

Tour of the Earlham CS Data Center

Network Topology, DNS, DHCP, and LDAP

CS Overview

What We Run

- **Data and Computation:** hardware and software
- **Network:** switches for several network variants, 2 subdomains
- **Power:** power from the college plus backups
- **Cooling:** AC system

Domains

- cs.earlham.edu: pedagogical software, preferred for courses and individual students
- cluster.earlham.edu: clusters and phat nodes, preferred for research and services in other departments and off-campus
- These do not map to a machine's physical whereabouts on the server racks.

CS Subdomain

- tools: SSH server, Jupyterhub
- net: network configuration files
- web: web server, websites, mail
- smiley: hardware where the 3 VM's above live
- bowie: specialized environments and databases for advanced courses
- proto: HIP's server for weather and electricity data

Cluster Subdomain

- hopper: SSH server, network configurations
- al-salam, layout, whedon: cluster computing for research
- bronte, pollock: phat nodes for research
- dali, kahlo, indiana: storage and backup
- t-voc, big-fe, elwood, krasner: misc services

Network Variants

- 1 Gb “commodity”: much of CS and cluster
- 10 Gb
- Non-firewalled: DTN
- Post-firewall: the network you’re familiar with
- Cluster internal: as, lo, w

Notes

- 10Gb network
- Internet2
- Managed switches and unmanaged switches
- RT_M

Important Protocols and Implementations: DNS, DHCP, LDAP

IP Addresses

- The Internet: global network of computer networks linked by way of the TCP/IP stack
- Internet Protocol: responsible for addressing packets moving across the Internet
- That address is called, creatively enough, an **IP address**.
- Group of IP addresses

DHCP

- Dynamic host control protocol: for a given network, generate IP addresses for each device
- Server networks like ours use static IP addresses
 - Why?
- Applications
 - ip
 - isc-dhcp-server/dhcpd

DNS

- Domain Name System: Hostname → IP addresses
- Let's look at applications.
 - hostname
 - `less /etc/resolv.conf`
 - `traceroute google.com`
 - `nslookup google.com`
 - `bind9/named`

LDAP

- Lightweight Directory Access Protocol
- Can use a directory service to provide many network services
- We primarily use it for user accounts, which is common.
- Important distinction: LDAP vs. local

Practice

Exercise

- **Pair up and diagram our network.**
- For each machine, include:
 - name
 - last octet of IP address on the commodity network
 - last octet of IP address on the 10Gb network if applicable
- Use:
 - Hostname bank
 - Terminal
 - Tools we've introduced
 - Help from others
- Please don't use:
 - websites, including the wiki

Exercise

- Feel free to disregard:
 - cooling
 - power

Hostname Bank

al-salam	elwood	net	
babbage	hopper	pollock	
big-fe	indiana	proto	tvoc
bowie	kahlo	shinken	web
bronte	krasner	smiley	whedon
dali	layout	tools	