Appendix B

What to Do When . . .

In this appendix we pull together the various elements from the rest of the book to show you how they can be used to deal with everyday situations or solve common questions SAs and managers often have.

B.1 I'm Building a Site from Scratch

- Think about the organizational structure you need—Chapter 25.
- Plan your namespaces carefully—Chapter 6.
- Build a rock-solid data center—Chapter 17.
- Build a rock-solid network—Chapter 18.
- Build services that will scale—Chapter 3.
- Build a software depot, or at least plan a small directory hierarchy that can grow into a software depot—Chapter 23.
- Establish your initial core application services:
  - email—Chapter 19
  - DNS, DHCP—Section 1.1.3
  - file service, backups—Chapter 21
  - printing—Chapter 20
  - remote access—Chapter 22

B.2 My Small Site Is Growing

- Have you grown to the point that you need a helpdesk?—Chapter 15.
- Have you grown to the point that you need a network operations center dedicated to monitoring—Chapter 24—and coordinating network operations?
- Think about your organization and whom you need to hire—Chapter 25.
- Make sure you are monitoring services for capacity as well as availability so that you can predict when to scale them—Chapter 24.
- Be ready for an influx of new employees—See B.19, B.20, B.21.

B.3 My Large Site Is Going Global

- Design your WAN architecture—Chapter 18.
- Make sure your helpdesk really is 24×7. Look at ways to leverage SAs in other time zones—Chapter 15.
- Architect services to take account of long-distance links (usually lower bandwidth and less reliable)—Chapter 3.
- Qualify applications for use over high-latency links—Section 3.1.2.

B.4 Services Are Being Replaced

- Be conscious of the process—Chapter 11.
- Manage your DHCP lease times to aide the transition—Section 1.1.4.
- Don't hardcode server names into configurations, hardcode aliases that move with the service—Section 3.1.6.
- Manage your DNS time-to-live values to switch to new servers—Section 13.2.1.

B.5 Moving a Data Center

- You need to have a scheduled maintenance window, unless everything is fully redundant and you can move one half of a redundant pair and then the other—Chapter 12.
- Make sure the new data center is properly designed—Chapter 17.
- Back up every file system of any machine before it is moved.
- Perform a "firedrill" on your data backup system—Section 21.2.1.
- Develop test cases before you move and test, test, test everything after the move is complete—Chapter 11.

- Label every cable before it is disconnected—Section 17.1.7.
- Establish minimal services (redundant hardware) at a new location with new equipment, then move everything else.
- Test the new environment (networking, power, UPS, HVAC, and so on) before the move begins—Section 17.1.4.
- Perform a dress rehearsal—Section 11.2.5.

B.6 Lots of People Are Moving Their Office

- Work with facilities to allocate just one "move day" each week.
- Establish a procedure and a form that will get you all the information you need about each person who is moving (what equipment they have, how many network connections, telephone connections, special needs). Have SAs check out nonstandard equipment in advance and make notes.
- Connect and test network connections ahead of time.
- Have customers power down their machines before the move and put all cables, mice, keyboards, and other bits that might get lost into a marked box.
- Brainstorm all the ways that some of the work can be done by the people moving. Be careful to assess their skill level—maybe certain people shouldn't do anything themselves.
- Have a moving company actually move the equipment and have a designated SA move team do the unpacking, reconnecting, and testing. Take care in selecting the movers—there are some good companies out there, but there are also a lot of bad ones.
- Train the helpdesk to check with customers who report problems to see if they have just moved and didn't have the problem before the move; then, pass those requests to the move team rather than the usual escalation path.
- Formalizing the process, limiting it to one day a week, doing the prep work, and having a move team makes it go more smoothly with less downtime for the customers and less move-related problems for the SAs to check out.

B.7 Dealing With Mergers and Aquisitions

- If you are the CEO, you should involve your CIO before the merger is even announced.
- If you are an SA, try to find out who at the other company actually has the authority to make "the big decisions."

- Start a dialog with the SAs at the other company. Understand their support structure, service levels, network architecture, security model, and policies. Determine what the new model is going to look like.
- Have at least one initial face-to-face meeting with the SAs at the other company. It's easier to get angry at someone you haven't met, which should be avoided.
- Move on to technical details. Are there namespace conflicts?—Chapter 6. How are you going to resolve them?
- Adopt the best processes of the two companies—don't blindly select the processes of the bigger company.
- Be sensitive to cultural differences between the two groups. Diverse opinions can be a good thing if people can learn to respect each other—Sections 30.1.5 and 27.2.2.
- Make sure both SA teams have a high-level overview diagram of both networks, as well as a detailed map of each site's LAN—Chapter 18.
- What should the new network architecture look like?—Chapter 18. How will the two networks be connected? Are some remote offices likely to merge with each other? What does the new security model or security perimeter look like?—Chapter 7.
- Ask senior management about corporate identity issues. Do the corporate identities need to merge or stay separate? What implications does this have on the email infrastructure—Chapter 19—and Internet-facing services?
- Are there any customers or business partners of either company who will be sensitive to the merger, and/or want their intellectual property protected from the other company?—Chapter 7.
- Compare the policies mentioned in Chapter 7, looking in particular for differences in privacy policy, security policy, and how each interconnect with business partners.
- Check router tables of both companies and verify that the IP address space in use doesn't overlap. (This is particularly a problem if you both use RFC1918 address space [Lear et al. 1994, Rekhler et al. 1996].)
- Consider putting a firewall between the two companies until both have compatible security policies—Chapter 7.

B.8 A Machine Keeps Crashing!

- Establish a temporary workaround. Communicate to customers that it is temporary.
- Find the real cause—Chapter 4.
- Fix the real cause, not the symptoms—Chapter 5.
- Replace the system—Chapter 11.

- If the root cause is hardware, buy better hardware—Chapter 2.
- If the root cause is environmental, provide a better physical environment for your hardware—Chapter 17.
- Provide your SAs better training on diagnostic tools—Chapter 4.

B.9 Which Tools Should I Purchase for My SA Team?

- A laptop with network diagnostic tools such as network sniffer, DHCP client in verbose mode, encrypted telnet/ssh client, tftpserver, and so on. Also provide both wired and wireless Ethernet—Section 17.1.10.
- A library of the standard reference books for the technologies they are involved in—Sections 28.1.1, 29.1.6, and bibliography.
- A set of screwdrivers in all the sizes computers use. Find a way to deal with the fact that people will borrow the most common screwdriver and not return it—Section 17.1.12. Either buy many of that one tool, or do as one site did: buy each SA 10 small screwdriver sets. When SAs asked to borrow a tool, they were told, "You can't borrow my tools but here is a complete set as a gift so you don't have to bother me again."
- High-speed connectivity to their home and the necessary tools so that they can telecommute.
- A portable label printer—Section 17.1.12.
- A cable tester.
- A spare PC or server for experimenting with new configurations—Section 13.2.1.
- Radios or walkie-talkies for communicating inside the building—Chapter 17 and Section 12.1.7.
- A PDA or nonelectronic organizer—Section 27.1.2.
- Membership to professional societies such as USENIX and SAGE—Section 27.1.4.
- A variety of headache medicines. It's really difficult to solve big problems when you have a headache.

B.10 Why Should I Bother Documenting Systems and Procedures

- Good documentation describes the "why" as well as the "how to."
- When you do things right and they "just work," even you will have forgotten the details when they break or need upgrading.
- You get to go on vacation—Section 27.2.2.

- You get to move on to more interesting projects rather than being stuck doing the same stuff because you are the only one who knows how it works—Section 24.2.1.
- You will get a reputation as being a real asset to the company (raises, bonuses and promotions . . . , or at least fame and fortune).

B.11 Why Should I Bother Documenting Policies

- Other people can't read your mind—Section A.1.16.
- It communicates expectations for your own team, not just your customers—Section 7.1.3 and Chapter 9.
- It's unethical to enforce a policy that isn't communicated to the people that it governs—Section 9.2.1.
- It's abusive to punish people for not reading your mind——Section A.1.16.

B.12 How Do I Identify the Fundamental Problems in My Environment?

- Look at the Basics section of each chapter.
- Survey the management chain that funds you—Chapter 25.
- Survey two or three customers that use your services—Section 26.2.2.
- Survey all customers.
- Identify what kinds of problems consume your time the most—Section 26.1.3.
- Ask the helpdesk employees what problems they see the most—Sections 15.1.6 and 25.1.4.
- Ask the people configuring the devices in the field what problems they see the most, and what customers complain about the most.
- If your architecture isn't simple enough to draw by hand on a whiteboard, maybe it's too complicated to manage—Section 18.1.2.

B.13 I Need More Money for Projects!

- Establish "the need" in the minds of your managers.
- Find out what management wants, and communicate how the projects you need money for will serve that goal.
- Become part of the budget process—Sections 28.1.1 and 29.1.5.

- Do more with less: Make sure that your staff has good time-management skills—Section 27.1.2.
- Manage your boss better—Section 27.2.3.
- Learn how your management communicates with you and communicate in a compatible way—Chapters 28 and 29.

B.14 Projects Don't Get Done!

- Make sure the people involved have good time-management skills—Section 27.1.2.
- Reduce the number of projects.
- Don't spend time on the projects that don't matter—Figure 28.1.
- Prioritize → Focus → Win.
- Outsource the highest-impact projects—Sections 14.2.2, 22.1.5, and 25.1.8.
- Hire clerical staff to take on tactical tasks (mundane work) so that you have more time for strategic tasks (vision and development), or to write code.
- Hire short-term contract programmers to write code to spec.

B.15 Customers Are Unhappy

- Make sure you make a good impression on new customers—Section 26.1.1.
- Make sure you communicate more with existing customers—Section 26.2.4 and Chapter 26.
- Create a System Status web page—Section 26.2.1.
- Create a local Enterprise Portal for your site—Section 26.2.1.

B.16 Management Is Unhappy

- Meet with them in person to listen to the complaints; *don't* try to do it via email.
- Find out your manager's priorities and adopt them as your own—Section 27.2.3.
- Be sure you know how management communicates with you and communicate in a compatible way—Chapters 28 and 29.
- Make sure people in specialized roles understand the roles—Appendix A.

B.17 SAs Are Unhappy

- Make sure their direct manager knows how to manage them well—Chapter 28.
- Make sure executive management supports the management of SAs—Chapter 29.
- Make sure SAs are taking care of themselves—Chapter 27.
- Make sure SAs are in roles that they want and understand—Appendix A.
- If SAs are overloaded, make sure they manage their time well—Section 27.1.2; or hire more people and divide the work—Chapter 30.
- Fire any SAs who may be fomenting discontent—Chapter 31.

B.18 Systems Are Too Slow

- Use your monitoring systems to establish where the bottlenecks are—Chapter 24.
- Look at performance-tuning information that is specific to each architecture so that you know what to monitor and how to do it.
- Recommend a solution based on your findings.
- Know what the real problem is before you try to fix it—Chapter 4.

B.19 There's a Big Influx of Computers

- Make sure you understand the *economic difference* between "desktop" and "server" hosts. Educate your boss or CFO about the difference or they will balk at high-priced servers—Section 2.1.3.
- Make sure you understand the *physical differences* between "desktop" and "server" hosts—Section 2.1.1.
- Establish a small number of standard hardware configurations and purchase them in bulk—Section 1.2.3.
- Make sure you have automated host installation, configuration, and updates—Chapter 1.
- Check power and HVAC capacity for your data center—Chapter 17.
- If new hosts are for new employees, see B.20.

B.20 There's a Big Influx of New Users

- If new hosts are for new employees, make sure the hiring process includes ensuring that new computers and accounts are set up before people arrive—Section 26.1.1.

- Make sure you have a stockpile of standard desktops preconfigured and ready to deploy.
- Make sure you have automated host installation, configuration, and updates—Chapter 1.
- Make sure there is proper new user documentation and that you have adequate staff to do orientation—Section 26.1.1.
- Make sure there is at least one simple game on every computer. It makes new computer users feel good about their machines if it entertains them too—less scary too.
- Check to make sure the building can withstand the increase in power utilization.

B.21 There's a Big Influx of New SAs

- Assign mentors to junior SAs—Sections 28.1.1 and 30.1.5.
- Have an orientation for each SA level to make sure they understand the key processes and policies; make sure that it is clear whom they should go to for help.
- It's essential to have documentation.
- Purchase proper reference books, both technical and "soft topics"—time management, communication, and people skills—Chapter 27.
- Give them all copies of this book.

B.22 Our SA Team Has a High Attrition Rate

- Be sure HR performs exit interviews.
- Completely lock out the SAs who leave from the systems—Chapter 31.
- Make the group aware that you are willing to listen to complaints in private.
- Have an "upward feedback session" at which your staff reviews your performance.
- Have an anonymous "upward feedback session" so that your staff can review your performance.
- Determine what you, as a manager, might be doing wrong—Chapters 28 and 29.
- Do things that increase morale: Have the team design and produce a t-shirt together—a dozen dollars spent on t-shirts can induce a morale improvement that thousands of dollars in raises can't.
- Make sure everyone in the group has read Chapter 27, but don't force it on them . . . that only reduces morale.
- If everyone is leaving because of one bad apple, get rid of him or her.

B.23 Our User-Base Has a High Attrition Rate

- Make sure management signals the SA team to disable accounts, remote access, and so on in a timely manner—Chapter 31.
- Make sure exiting employees return all company-owned equipment and software they have at home.
- Take measures against theft as people leave.
- Take measures against intellectual property theft, possibly restricting remote access.

B.24 I'm New to a Group

- Before you comment, ask questions to make sure you understand the situation.
- Meet all your coworkers one-on-one.
- Meet with customers informally (lunch) and formally—Chapter 26.
- Be sure to make a good first impression, especially with customers —Section 26.1.1.
- Give credence to your coworkers when they tell you what the problems in the group are. Don't reject them out of hand.
- Don't blindly believe your coworkers when they tell you what the problems in the group are. Verify them first.

B.25 I'm the New Manager of a Group

- Meet all your employees one-on-one. Ask them what they do, what role they would like to be in, and where they see themselves in three years. The purpose of this meeting is to listen to them, not to talk.
- Establish weekly group staff meetings.
- Meet your manager and your peers one-on-one to get their views.
- From day one, show the team that you have faith in them all —Chapter 28.
- Meet with customers informally (lunch) and formally—Chapter 26.
- Ask everyone to tell you what the problems facing the group are, listen carefully to everyone, and then look at the evidence and make up your own mind.
- Before you comment, ask questions to make sure you understand the situation.

B.26 I'm Looking for a New Job

- Determine why you are looking for a new job—understand your motivation.
- Determine what role you want to play in the new group—Appendix A.
- Determine which kind of organization—Section 25.3—you enjoy working in the most.
- Meet as many of your potential future coworkers as possible to find out what the group is like—Chapter 30.
- Never accept the first offer right off the bat. The first offer is just a proposal. Negotiate!—Section 27.2.1.
- Negotiate the things that are important to you in writing (conferences, training, vacation).
- Don't work for a company that doesn't let you interview their boss or your future boss.

B.27 I Need to Hire Many New SAs Quickly

- Use as many recruiting methods as possible—organize fun events at the appropriate conferences, use online boards, get referrals from SAs and customers—Chapter 30.
- Make sure you have a good recruiter and HR contact who knows what a good SA is.
- Determine how many SAs of what level and what skills you need each to have.
- Move quickly when you get a good candidate. You can refine your search later as you get to know what skills you have hired already.

B.28 I Need to Increase Total System Reliability

- Set up monitoring to pinpoint uptime problems—Chapter 24.
- Deploy end-to-end monitoring for key applications—Section 24.2.4.
- Reduce dependencies. Nothing in the data center should rely on anything outside of the data center—Sections 3.1.7 and 12.1.7.

B.29 I Need to Decrease Costs

- Decrease costs by centralizing some services—Chapter 14.
- Are you paying high maintenance on old equipment that it would be cheaper to replace?—Section 2.1.4.

- Reduce running costs, such as remote access, through outsourcing —Chapter 22 and Section 14.2.2.
- Can you reduce the support burden through standards and/or automation?—Chapter 1.
- Can you reduce support overhead through applications training for customers, or better documentation?
- Can you distribute costs more directly to the groups that incur them, such as maintenance charges, remote access charges, special. hardware, high-bandwidth use of wide-area links?—Section 25.1.2.
- Are people not paying for the services you provide? If they say, "It's important" but aren't willing to pay for the service, then it isn't important.

B.30 I Need to Add Features

- Know the requirements—Chapter 3.
- Make sure you maintain at least existing service and availability levels.
- If altering an existing service, have a back-out plan.
- Look into building an entirely new system and cutting over rather than altering the running one.
- If it's a really big infrastructure change, consider a maintenance window—Chapter 12.
- Decentralize so that local features can be catered to.
- Test! Test! Test!
- Document! Document! Document!

B.31 It Hurts When I Do "This"

- Don't do "that."

If It Hurts, Don't Do It
A small field office of a multinational company had a visit from a new SA supporting the international field offices. The local person who performed the SA tasks when there was no SA had told him over the telephone that the network was "painful." He assumed that she meant painfully slow until he got there and got a powerful electrical shock from the 10Base-2 network. He closed the office and sent everyone home immediately while he called an electrician to trace and fix the problem.

B.32 I Need to Build Customer Confidence

- Improve follow-through—Section 27.1.1.
- Discard projects that you haven't been able to achieve until you have enough time to complete the ones you need to.
- Communicate more—Chapter 26.
- Focus on projects that matter to the customers—Figure 28.1.
- Create a good first impression on the people entering your organization—Section 26.1.1.

B.33 I Need to Build the Team's Self-Confidence

- Start with a few simple, achievable projects then involve them in more difficult projects.
- Ask them what training they feel they need, and provide it.
- Coach them. Get coaching on how to coach!

B.34 I Need to Improve the Team's Follow-Through

- Find out why they are not following through.
- Make sure your trouble-ticket system assists them in tracking customer requests—make sure it isn't just for tracking short-term requests. Be sure it isn't so cumbersome that people avoid using it—Section 15.1.7.
- Encourage team members to have a single place to list all their requests—Section 27.1.1.
- Discourage team members from trying to keep to-do lists in their heads—Section 27.1.1.
- Purchase PDAs for all team members—Section 27.1.1.

B.35 I've Been Asked to Do Something, but I'm Not Sure of the Ethics Involved

- Log all events and actions.
- Get the request in writing.
- Check for a written policy regarding the situation—Chapter 9.
- If there is no written policy, absolutely get it in writing.
- Consult with your manager, *before* doing anything.

B.36 My Dishwasher Leaves Spots on My Glasses

- Spots are usually the result of not using hot enough water rather than finding a special soap or even using a special cycle on the machine.
- Check for problems with the hot water going to your dishwasher.
- Have the temperature of your hot water adjusted.
- Before starting the dishwasher, run the water in the adjacent sink until it's hot.

B.37 I Need to Protect My Job!

- Be the best SA in the group: have positive visibility—Chapter 26.
- Document everything—policies and technical and configuration information and procedures.
- Have good follow-through.
- Help everyone as much as possible.
- Be a good mentor.
- Use your time effectively—Chapter 27.
- Automate as much as you can—Chapter 1 and Sections 5.2, 21.1.6, and 26.1.4.
- Always keep the customers' needs in mind—Sections 26.1.3 and 27.2.3.

B.38 I'm Not Sure What I Should Do Next!

- Depending on what stage you are in, certain infrastructure issues should be happening:
  - Basic services, such as email, printing, remote access, and security, need to be there from the outset.
  - Automation of common tasks, such as machine installations, configuration, maintenance, account creation, and deletion, should happen early; so should basic policies.
  - Software depot should happen a little later (but not before it is a mess).
  - Documentation should be written as things are implemented or it will never happen.
  - Monitoring needs to happen before you can think about improvements and scaling, which are issues for a more mature site.
  - Chapter 15 talks about when and how the helpdesk should come into the process.
- Get more in touch with your customers to find out what their priorities are.

- Improve your trouble-ticket system—Chapter 15.
- Review the top 10 percent of the ticket generators—Section 15.2.1.
- Adopt better revision control of configuration files—Chapter 10, particularly Section 10.1.1.

B.39 There's Never Enough Time to Get Work Done!

- Read the time management section—Section 27.1.2.
- Take a time-management class—Section 27.1.2.
- Use a Console Server so that you aren't spending so much time running back and forth to the machine room—Sections 17.1.10 and 2.1.8 and 12.1.7.