

Network Services

System Administration Decal

Lecture #8

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Last time...

- I was sick. So we did nothing! Yet...
- I haven't received a single project proposal.
Y'all suck.
- So, I'm forced to give...

Deadline #2

- Week 5, 6, 8 labs are now due by 11/18, or it's **bonus lab time**.
- If your project proposal isn't in by next week, it's **group bonus lab time**.
- *It's possible for you to have to do both an individual bonus lab and a group one. Just do your work regularly!*

Today

- SMTP: How do email servers send and receive mail?
- DNS: How do you translate google.com into an IP address that your machine can talk to?
- DHCP: how do you get an IP address when you log on to a home network, AirBears, etc.?
- HTTP: How do web browsers and servers talk to each other?

SMTP

- “Simple Message Transfer Protocol”:
protocol for server-to-server mail delivery connections
- It’s been around since the late 1970s and has since been heavily extended - basic behavior is still the same
- Popular solutions on Linux: **postfix**, **qmail**, **exim**, **sendmail**

SMTP Example

220 smtp.awesome.com Welcome	Server greeting
HELO alberts-box	Client greeting
250 Why hello there	Acknowledgement
MAIL FROM:< <u>albert@awesome.com</u> >	Sender command
250 OK	
RCPT TO:< <u>betty@brilliant.com</u> >	Recipient command
250 OK	
DATA	Start of message
354 Terminate data with '.'	Acknowledgement of start
From: <u>albert@awesome.com</u>	Message body + headers
Subject: Dinner	
 Hey, let's do dinner tonight.	
-Albert	
.	
250 OK queued as FFDC3387	Acknowledgement of end
QUIT	
221 See ya	Quit message

Mail Routing?

- But how do you know what server to talk to in the first place to deliver the message?
- This is where DNS comes into play... Let's discuss.

DNS

- “Domain Name System”
- Basic purpose: to provide IP address translation for easier-to-remember strings
- Much more information can be contained within.
- It’s a part of **core internet functionality**.
- Popular solutions on Linux: **BIND** (Berkeley!), **djbdns**, **PowerDNS**

DNS Records

- Whenever you're on the Internet, you're designated a DNS server
- You can ask this server for records
- For example: "google.com IN A" is a request that returns the IP address for google.com.
- Try using `host(I)` to issue DNS requests.

DNS Records

- Types of DNS records you can ask for/retrieve:
 - A record: an IPv4 address.
 - CNAME record: an alias for another domain.
e.g. “www.google.com” is a CNAME for google.com
 - AAAA record: an IPv6 address.
 - PTR record: reverse DNS for an IP.
 - MX record: mail server for a domain. Personal Gmail? triplehelix.org MX gmail.com

DHCP

- So how are you assigned that DNS server?
With DHCP, of course
- Dynamic Host Configuration Protocol
- All OSes worth a damn have a DHCP client. Very, very ubiquitous
- Popular software on Linux: ISC DHCP server (dhcp3-server), dnsmasq

HTTP

- Once you have that IP on AirBears, how do you log on? HTTP!
- HTTP is a really simple text-based protocol.
- wget, curl, Firefox... all use HTTP.

HTTP Example

```
% telnet triplehelix.org 80
Trying 65.49.35.50...
Connected to triplehelix.org.
Escape character is '^]'.
GET / HTTP/1.0
(newline)
HTTP/1.1 200 OK
Date: Tue, 04 Nov 2008 23:36:24 GMT
Server: Apache/2.2.3 (Debian) DAV/2 SVN/1.4.2 mod_python/3.2.10 Python/2.4.4 PHP/
5.2.0-8+etch11 mod_ssl/2.2.3 OpenSSL/0.9.8c mod_perl/2.0.2 Perl/v5.8.8
Last-Modified: Thu, 17 May 2007 06:57:40 GMT
ETag: "8f0cbf-147-430a4fb8e0100"
Accept-Ranges: bytes
Content-Length: 327
Connection: close
Content-Type: text/html

<html>
<head>
<title>triplehelix.org</title>
</head>
<body>
<p>There's nothing here. Perhaps you're looking for my
<a href="/~joshk/">personal website</a>?</p>
</body>
</html>
Connection closed by foreign host.
```