

4417/5417

System Administration

Jack Ramsey

Lecture 1

Welcome and Overview



East Tennessee State University
Department of Computing
Jack Ramsey, Lecturer

Welcome

- About Me
 - ETSU Grad (x4)
 - Father of two (17 & 21)
 - CompTIA Network+ certified
 - CompTIA Linux+ & AWS Certified Solutions Architect in progress
- Research Interests
 - Web Design
 - Networking
 - Linux



About this Class

- Tuesday/Thursday @ 2:15-4:15
- Nicks 490/436
- Extensive use of D2L
 - All lecture notes
 - All lab assignments
- Syllabus



Syllabus Highlights

- 3 Exams @ 100 pts each
 - Incremental in topic matter (i.e., partially cumulative)
- 8-12 Labs @ 10 pts each
 - You will have 1 week for each lab
 - All labs due by start of class 1 week after they are assigned to D2L
- Semester Project @ 100 pts



Syllabus Highlights

- Attendance Policy

- After 3 missed lectures, deduct one letter increment from final grade. (e.g., B+ to a B)
- Please don't email me if you're going to miss class for anything less than a medical emergency involving you or close family. It clutters up an inbox in which even important emails occasionally are overlooked.
- Make up work will be allowed only if some form of documentation (e.g., a doctor's excuse) is provided.



Lab Guidelines

- All lab submissions will follow the Lab Guideline document found on D2L
- Any lab not conforming will not be graded (zero)
- Lab reports constitute a big part of your grade and should be taken seriously.
- All labs should be comprised of a well thought out documentation of what you did.
- More to come



Syllabus Highlights (con't)

- Books – HIGHLY Recommended (Quiz and Exam questions, in part, will be drawn from assigned reading)
 - The Practice of System and Network Administration, 2nd Ed.; Addison-Wesley; ISBN: 978-0-321-49266-1
 - UNIX and Linux System Administration Handbook (4th Edition); Prentice Hall; ISBN-13: 978-0131480056
 - Microsoft Server 2012 Unleashed; Sams; ISBN-13: 978-0672336225



Amazon Web Services

- Everything we do will be on the Amazon Web Services (AWS) platform
- Academic grant (Thank you Amazon!)
- Infrastructure as a Service (IAAS)
- Solves many problems with hardware provisioning
- NOT teaching Amazon Certifications, but providing experience with the platform and a good foundation if you want to pursue (Linux Academy)



Certifications - Microsoft

- [Microsoft Certified Technology Specialist \(MCTS\)](#)
 - Targets individual platforms
 - Server 2012
 - Windows Client (Win 7 / Win 8)
 - SQL and Exchange
 - No longer in development, but useful for supported technologies



Certifications - Microsoft

- [Microsoft Technology Associate \(MTA\) - IT](#)
 - Introductory Microsoft certification for individuals considering a career in technology
 - Windows Server Administration Fundamentals (Exam 98-365, \$115.00)
 - Networking Fundamentals
 - Security Fundamentals
 - Mobility and Device Fundamentals
 - Cloud Fundamentals



Certifications - Microsoft

- [Microsoft Certified Solutions Expert \(MCSE\)](#)
 - MCSE: Server Infrastructure
 - MCSE: Desktop Infrastructure
 - MCSE: Private Cloud
 - MCSE: Enterprise Devices and Apps
 - MCSE: Data Platform
 - MCSE: Business Intelligence
 - MCSE: Messaging
 - MCSE: Communication
 - MCSE: Sharepoint



Certifications - Linux

- [CompTIA Linux +](#)
- [LPIC-1: Linux Server Professional Certification](#)
- [Oracle Certified Associate](#)
- [Red Hat Certified Architect](#)
- [Red Hat Certified Engineer](#)
- [SUSE Certified Linux Administrator \(CLA\)](#)



Certifications

- Project management
 - [PMI Institute](#)
- [Amazon](#)
 - Associate
 - AWS Certified Solutions Architect - Associate
 - AWS Certified Developer - Associate
 - AWS Certified SysOps Administrator - Associate
 - Professional
 - AWS Certified Solutions Architect - Professional
 - AWS Certified DevOps Engineer - Professional



Organizations / Resources

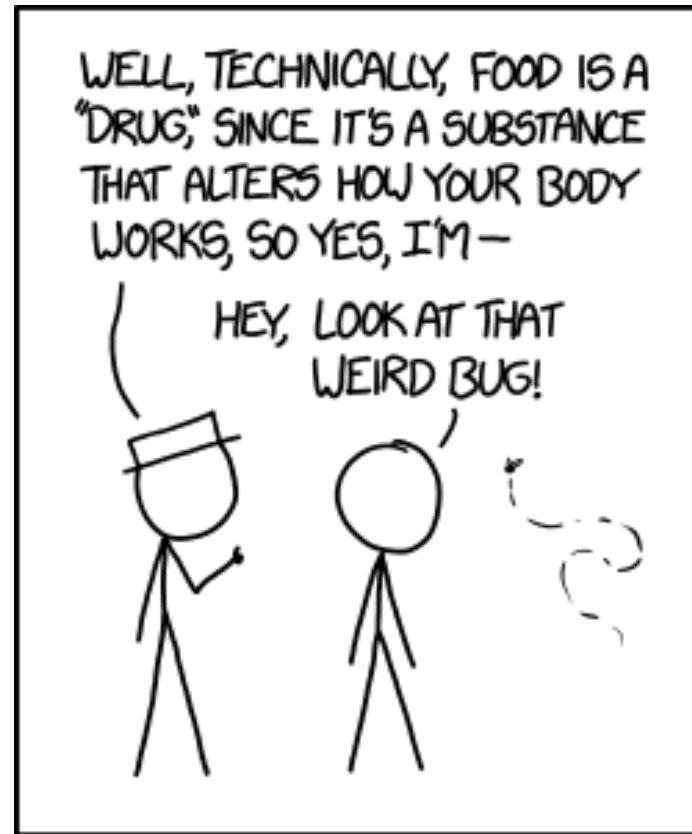
- Usenix - <https://www.usenix.org/>
- Large Insallation System Administration (LISA) SIG - <https://www.usenix.org/lisa>
- ACM, of course - <http://www.acm.org/>
 - SIGCAS - Computers and Society - <http://www.sigcas.org/>
 - SIGCOMM - Data Communication - <http://www.sigcomm.org/>
 - SIGecom - Electronic Commerce - <http://www.sigecom.org/>
 - SIGMIS - Management Information Systems - <http://www.sigmis.org/>
 - Many, many more - <http://www.acm.org/signs/panel#028>



Organizations / Resources

- Serverfault - <http://serverfault.com/>
- Superuser - <http://superuser.com/>
- Stackoverflow - <http://stackoverflow.com/>
- Admin Magazine - <http://www.admin-magazine.com/>
- Everything Sysadmin - <http://everythingsysadmin.com/>
- The Register - <http://www.theregister.co.uk/>





MY LIFE IMPROVED WHEN I REALIZED
I COULD JUST IGNORE ANY SENTENCE
THAT STARTED WITH "TECHNICALLY."

System Administration

The Bird's-Eye View



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Mark Burgess*: Principles of System Administration

- Good ideas for students:
 - learn to learn independently
 - systematic and organized work habits
 - balance between reality (problems happen) vs. Utopia

*Author, creator of CFEngine, Emeritus Professor of Network and System Administration. IOW: In the world of System Administration he's kind of a big deal...



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Mark Burgess: Principles of System Administration

- Bad ideas for students:
 - expect a single right answer to every problem
 - get stuck due to frustration
 - expect the textbook/manual/instructor/guru to be able to accurately and completely answer every question



What is a System Administrator?

- US Bureau of Labor Statistics:

- [What Network and Computer Systems Administrators Do](#)

Computer networks are critical parts of almost every organization. Network and computer systems administrators are responsible for the day-to-day operation of these networks.

- [Work Environment](#)

Network and computer systems administrators work with the physical computer networks of a variety of organizations and therefore are employed in many industries.

- [Job Outlook](#)

Employment of network and computer systems administrators is projected to grow 12 percent from 2012 to 2022, about as fast as the average for all occupations. Growth will be highest at firms that provide cloud computing technology.



What is a System Administrator?

US News:

- A network and computer systems administrator's greatest contribution is maintaining an organization's work flow and keeping its lines of communication open.



Essential Duties

- Account Provisioning
- Adding & Removing Hardware
- Performing Backups
- Installing & Upgrading Software
- Monitoring the System
- Troubleshooting
- Maintaining Local Documentation
- Fire Fighting



Entry-Level Sysadmin (From indeed.com)

- Able to work in a small tight-knit group and collaborate effectively with clients and business owners.
- Able to manage multiple projects simultaneously
- Strong customer support skills
- Comfortable with working under tight deadlines with customers
- Familiar with ticketing tracking software and workflow
- Experience using Red Hat based Linux
- Skilled with general office network troubleshooting
- Eager to learn and support new technologies



Entry-Level Sysadmin (From indeed.com)

Knowledge and Skills:

- Superior skills in both written and verbal communication
- Experience in customer facing role either remote or face to face
- Computer proficiency with applicable software applications (for example Microsoft Office, CAD, Adobe Suite, programming)
- Problem solving skills
- Accuracy in data entry



Entry-Level Sysadmin (From indeed.com)

Knowledge and Skills:

- Excellent fluency in language to be supported
- Experience in a phone based remote role, esupport, e-chat or similar
- Familiarity with computer technology
- Knowledgeable in call routing and case management processes as well as case logging systems and obligation systems
- Understands internal processes and tools



Outline for the Semester



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Outline of Topics for the Semester

- OS Concepts
- Automation / Task Scheduling
- Active Directory
- User Management
- File Systems
- Network Services
- DNS
- DHCP
- Group Policy
- Cloud Computing
- Backups
- Performance Monitoring / Logs
- Heterogeneity
- Other services, if possible



Outline of Topics for the Semester

- In addition to the above technical topics, I plan to devote part of each lecture to what one sysadmin described to me as “soft skills”
 - Interview tactics
 - Effectively answering interview questions
 - Help-desk overview
 - Prioritization
 - Effective documentation and written communication



My Holiday Activities (Actually, 2014-15)

- LinkedIn
- ETSU Department of Computing SIG on LinkedIn
- Solicited advice from alumni regarding what they look for in a prospective new hire
- Response was overwhelming



My Holiday Activities

- For example:

I can not emphasize enough : NETWORK - routers, transmission protocols and ports. Unix: TCPIP networking; DHCP/DNS; Apache servers and file sharing with NFS and SAMBA; KNOW your processes and what init.d does; understand malware and how it works. Unix install packages. Windows: understand the net commands; WMIC [PowerShell], Virtual networks (internal and external); HyperV for Vlan Tagging, RSAT (Remote admin server tools), SVC MIM System Center Virtual Machine Manager, Name Resolution, DB Memory and Performance, Schedulers, Storage and Security. Understand dlls and how they work as well as diff types of *nix

MOST OF ALL: NETWORK, NETWORK, NETWORK. You can not system admin if you cant subnet and understand subnet, VMs, Vlans, DMZs, Honeypots, Domain Controllers, Name Servers, PERMISSIONS!, GROUPS! AND ACLs!!!!!! and if you do sys admin and you do not understand these...you wont be sys admin long becuz your gonna open your network up to be hacked. I can not emphasize this enough.....NETWORK is key and quite frankly they cared more about that than my M.S.



My Holiday Activities

- While a lot of the responses included new technologies, many emphasized the need for a System Administrator to be strong in the aforementioned “soft skills”
- Teamwork
- Communication – with all levels of technical proficiency
- Documentation
- Troubleshooting



January 21

- Room 436
- Discussing OS Basics
 - Various OS issues (Windows / Linux)
- Reading:
 - U&L: Ch1 & pp. 1264-1276
 - PSA: Appendix A



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Sources

- Hellman, Nathan. *USN Computer Systems Administrator*. 2015. 7 January 2015.
- Nemeth, Evi, et al. *UNIX and Linux System Administration Handbook*. New York: Prentice Hall, 2010.
- US Dept of Labor. *Network and Systems Administrators*. 2014. 7 January 2015.



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