

Week 8

Beginning System Administration

Review

- Initial setup
 - Fresh install of Debian GNU/Linux
 - Acquire, compile, and install software
 - Package management system: apt
 - The LAMP model
 - Initial design choices
 - Customer/client, availability of support, previous experience/familiarity

Review (cont.)

- Basic security
 - Threat model
 - Who is using your system?
 - Permissions
 - chmod, chgrp, chown
 - read, write, execute bits
 - Privilege escalation
 - sudo, su, root
 - Are you always logging on as root?

Review (cont.)

- Basic security (cont.)
 - Services running as their own user
 - Apache: www-data
 - MySQL: mysql
 - We will explore why this is the case
- Other
 - Troubleshooting
 - `/var/log/`

Lecture Goals

- Server management and administration
 - the second half to sysadmin
- Different threat model
 - multiple untrusted users
- Resource sharing
 - limited resources to go around
- Security
 - permissions and privileges

Administrative Stuff

- Read the notes, ask questions, come to office hours!
 - Notes cover more than what we can cover in class
- 3 classes left
 - April 23: today, multi-user environments
 - April 30: security, proposals due @ 11:59pm
 - May 7: last class, write-ups due @ 11:59pm
- Last class
 - suggestions?
 - initial course survey

Resource Sharing

- Movies: unlimited everything (e.g., *The Matrix*, *Swordfish*, *Live Free or Die Hard*, etc.)
- Real world
 - limited resources, almost unlimited demands
 - memory, processing speed, disk storage, physical space...

Resource Sharing

- Costs
 - Initial costs
 - Memory
 - Disk storage
 - Servers
 - Continuous costs
 - Power (cooling, backup generators, etc)
 - Bandwidth (cost per MB transferred)
 - System upgrades and maintenance

Resource Sharing

- Role as system administrator
 - Everyone gets a fair share
 - Can't always throw money at a problem
 - Think of inefficient algorithms
 - More is not always better
 - Where are you going to store the servers?
 - How are you going to cool them at a reasonable cost?

Resource Sharing

- Why is this a concern?
 - Limited disk space
 - people taking more than others
 - copyrighted files, hogging disk storage
 - Limited bandwidth
 - someone shares their large music library
 - Denial of Service
 - “an incident in which a user or organization is deprived of the services of a resource they would normally expect to have” (Whatis.com)

Resource Sharing

- Problems
 - Legal issues
 - Security issues
 - Potential server compromise results in more work
 - Availability issues
 - Taking down a server can result in money wasted on fixing things
 - Downtime can cause lost revenue

Resource Sharing

- Quotas
 - Impose a limit a user's resource
 - you have a 200 GB hard disk: physical limit
 - each user gets only 400 MB: quota
 - Commands: quota

```
Disk quotas for user (uid 12345):  
Filesystem      usage  quota  limit  timeleft  files  quota  limit  timeleft  
/var/mail       520    10240  35840          0      0      0  
  
/home           294898 409600 460800          0      0      0  
  
/services       294898 409600 460800          0      0      0
```

Resource Sharing

- Accounting
 - Processor usage
 - Based on CPU time
 - Bandwidth
 - Based on how much data is transferred in/out

Security

- Permissions revisited
 - Three sets of read, write, execute
 - Each set corresponds to the owner, group, and everyone
 - A file's permission set to `777`?
- Tools to find these kinds of files
 - the utility “find” can search for files based on permissions
 - Exercise: read the man page and come up with a command to list all files with permissions `777`

Security

- Access Control Lists
 - Owner, group, and everyone is sometimes too broad.
 - What if alice wants to share a file with bob, but they are in different groups, and alice doesn't want to share with everyone?
 - What if alice wants to share a file with multiple groups?
 - Utilities: `setfacl`, `getfacl`
 - Allows more fine-grained control over access permissions

Security

- Privilege escalation
 - sudo, su
- Non-privileged users
 - Security vulnerabilities
 - What if a service was taken over?
 - Look at the list of processes running on your system; how many are running **not** as root?

Laboratory/Homework

- Server limitations
 - Ideally, setup and install support for quotas and ACLs.
- Lab
 - Will come out later this week
 - Most work will be done on OCF servers

Questions?