The Path to Senior Sysadmin

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I Promise

No "Death by PowerPoint"

A Note to The Reader

What you see before you is a combination of the slides I'll be showing during my talk interspersed with my speaking notes. This PowerPoint file isn't intended to be complete, but it's at least more than what you'll see on the screen while I'm talking.

Purpose

Some suggestions for professional and personal growth, and to help you advance your career

Agenda

- What do I mean by "senior?"
  - Intended audience?
- "Hard" technical skills
- "Squishy" technical skills
- "Soft" skills

(agenda)

- Four topics:
  - 5 minutes
  - 10 – 15 minutes
  - 20 minutes
  - 20 minutes
- Time for questions

Senior?

Senior

What Kind of Senior?

- Generalist
- Specialist
  - Email
  - Storage
  - Networking
- All senior, but have (and need) different skills

Intended Audience

- Generalist and specialists
  - "Hard" focuses on general; "squishy" and "soft" for everyone
- Any sector
  - .com, .edu, .gov
- Any O/S
- Currently "mid-level"
  - But junior can get long-range plans / ideas

Xenophobia?

- Speaking of O/Ses …
- I'm going to say "*nix" / "Unix" / "Linux"
  - Because I'm lazy
- Please pretend I said "the operating system of your choice"
- All the skills are the same
  - They just have different names

A Tip

- Having experience on two or more different platforms is a great "hard" skill to have
- Different == Linux + Solaris
  - Not Debian + RedHat

Suggestions, Not Rules

- Everything I say is a suggestion
- May not apply to every job or person
- May apply differently at different jobs or in different sectors
- Probably less variation for "squishy" and "soft" than for "hard"

One More Thing

- "Hard" skills get the least time on the agenda
  - In general these are obvious to most sysadmins, and easiest for them to learn
- "Soft" skills are most sysadmins' weakest area
  - And hardest for them to see / understand
  - And hardest to learn

Other Sources

- Covers some of the same material as this talk
- Available now
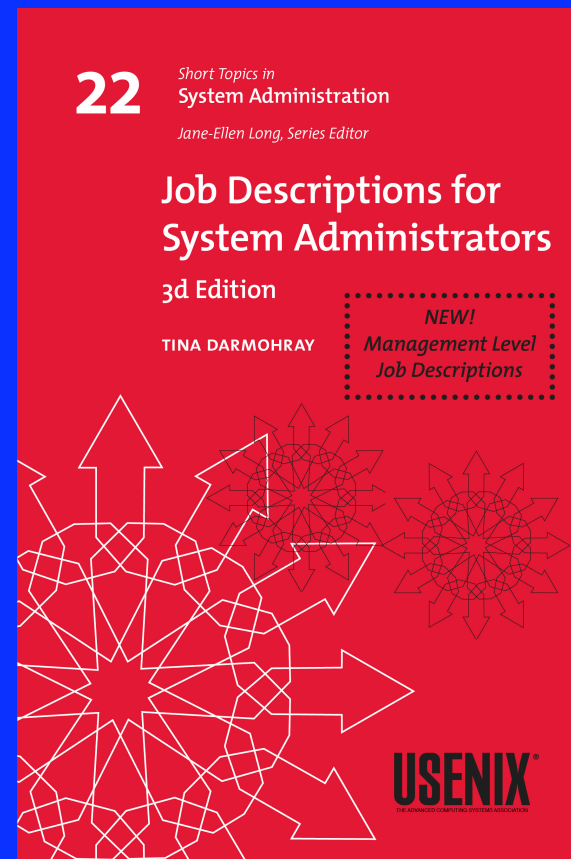
No Answers

- I'm just listing skills you need to learn
- Not addressing how or where to learn them
- Not enough time
- And, for most folks, just getting the list of skills is a big step forward

Agenda

- What do I mean by "senior?"
- Hard technical skills
- "Squishy" technical skills
- "Soft" (non-technical) skills

"Hard"
Technical Skills

Hard Skills

- The obvious stuff: back-ups, email, networking, printing, storage, *nix commands, etc.

- **VERY** high-level overview
    - names, examples
    - maybe why you want/need them

Hard Skills

- Not everyone needs all of these skills
- Not every job requires all these skills
- These are suggestions and guidelines, not hard-and-fast rules

Hard Skills

- Full and thorough knowledge of "standard" *nix "user" commands
  - a/k/a POSIX.2
  - a/k/a (1)
- Same for admin commands
  - a/k/a (7)

Hard Skills

- Easier to solve problems if you're familiar with all the tools

- Someone in #lopsa asks programming question, thinking answer will be complicated

  - "Just use comm"

  - "Oh!"

- others: join, uniq, expr

Hard Skills

- Complete understanding of the boot process, run levels (/etc/inittab), start-up file (/etc/init.d)

- Alternates:
  - Solaris SMF, OS X launchd, maybe others

Hard Skills

- Strong understanding (in general, and at least one implementation) of:
    - Back-up
    - RAID, volume management
    - NIS/LDAP/AD/…
    - PAM
    - N-factor authentication
- (Sysconfig comes later)

Hard Skills

- Programming skills
    - Because automation is your friend
    - Because there's always some stuff the devs won't write for you
    - To understand other people's code
- Several levels:
    - "Entry requirements": comfortable with shell, awk, and sed

Hard Skills

- (levels)
  - Very comfortable writing modestly complicated perl programs (with subs, "use <module>," error checking)
    - because perl is still the most widely-used and widely-understood programming language for sysadmins
    - python and/or ruby catching up but not there yet

Hard Skills

- (levels)
  - C
    - mostly for understanding
    - enough to understand POSIX.1
    - enough to read the kernel
      - both needed for very deep debugging
  - Assembler
    - bonus, not a requirement
    - helps with the deepest bits of the kernel

Hard Skills

- Software engineering skills, too
  - basic version control
    - RCS (found everywhere, easy to use)
    - git, mercurial, maybe bazaar
  - used for s/w dev and for system config files (with or without sysconfig tools)

Hard Skills

- (s/w eng)
  - variables/config parameters versus hard-coded constants
    - makes it easier to use software on more than one system or for more than one user

Hard Skills

- System configuration tools
- "The Big Four": bcfg2, chef, cfengine, puppet
  - (isconf, lcfg, pan, quattor, radmind)
- Understand their use/purpose/benefit
- Have set up one from scratch

Hard Skills

- Networking
- Basic knowledge of common protocols:
  - IP, TCP, UDP
  - Set-up, tear-down, ARP, basic routing, etc.
- In-depth knowledge of "application" protocols:
  - DHCP, DNS, FTP, HTTP, LDAP, NFS, POP/IMAP, SSH, SMTP, Telnet

Hard Skills

- (nets)
- Solid understanding of routers, firewalls, load balancers, caches, (WAN) accelerators
- Ability to use a protocol analyzer (wireshark, NetScout)
- All required for debugging network problems

Hard Skills

- Triple-bonus skill: In-depth understanding of the *nix kernel

Hard Skills

- Here's some you really won't like
- Learn Windows (desktop)
- Learn common Office apps
- Learn Outlook or Lotus Notes
- Learn to do basic config
- Because it's the standard
- And you need to "play nice" with managers, executives, etc.

Agenda

- What do I mean by "senior?"
- Hard technical skills
- **"Squishy" technical skills**
- "Soft" (non-technical) skills

"Squishy"
Technical Skills

"Squishy"

- HUH? ☺
- These are very clearly technical skills
  - But not based on specific technologies (or commands or whatever)
- Some 'face out"
  - Planning & analysis
- Others "face in"
  - Career growth

"Squishy"

- "Out"
- Analysis, planning, & evaluation
  - Ability to look at "big picture" for a project
  - Figure out requirements
  - Make a plan based on analysis
  - Evaluate results
  - Includes things like roll-back, decision trees, scheduling

"Squishy"

- "Big Picture"
- Need to be able to figure out how all the pieces fit together
- And how pieces affect each other
  - System throughput/response time
  - Security
- …

"Squishy"

- (big picture)
- Must be able to apply this to new systems during design/planning
- And to existing projects for systemic trouble-shooting

"Squishy"

- "Process"
  - "Rules" and systems for how things get done
    - Change management, disaster plans, security breaches, releases, etc.
  - Need to be able to figure out how much process is appropriate
  - And what kind of process
    - automatic or manual?
  - And for what things

"Squishy"

- (process)
- Also need to be able to evaluate existing process, recommend changes/ improvements
  - starts to address business requirements
    - coming in a few minutes

"Squishy"

- "Standards"
- "POSIX"
  - "Open Group Base Specification"
  - "IEEE Std 1003.x"
  - "Single Unix Specification"
  - "Spec 1170"
- Covers the API and user commands
  - Woefully incomplete on sysadmin stuff

"Squishy"

- Regulations
- SOX, HIPAA, FERPA, PCI, etc.
- Minimum is to know they exist
- Next is to be able to work with "experts" to implement any/all applicable regulations
- …

"Squishy"

- (regs)
- One skill that "faces in": BE WILLING TO WORK WITHIN THESE RULES
  - Some of it is bullshit
  - But it's what we're stuck with
- Senior means doing it because it's what's required
  - And doing it without complaining!

"Squishy"

- And that brings us to …
- Understanding (the) business
- Ahem …
- Unless your business is sysadmin consulting services …

"Squishy"

- Sysadmin is about supporting the business!

- EVERYTHING sysadmin does needs to have a business reason behind it:
  - meet an SLA, meet a defined risk level, conform to a regulation, build a product, enable an employee to perform his/her job, etc.

- …

"Squishy"

- The gear isn't there for you to do "cool stuff" with

- "Good enough": meet the requirements AND NO MORE
  - because any extra time/money is wasted

You
Ain't
Gonna
Need
It

"Squishy"

- YAGNI
- From Agile / Extreme Programming
- "You Ain't Gonna Need It"
- Or, don't build unless there's a defined requirement
- Again, wasted time/money

"Squishy"

- Yes, some "economy of scale" and "planning for future growth"
- But that should be part of the business plan, too
- Some people call this BDIM: "Business-Driven IT Management"
  - I say there's no other kind!

"Squishy"

- When asked, if you can't provide the business case for a particular task (machine, whatever), management probably can't provide it either

- In which case, don't do that task

"Squishy"

- Budgeting
- Part of the business side of sysadmin
- Your manager will probably do most of the work
  - But needs accurate data from you
  - And that requires long-range planning, analysis, etc.

"Squishy"

- Skills that "face in" …
- Similar to budgeting, you're likely to know more about the technical side of IT than your manager
- THIS IS OK!
- LEARN TO ACCEPT IT!
- …

"Squishy"

- Managers manage people
  - Senior sysadmins manage technology
- Managers may never have been sysadmins
  - Because so many sysadmins have bad people skills and thus make lousy managers
- Again, it's not the manager's job to be the technology expert

"Squishy"

- This means you can't ask your manager for technical help

- You have to learn how to learn new things on your own

  - Quickly

  - With limited resources

  - From incomplete or incorrect documentation

"Squishy"

- You also need to develop a network of people you can ask for help:
    - People you meet at LISA ☺
        - Or SCALE or OLF or …
    - LOPSA / SAGE / USENIX
        - Mailing lists, IRC, personal contacts
    - Local sysadmin groups
        - Back Bay LISA / BayLISA / …

"Squishy"

- Professional development
    - LISA, PICC, Velocity, etc.
    - Even if you have to pay for it yourself

"Squishy"

- You need to stay abreast of the literature
  - Minimum = LISA proceedings
- Probably should read / keep up with some "near field" stuff as well
  - DB / SQL
  - UI / CHI
    - Like CHIMIT ☺
  - Programming

"Squishy"

- Sort-of related to learning: books
- You ought to have your own reference books
  - So you can take them with you when you change jobs
- Not going to give you a list
  - It changes too quickly

"Squishy"

- Ought to include:
  - One O/S design text
  - One language reference
  - One sysadmin reference
    - like Nemeth et al. or Limoncelli et al.
  - One networking reference

"Squishy"

- Know when to ask for help
- Mainly for programming help
  - Because some things, especially those intended for end users, would benefit from solid S/W engineering

"Squishy"

- Also for sysadmin help
  - If the operation has the potential for large-scale disruption
  - Or it's hard to roll back if it goes wrong
- In this case, could get help from someone less experienced
  - Make yourself explain it to the other person
  - And don't continue until they (and you) fully understand it
  - OK, maybe that's overkill

Agenda

- What do I mean by "senior?"
- Hard technical skills
- "Squishy" technical skills
- "Soft" (non-technical) skills

"Soft" Skills

- Attitude
- Attitude
- Attitude
- A few "people skills"
- Attitude
- One "hard soft" skill

"Soft" Skills

- This is the stuff you probably don't want to hear

- This is almost certainly the stuff you need to hear the most

- It's also probably going to be the hardest for you to learn

- Because sysadmin is about people (and business) not technology!

"Soft" Skills

- Yes, people and business, not technology

- I said this in "squishy": Machines exist to perform business functions

- Sysadmin is about keeping those machines running

- And about helping people use those machines

"Soft" Skills

- Attitude #1: Be helpful and friendly
- If people don't ask for help because sysadmins make them uncomfortable, those people won't be effective when there are problems
- You have failed to perform your job
  - (of helping those people)

"Soft" Skills

- Worth repeating
- Your job is to help the business
  - Keep machines running
  - Help people use the machines
- Have to stay within security/PCI/etc. but the goal is to "get to yes" and not "just say no"

"Soft" Skills

- Learn how to talk to managers
    - Give appropriate level of detail
    - Approach from business perspective
    - Solid reasoning, not dogma or cargo cult

"Soft" Skills

- Attitude #2: Respect other people in the company
- They know less about computers than you do
  - Probably a LOT less
- IT'S NOT THEIR JOB to know a lot about computers
  - If it was their job, the company wouldn't need to hire you!

"Soft" Skills

- Attitude #3: More respect
- Other people ARE NOT STUPID!
- Many of them are experts in their own fields
- They can't solve computer problems …
- You can't solve nuclear physics problems
- Doesn't make either of you stupid!

"Soft" Skills

- Example:

- I use an IBM ThinkPad X-61

- My wife uses a Mac iBook

- Very different physically:
  - Different latch
  - Different on/off switch
  - Different pointing devices
  - Different buttons

"Soft" Skills

- While on vacation, she tried to use my X61, and had to ask:
    - How do I open it?
    - How do I turn it on?
    - Which button clicks the mouse
- "Boy, is she ever dumb!"
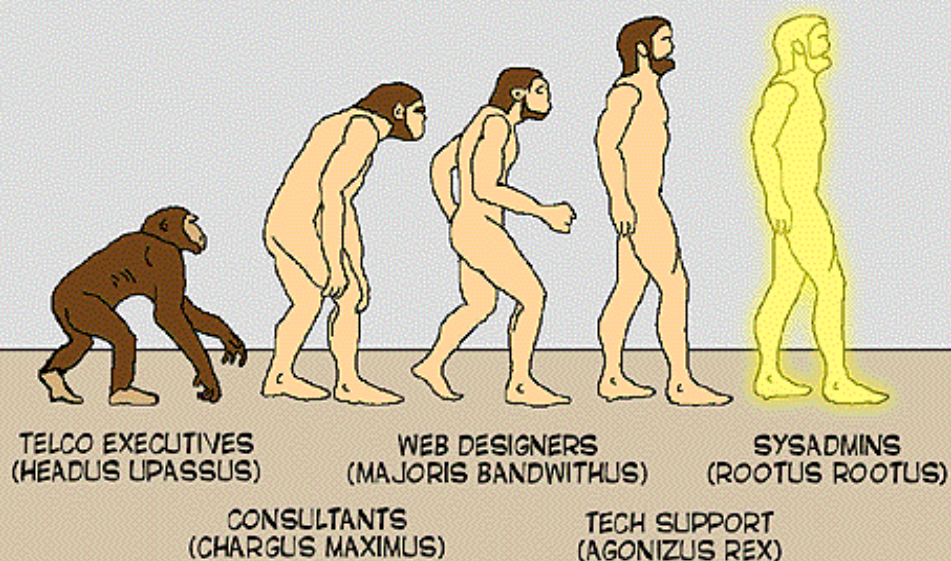- …

"Soft" Skills

- Um, no …
- She has an MS in biomedical engineering
  - And at least one patent
- She's also an MD
- In some ways, she's smarter than I am
  - I just happen to know more about computers than she does

"Soft" Skills

- She has ~7,500 hours
- I have ~120,000 hours!
  - That's ~16x
- Most sysadmins forget how big this experience gap is

"Soft" Skills

- As a joke it's mildly amusing
- Too many sysadmins take it seriously
- Don't do that
- You are not better than your co-workers
  - And maybe not even smarter
- You simply know more about computers than they do

"Soft" Skills

- More being helpful …
- When the developers you work with give you bad software, rather than bash them, GO WORK WITH THEM to help them fix the problem
- Help them understand the problem

"Soft" Skills

- Developers are not dumb
- Usually they're just not familiar with ops requirements
- Or, more likely, ops stuff never made it into the design, so it's not on the devs' schedule
- In which case, work with the designers
  - Because this isn't the devs' fault

"Soft" Skills

- "Public speaking" skills
- Need to present to:
  - your group
  - other groups
  - your manager
  - 1st- / 2nd-level managers
  - executives
- Good way to get to conferences ☺

(almost done)

OK, A Few Answers

- For soft skills, find a mentor
  - A good manager
  - Probably NOT a techie
- Might find someone through the LOPSA Mentorship program
  - But someone you work with might be easier
  - Again, doesn't have to be technical

That's All, Folks

Credits

- Thanks to:
  - John Dalton
  - Steven Ellis
  - Illiad
  - Andrew McMillan
- Shirt by KOG
- More pictures of Ancho:
  - http://menlo.com/ancho/

After Today …

- Copies of my speaking notes:
  - Conference web site:
    - http://www.usenix.org/events/lisa10
  - My web site:
    - http://menlo.com/lisa-2010/
- If you have more questions:
  - *<adamm@menlo.com>*
- Thank you!