Domain Name Service

- Distributed, redundant, hierarchical database
  - ownership
  - characteristics of the organization (.com, .org, ...)
  - geography (.uk, .cn, .nh.us)

- Query delegation:
  - recursive
  - iterative (non-recursive)
LOCAL DOMAIN NAME RESOLUTION

UNH. EDU

IP for j.unh.edu
j.unh.edu

X.unh.edu is at 132.127.1.2
j.unh.edu

connect to
132.127.1.2
Global Root
Server Locations
# DNS Records (examples)

<table>
<thead>
<tr>
<th>DNS Record</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>address record</td>
</tr>
<tr>
<td>AAAA</td>
<td>IPv6 address record</td>
</tr>
<tr>
<td>CNAME</td>
<td>canonical name record</td>
</tr>
<tr>
<td>MX</td>
<td>mail exchange record</td>
</tr>
<tr>
<td>NS</td>
<td>name server record</td>
</tr>
<tr>
<td>PTR</td>
<td>pointer record</td>
</tr>
<tr>
<td>SOA</td>
<td>start of authority record</td>
</tr>
<tr>
<td>TXT</td>
<td>text record</td>
</tr>
</tbody>
</table>

- **DNS tools:** nslookup, host, dig
Electronic Mail - SMTP

- Asynchronous message delivery
  - delivers robustness and reliability

- Two types of agents:
  - User Agent (UA)
  - Message Transfer Agent (MTA)

- Two types of interactions (and protocols):
  - MTA to MTA
  - UA to MTA
MTA to MTA

- Simple Mail Transfer Protocol (SMTP)
  - covers single hop
  - no encryption
  - no authentication
  - there was supposed to be a “not so simple” mail transfer protocol
  - some problems were addressed by ESMTP (extended SMTP) and other procedural methods