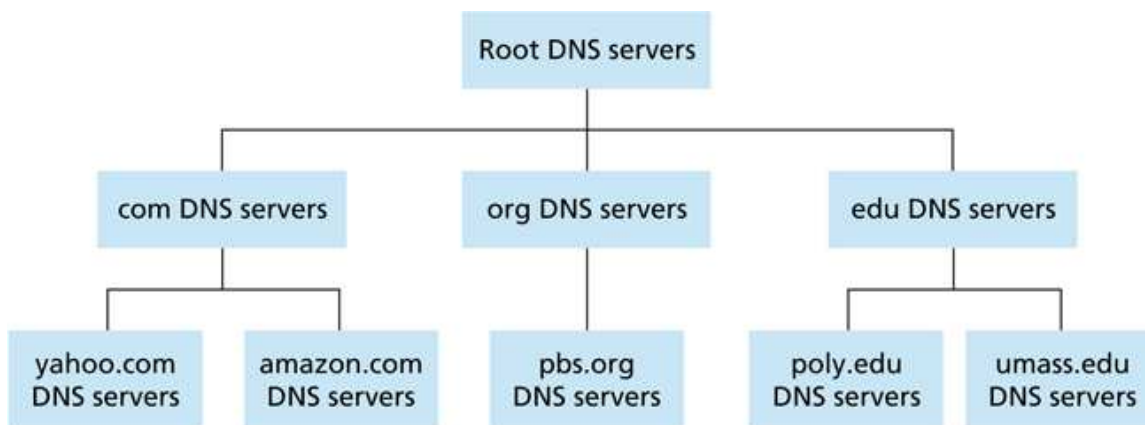
Stale entries and flushing the cache.

7. A and PTR records. Some other records types: SOA, NS, MX,

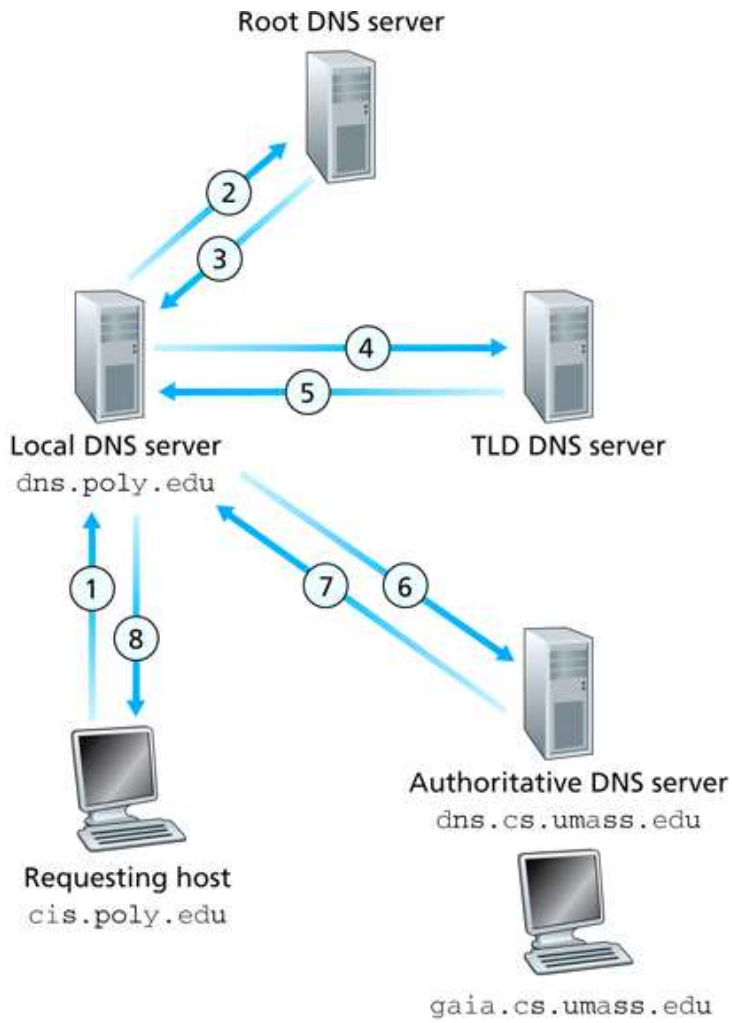
TXT records and Sender Policy Framework (SPF) information for reducing SPAM.

8. Vulnerabilities: DDOS, cache poisoning, hosts file attacks.

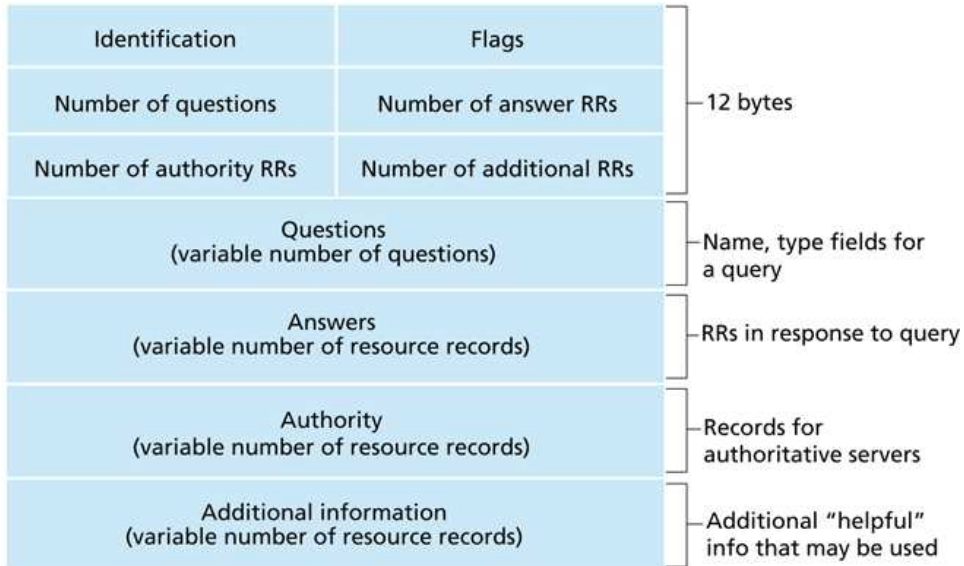
A view of the hierarchy:



Anatomy of a DNS query:



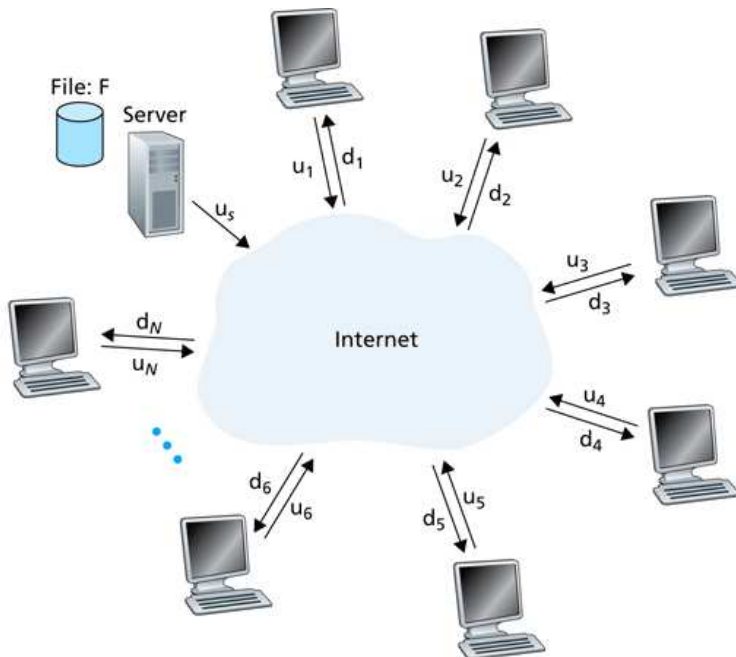
Format of a DNS server response:



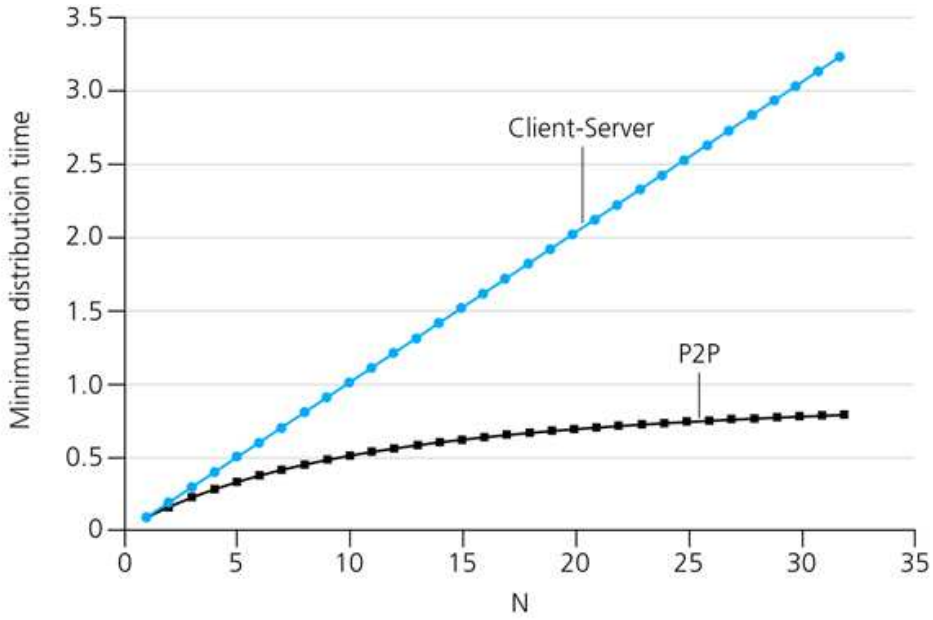
1. Why does phoenix have two IP addresses?
2. DNS implications under this scenario.

## 4 P2P

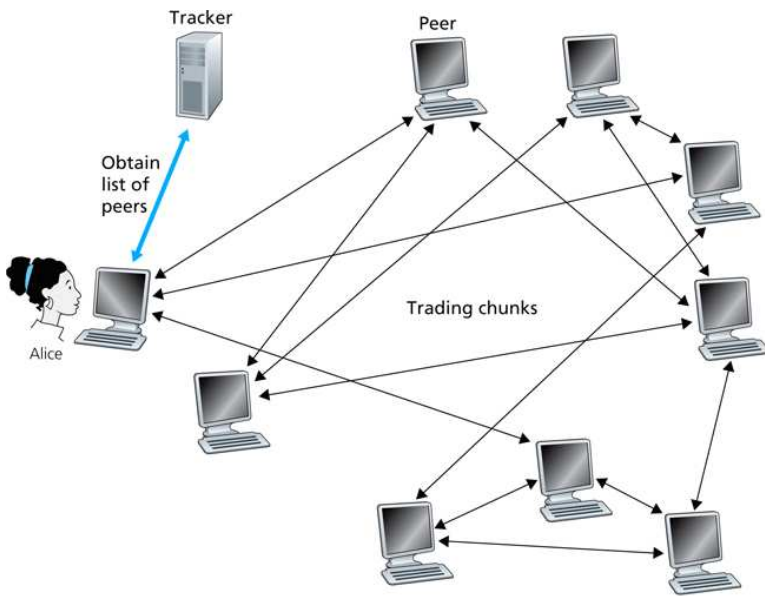
The file distribution problem:



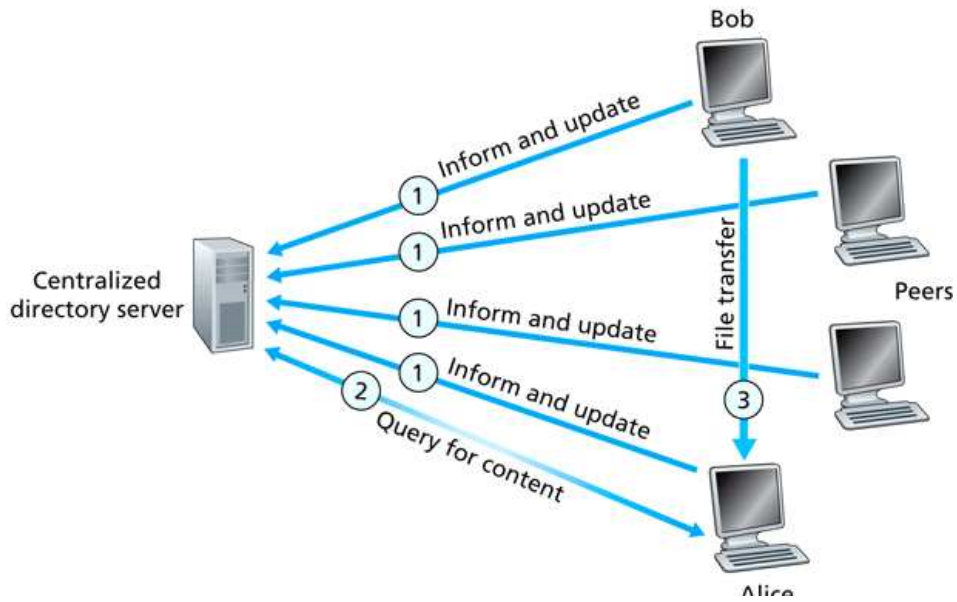
Scalable vs. unscalable architectures:



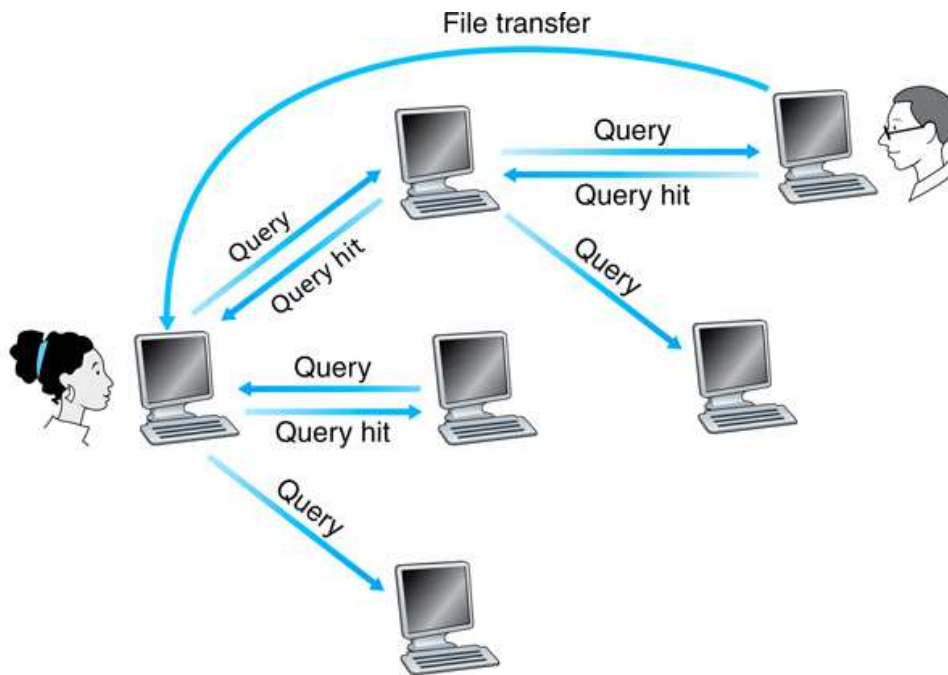
BitTorrent chunking:



Centralized indexing service:



Distributed indexing service; query flooding:



Limiting scope with a hop count field.

A hybrid approach:



