

System and Network Administration

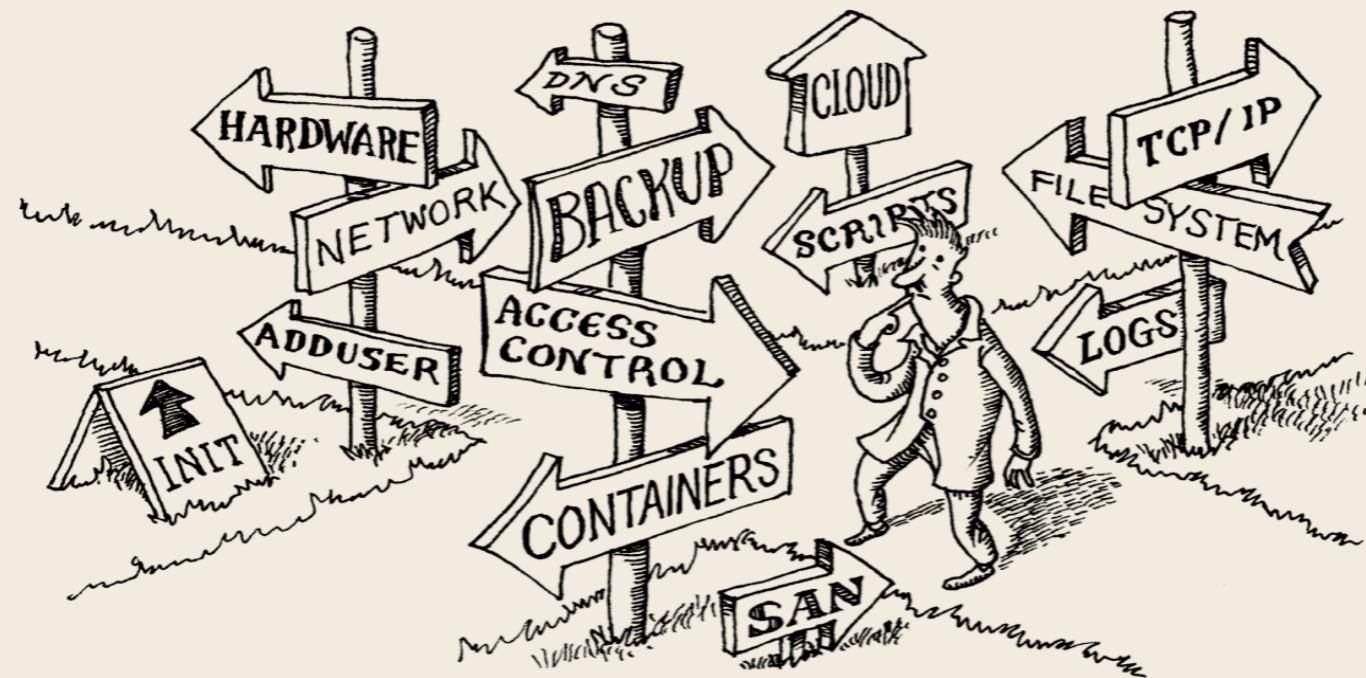
Lecture - I



SYSTEM ADMINISTRATOR

Prerequisites

- ◆ Basics of Operating System
- ◆ Basics of Programming / Scripting
- ◆ Passion to hack with the system

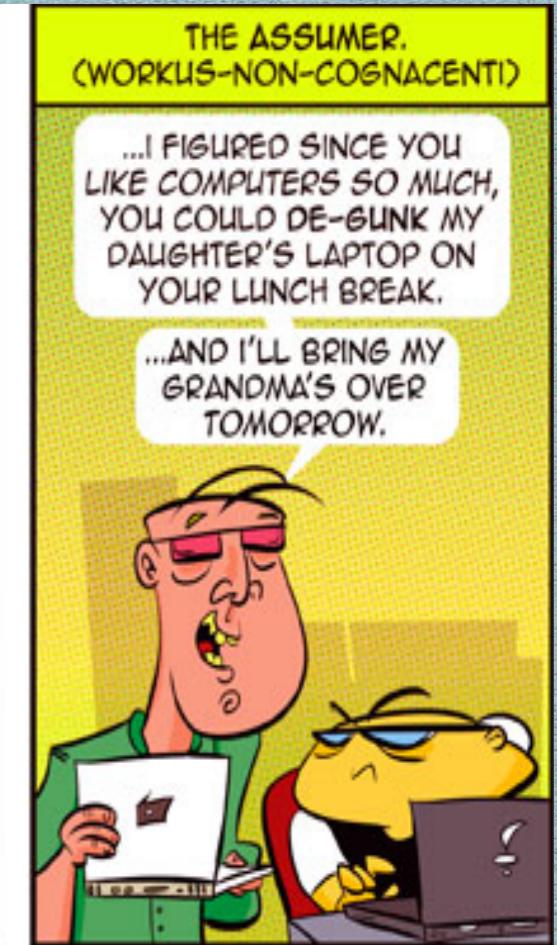


Course Logistics

- ◆ **Instructor:** Anurag Agarwal
- ◆ **Schedule:**
IT(M): Wed (2.30-3.20), Thu (12.50-1.40), Fri(12.00-12.50)
IT(E): Mon (12.50-1.40), Tue (3.20-4.10), Fri (11.10-12.00)
- ◆ **Attendance:** [anuraga.live / sna-attendance](http://anuraga.live/sna-attendance)
- ◆ **Group-Link:** [anuraga.live / sna-class](http://anuraga.live/sna-class)
- ◆ **Group-Email:** sna-bvcoe@googlegroups.com

Reference Books

1. Unix and Linux System Administration Handbook, 5th ed.
by Ben Whaley, Evi Nemeth et al.,
2. Essential System Administration, 3rd ed.
by Æleen Frisch
3. Linux System Administration, 7th ed.
by Wale Soyinka
4. TCP/IP Network Administration, 3rd Ed.
by Craig Hunt



Life of a SysAdmin

pic courtesy: www.pcweenies.com

Duties of a SysAdmin

- ◆ **Controlling Access:**

Create account for new users, remove account for inactive users, and other related issues.

- ◆ **Adding Hardware:**

Installing and configuring new hardware like network interface card or specialized external storage array.

- ◆ **Automating Tasks:**

Automate repetitive and time-consuming tasks by writing scripts or using automation tools.

- ◆ **Overseeing backups:**

Backing up data on a regular schedule and restoring it when needed is mandatory given the high frequency of real-world disasters.

Duties of a SysAdmin

- ◆ **Installing and upgrading software:**

Software upgrades and security patches should be tested and incorporated without affecting the stability of production systems.

- ◆ **Monitoring:**

Minimizing latency of web services, analyzing log files, ensuring availability of server resources, are some of the tasks that require regular monitoring.

- ◆ **Troubleshooting:**

Finding the cause of system or network failure and resolving it with complete satisfaction of users.

- ◆ **Maintaining local documentation:**

Documentation should be maintained for every aspect of the system functioning like software, network architecture, user privileges.

Duties of a SysAdmin

- ◆ **Vigilantly monitoring security:**

Implementing security policy, configuring firewall, setting up procedures to prevent system breach.

- ◆ **Tuning Performance:**

SysAdmins should ensure optimal performance in accordance with the available infrastructure, user needs and the services that system provides.

- ◆ **Developing site policies:**

Policies that govern acceptable use of computer systems, management and retention of data, privacy and security of networks and systems should be framed according to law.

- ◆ **Working with vendors:**

Administrators may be tasked with selecting vendors, assisting with contract negotiations, and implementing solutions once the paperwork has been completed.



Brief History of Unix / Linux

Brief History of Unix

- ◆ **mid-1960s:** History begins with the development of a multi-user time-sharing system named **MULTICS** (*Multiplexed Operating and Computing Service*).
- ◆ **1969:** People at Bell Labs wrote the first version of Unix (UNICS) for PDP-7 machine in assembly language.
- ◆ **1970:** Unix was officially named, and ported to PDP-11.
- ◆ **1971:** First edition of Unix released on Nov 3 1971. It included program '*roff*' which added text processing capabilities.
- ◆ **1973:** Unix ver. 4 was rewritten in C. Later ver. 5 was released in 1974.
- ◆ **1975:** Unix ver. 6 released. It became popular as it was distributed with its source code.
- ◆ **1979:** Till 1979, Unix was ported to many more systems, its complexity grew manifolds, and ver. 7 was also released.
- ◆ **1983:** AT&T released its first version of System V. Removed distribution of source code

Brief History of Unix

Advent of BSD:

- ◆ 1977: Ken Thompson spent a year's sabbatical with the University of California at Berkeley. While there he and two graduate students, Bill Joy and Chuck Haley, wrote the first Berkeley version of Unix, named BSD Unix.
- ◆ 2BSD released in mid-1978, 3BSD released in late-1979.
- ◆ Features: It included vi-editor, c-shell, tcp/ip networking.
- ◆ Widely adopted by other UNIX variants like DEC Ultrix and SunOS.
- ◆ 1990s: Many free and open-source Unix-like operating system released, like FreeBSD, NetBSD, OpenBSD.
- ◆ FreeBSD maintains a complete system, i.e. the project delivers a kernel, device drivers, userland utilities, and documentation
- ◆ These Open Source Systems formed the basis of many proprietary OS's like Apple MacOS and iOS.

Brief History of Unix/Linux

Advent of Linux

- ◆ **1991:** Finnish Student Linus Torvalds creates a new free and open source operating system kernel.
- ◆ **1992:** Linux kernel was published under GNU GPL license
- ◆ **By 1996:** Many components of GNU added to Linux to make it usable, and it began to be called as GNU/Linux

Advent of GNU Project

- ◆ **1983:** Richard Stallman started the GNU project with the goal of creating the free UNIX-like OS.
- ◆ GNU GPL was also released.

GNU GPL License

GNU General Public License (GPL) has the following features:

- ◆ The software being released is free and that no one can ever take away these freedoms.
- ◆ It is acceptable to take the software and resell it, even for a profit; however, in this resale, the seller must release the full source code, including any changes.
- ◆ The resold package remains under GPL and can be resold yet again for profit.
- ◆ **Liability clause:** The programmers are not liable for any damages caused by their software.
- ◆ **Difference with BSD License:** In BSD License, it is not mandatory to release the modified code, redistribution is permitted in source and binary forms.

Differences between Windows & Linux

- ◆ Single User vs. Multiple User
- ◆ Micro Kernel vs. Monolithic Kernel
- ◆ Separation of the GUI and Kernel
- ◆ Registry vs. Text Files
- ◆ My Network Places vs. Mounting
- ◆ Everything in Linux is file