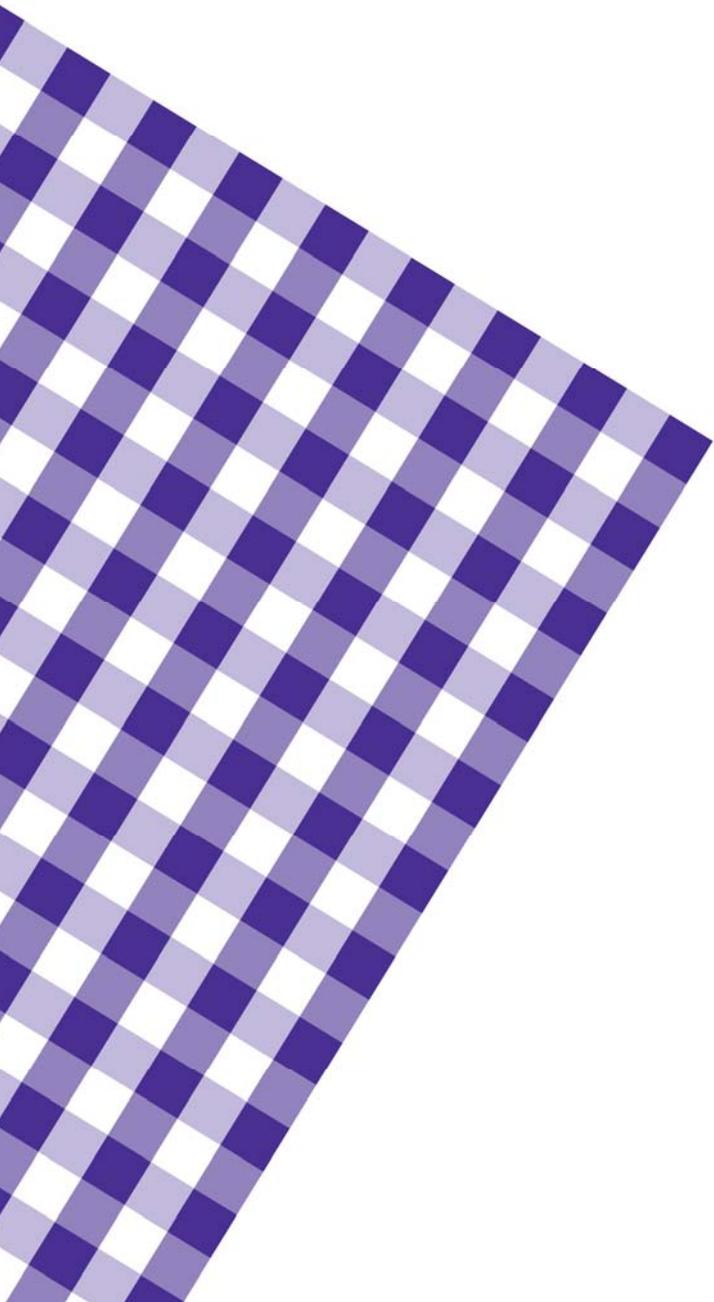


The Joy of Computing

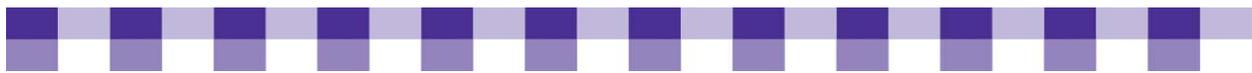
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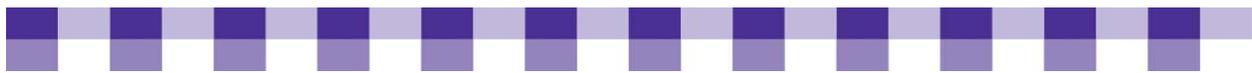


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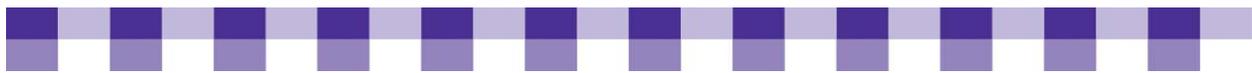
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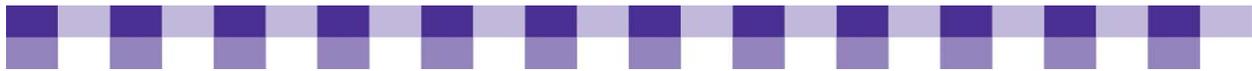
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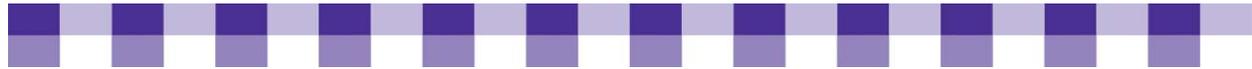
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Introduction

Welcome to the “Joy of Computing–Planning for Success.” Comprehensive in scope, this online resource brings together the most current ideas and best practices for planning, building, and managing your library’s computer technology. Cookbook 3 is not intended to turn you into a networking guru. Its sole purpose is to give you the details you “need to know” to get your library’s technology up and running properly, sustain its growth, and ensure its viability. All of the information contained here is based on the real life experiences and successes of librarians across the country, and is supported by a complete set of online tools. We’ve also provided many opportunities to link to additional Internet resources so—if you are so inclined—you can learn more about a particular topic.

Cookbook 3 is organized into six key segments. You can go through these segments from start to finish, or go to only specific areas of interest. Here is a brief description of what you will find:

- **Planning and Decision Making** covers the ins and outs of creating a technology plan that ties to your strategic priorities and goals.
- **Communication and Partnerships** delves in the fundamentals of day-to-day technology communication from a “techie” and “non-techie” perspective. It also includes some important guidelines for working and collaborating with key stakeholders.
- **Buying and Deploying Technology** goes through some of the core actions and decisions you need to consider when planning deployments, installations, and upgrades.
- **Maintaining and Sustaining Technology** offers important insight into the daily management of public computers.
- **Networking and Security** covers some of the basic standards and practices for ensuring your library’s network security.
- **Innovation** highlights the true value of today’s libraries and the role in serving as the center of new community conversations via a much higher level of user interactivity and experiences. If you are ready for Web 2.0, this is a good place to start.

Joy of Computing–Planning for Success is also available in a [downloadable PDF format](#).



Planning and Decision Making

A technology plan is a lot like a strategic plan or a project plan. It's a formal mechanism for helping you to see where you've been, where you are and where you're going. Technology planning is especially vital because bad decisions in this area can cost so much in terms of "wasted" spending and staff time. It reflects feedback from your key stakeholders (staff, patrons, board members), and also ties back to your strategic priorities and your long-range goals.

IN THIS SECTION

- [Introduction to Technology Planning Process](#)
- [Key Decision Makers](#)
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Introduction to the Technology Planning Process

The technology planning process lets you step back from the daily routine of checking out books and answering reference questions. It gives you a chance to think about the big picture.

Why Should You Create a Technology Plan?

- **Technology plans help you make the case for more funding.** Funders want to know that you have specific goals in mind, as well as a plan for reaching those goals and measuring progress.
- **Many funders actually require technology plans.** If you're asking for e-rate discounts, you have to have a written tech plan in most cases. A lot of grants, including those made with LSTA funding or Gates Foundation money require that you undertake some or all of the steps discussed in this section.
- **With a plan in place, you're much less likely to buy an expensive new technology that you can't support due to a lack of ongoing funds, staff time and/or expertise.**
- **Technology planning:**
 - Forces you to align your IT decisions with the library's overall strategic priorities.
 - Encourages you to align your IT priorities with the needs of your community and the needs of your staff.

For more reasons why technology planning is important, see [this article](#) on WebJunction.

Key Actions

To help you launch your technology planning efforts, we've provided a [Six-Step Technology Planning](#) tool. It lists some key actions for gathering information and preparing a technology plan for your library. Please note that there's no strict sequence that you have to follow when creating a technology plan.

Further Resources

Want to learn more about technology planning? Check out the [Further Resources](#) sections.



Key Decision Makers

Every town has a different power structure, with its own personalities, its own accountability requirements, its own reporting system and its own state and local statutes. So when we talk about how to be a leader in your community, it's difficult to generalize too much. However, there are a few principles to keep in mind as you develop your technology plan and advocate for that plan.

Why Should You Get to Know Key Decision Makers?

- **You don't** want to inadvertently break the law or ignore an important regulation. Key influencers and decision makers can often tell you about the most important state and local statutes.
- **You don't want to waste your time** planning for a project or service that will later get overturned by someone you forgot to consult.
- Other departments and other city employees often have good advice about planning and advocacy. Also, they might have expertise in the particular technology you're trying to implement.
- **Avoid duplication of effort.** Another city or county department may already offer the technology or the service that you're looking at.
- **There could be funds available** for technology that you aren't aware of.
- **People like to be asked for their opinion.** If you talk to key influencers in your community, they're much more likely to support your technology initiatives and much less likely to oppose them. Also, you might turn them into advocates for your project.

Key Actions

- Start by reading our tools regarding technology decision makers: [Quick Reference: What Do You Need to Know About Technology Decision Makers?](#) and [Who are Possible Key Decision Makers?](#)
- Arrange a meeting with a key IT decision maker in your community, or sit in on a meeting of a technology advisory committee if one exists in your local government.
- At that meeting, ask some of the questions. Make sure you get a sense of what their concerns are, who they report to, and how their performance is evaluated. Also, ask for the names of other influential people you could talk to.

Further Resources

To find out more about meeting and working with technology decision makers, see the [Further Resources](#) section.



Technology Assessments

A **technology assessment** provides you with a snapshot of the computing environment in your library. It also gives you a high-level perspective on your staff skills, budget, vendor relationships, procedures and policies. A **technology inventory**, on the other hand, is a more specific, low-level description of what you own and where it's located. Your inventory might include details about when and where the technology was purchased, who provides tech support, warranty information and the number of licenses you own. The assessment and the inventory are often done at the same time and often included in the same report.

Under ideal circumstances, a tech inventory is the beginning of an ongoing process known as IT Asset Management, so read that article for a discussion of tools that help you track your hardware and your software licenses. The rest of this article relates mainly to the technology assessment. Also, be sure to review our [Technology Assessment Checklist](#) to learn more about what's included in a tech assessment.

Why Do a Technology Assessment and Technology Inventory?

- **An assessment lets you avoid duplicated effort.** Perhaps someone in your IT department has been researching and testing patron management software. Maybe someone in the library wrote a computer use policy last year and then forgot to tell you about it.
- **A good assessment lets you know if any critical procedures or policies are missing.** For instance, what steps will you take if you find out that one of your servers has been hacked? Do you have a regular backup routine in place? Do you have a disaster recovery plan?
- **A good assessment lets you know where to spend your technology training dollars.** Are staff lacking in email skills? Word processing skills? Do they want to know more about Web 2.0 and cutting-edge technology? Also, what sorts of hard IT skills do you have on staff?

Key Actions

- **A good assessment relies on a good inventory.** For an in-depth discussion of technology inventories, read, [IT Asset Management](#). If you want to create an inventory using TechAtlas, [these instructions at WebJunction](#) can help you get started.
- **Answer the assessment surveys in TechAtlas.** Sign up for an account on [TechAtlas](#) and click on the Survey tab. These questionnaires will help you better understand where you are in terms of technology. In addition to this, TechAtlas will provide you with custom recommendations and resources based on your answers. These recommendations can provide the basis of your technology plan.



Stories from the Field

Oh, one thing I've really been using lately is TechAtlas. And oh my gosh, that is just an awesome tool. I did an inventory of all my computers last year, and of course, I didn't know about TechAtlas, I wish I had. But I've been using it already to work on my 2008 budget and on some surveys for the employees. It helps me understand what they know about computers and how much they can help the patrons. And it's just — I love it. It's an awesome tool. I thought it was going to be difficult, but then when I got into it, I was like, oh my God, this is great. And my budget, it's so easy. [TechAtlas] lets you enter your line items and just everything that you do on a budget. Oh, and the technology plan, I've started entering information on that, too, to prepare a technology plan.

*Mindy Farley
Barton Public Library, AR*



Strategic and Technology Plans

A strategic plan (aka long-range plan) lays down a path for your entire library to follow, including tech staff, circulation staff, director, trustees, pages and so on. It begins with a look at the present, proceeds to a discussion of future trends and then discusses the ways in which your library will address these challenges. As you're creating a strategic plan, you'll be getting an overall picture of your library — its strengths, its weaknesses, its opportunities, its ongoing projects and services. You'll also look at your community to see who they are, why they use the library or don't use the library and what needs they have that aren't being fulfilled.

Why Use a Strategic Plan As You're Writing Your Tech Plan:

- Without a strategic plan to refer to, your technology planning conversations are more likely to wander aimlessly. The goals and objectives for the library as a whole can focus and guide your conversations.
- Without a strategic plan, you're more likely to embrace a technology because it's cool or sexy. Every new and existing technology should relate to one or more of the library's strategic objectives.
- Strategic planning can help you prioritize your technology objectives. There are so many great new technologies that your brainstorming list can be pages and pages long. Which ones will you tackle first?
- A good strategic plan can remind you who you serve. What different demographic groups and interest groups are there in your community? Which needs do they have that a library could fulfill?
- It can also remind you of technology projects you've worked on in the past, and projects that are still underway. Did they fail or succeed and what lessons were learned? Especially in larger libraries it's often hard for one person to know the library's entire technology history. The technology assessment that we discussed earlier [can also help with this.

Key Actions

- **Dust off your strategic plan and read it.**
- **If you don't have a strategic plan, visit some of the following resources and think about how to begin this crucial process.**

Stories from the Field

We do have an overall strategic plan. It was a five-year plan, we're in year three, and that was for the whole library system. We actually hired a consultant. She came in, and we had the community come in and give their opinions about what we should do and all that kind of stuff. Then we set our goals for the next five years, and each year, we update those with activities that support the goals. So, for example, one of the things that the people in the public said that they wanted was they wanted the library



to be like a community meeting center. We started talking about maybe we need to renovate some of our older meeting rooms so that they're more user-friendly and maybe we need to drop in some extra data jacks, stuff like that. That's where it started. Then as it has progressed, we've just done different activities to support that goal. Then what I do, I don't write a technology plan in a vacuum because to me, that's kind of pointless.

Michelle Foster
Boone County Library, KY

Yeah, we do have a technology plan, but pretty much everything is in process. So our technology plan was actually, I can't say it was easy to write, but once I started actually figuring out how to do it all the goals were there already. They were already put in place before I walked through the door, [in] the planning documents for this building.

Darla Wegener
Lincoln Public Library, CA

Further Resources

For more information about strategic and technology planning, check out the [Further Resources](#) section.



Building a Technology Team

Have you ever tackled a big project on your own . . . only to find yourself confused and flailing, wishing you had someone to turn to for advice? If so, you know firsthand the importance of an advisory committee. As you dive into this important topic, be sure to review our [10 Rules for Building and Maintaining a Technology Team](#).

Why Create an Advisory Committee to Help You Create Your Tech Plan?

- **There's a lot you don't know about technology.** No one person can keep track of it all, so hearing from techies within your library and outside your library can inform you about what's possible, what isn't and what the real costs are.
- **There's a lot you don't know about your community.** Community members will give you a better idea of how patrons use computers, what they can find elsewhere (e.g. at home, at school) and what they're missing in terms of technology access and technology training. Frontline librarians will also know a lot about patrons' computing needs.
- **There's a lot you don't know about your library** and your fellow librarians. What are their successes and frustrations with technology? What tools, training and support services do they need?
- **You need evangelists.** The librarians and community members on your tech team will communicate your technology vision to other librarians and other patrons.

Key Actions

For libraries that feel a tech team is a little beyond their reach right now:

- **Try to develop some informal feedback loops if you can't create a formal advisory committee.** Make technology a part of the regular conversations you have with your staff, your trustees, your patrons, and your friends.
- **Get in touch with techies in your area and invite them to have lunch or coffee.**
- **If you can't find the right conversation partners locally, get online and look for mentors in the [WebJunction](#) or [TechSoup](#) discussion forums.**

For libraries that feel they can pull off a tech team:

- **Begin by defining the mix of roles you'd like on your tech team.** This can include such roles as tech evangelist, a technology skeptic, a frontline librarian who deals with patrons and their computing needs, someone who understands the library's budget and strategic plan, etc.
- **Then think about the folks you know within the library and outside of the library who might fill those roles.** Some folks will fill more than one role.
- **Start with modest goals.** Try to find three or four interested individuals (not all of whom have to be techies) who can meet three or four times a year. That might be all you ever need, especially in small and mid-sized library systems. If you find you need



to meet more often, or if you need more points of view on your team, you can always make those changes down the road.

Stories from the Field

I have a department of five people so we all get together and we go over the plan that's been done for the library as a whole and we talk about different things that we need to do to support those goals. Some stuff is pretty much the same every year, honestly, replacements and that kind of stuff. But then we talk about other ideas that they might have that support the goals that aren't on there. So first it goes through my department and then, of course, I run it past the supervisors. This is going to sound terrible and I mean absolutely no disrespect in any fashion, but most of the supervisors don't really care. They just want it to work; they don't care how it gets there. But the director certainly likes to see what we're going to do because that helps her with her budgeting and that kind of stuff. The public services people tend to be more interested in it than some of the other supervisors.

*Michelle Foster
Boone County Library, KY*

When you create a team, it needs to be made up of people who are willing to work. If you have someone who only complains and thinks that being on the committee is a way of complaining about stuff, you're never going to go anywhere. But you want people who will see things differently than you...They don't have to be technology whizzes...but they [should] be interested in supporting that type of thing....[Getting] different viewpoints...really helps when you're trying to build something that's going to be accepted by everybody. I had people from different branches and I had a person from the public, which is recommended . . . because they have a different perspective on your library.

*Claire Stofford
Madelyn Helling Library, CA*

Further Resources

For additional references and tools on building and maintaining technology teams, check out the [Further Resources](#) section.



The Costs and Benefits of Technology

We've all been exhilarated at some point by the impact of technology on our lives and our libraries, but at other times computers feel like a huge, unfunded mandate. In the last ten or fifteen years, libraries have become the biggest provider of free computer resources in the country (except for public schools). But rather than acknowledge this shift where it matters the most, local and state governments have been slashing library budgets. In order to push back, we need to emphasize the true costs of technology, as well as the true benefits.

To put it as simply as possible, our job here is to help you figure out how much time and money you're investing in your technology (the Costs), and what you and your patrons are getting back from that investment (the Benefits). Sounds easy! Of course, it really isn't, and some of this material has a steep learning curve, but we'll start off slowly.

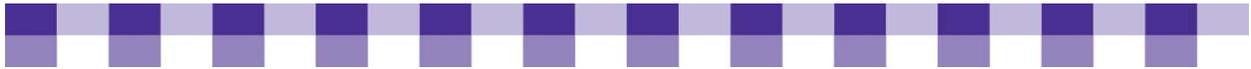
If you're looking for some basic tips and tools, and recommendations on where and how to get started writing your technology budget, be sure to review our [Writing a Technology Budget — Ideas in Action](#) tool.

Why Measure Your Technology Costs?

- **Accurate financial statements are part of your baseline for planning** and decision-making. If your Web site is hard to navigate, spending more money may or may not help, but you need to know how many resources you've been allocating to this project in the past.
- **Anything and everything is possible if you don't look at the cost.** You could buy life-size robots and let patrons check them out if price wasn't a factor. So without a budget, you're in danger of overspending now and then trying to cut back later. Staff and patrons don't appreciate the inconsistency that comes from poor budgeting. Everyone gets accustomed to a certain level of service, a certain number of public computers, a certain amount of bandwidth, and then those services are cut back.
- **However, libraries often do the exact opposite when they don't have accurate budget projections.** They buy little or no new technology, and they have to explain to funders why they haven't spent all the money that was allocated to them. Nothing is more likely to cause budget cuts than unspent money.
- **There's usually a tradeoff between explicit costs and hidden costs.** If you reduce your tech support budget by \$70,000, you may end up paying much more than that in lost productivity, which is harder to see and harder to measure. This idea is discussed in more detail in [Total Cost of Ownership \(TCO\)](#).

Why Measure Technology Benefits?

- **Again, it's all about the money.** You want to demonstrate that technology is expensive, but also that it's worth the expense. How is your community benefiting? How are the politicians and town council members benefiting? How are their constituents' lives improving? You can use general, abstract arguments, but numbers and stories have more of an impact.



- **If you don't measure benefits and outcomes, you're driving blind.** You and your staff may have an intuitive sense that a service is succeeding, but intuitions are sometimes wrong. And even if you're right, there's always room for improvement.

Key Actions

- **Ask some other city departments if you can look at their budgets and their other financial statements.** Compare the technology expenses that they're reporting on to the ones that you have in your budget.
- **Pick out three technology metrics that you can track during the upcoming year.** For an idea of some basic metrics that you can choose from, see Evaluations and Metrics on our Web site, or [Quantifying Impact](#) on the WebJunction site.
- **Review some of our basic information on [Total Cost of Ownership \(TCO\)](#).**

Further Resources

There are a lot of different ways you can think about your technology spending. The right model for you depends largely on the goals of your organization, the audience you're trying to reach (e.g. board of trustees, patrons, politicians, etc.) and any relevant laws or regulations.

If you're looking for some more articles to get you started, look at our [Further Resources](#) section.



Total Cost of Ownership (TCO)

Total cost of ownership, or TCO, is a business concept that's been around for about 20 years now, but it's an idea that librarians have understood informally for centuries. When a patron loses a book, most libraries charge more than the cover price of the book, because the cover price doesn't include the cost of ordering, processing and cataloging the book. The staff time involved in getting that book into the system is part of the TCO of that book. If you look out even further, there are costs related to shelf space, repairs, circulation, reshelving it and deaccessioning. Cars, houses, pets, children — there's a TCO associated with just about everything, and computers are no exception.

For example, when you're setting out to buy a new computer, the latest prices on the Dell or HP Web site represents at most 30 percent of the true, long-term cost of that computer. And that's the high end of the scale. Some experts estimate that the purchase price of a new technology is closer to 10 or 15 percent of the long-term cost. Installation, maintenance, training, tech support and replacement parts are a few of the hidden costs of technology.

On the other hand, some technology acquisitions and upgrades will make your staff more productive or improve the service you offer to patrons. Experts sometimes refer to this as the total cost of ownership (TVO) or return on investment (ROI), and you should consider it alongside the TCO. For some additional guidance, we recommend that you read [Some TCO/TVO Questions You Should Be Asking](#).

Why Should You Consider the Total Cost of Ownership when Buying Technology?

- **TCO helps you make decisions about technology and prioritize among competing projects and services.** For example, let's say you're looking at a new accounting software package. It's more expensive than your existing software, but it's also more user-friendly and your staff won't spend as much time completing routine tasks. How much staff time are you really saving, and how does that time translate into dollars? How much retraining does your staff need, and how much will that cost? What are the annual costs for maintenance and upgrades? By comparing the TCO for your existing software to the TCO for the new software, you have a solid framework for making decisions.
- **TCO helps you make accurate budget projections, which makes you popular with your trustees and funders.** Of course, you'll still have to make some adjustments, but the adjustments won't be as jarring as they would be without TCO.
- **Savvy funders already understand TCO or the concepts behind it.** They'll be impressed if you couch your request in these terms.
- **When you ignore TCO, the indirect costs of technology will haunt you.** For example, if you don't budget properly for staff development, productivity might plummet as librarians struggle with the new system and develop inefficient workarounds. In the worst-case scenario, staff won't adopt the new system and you'll have to write off the money you invested.



Key Actions

- **Whenever you're thinking about the purchase of a new technology, whether it's a new computer, a new piece of software, or a network upgrade, make a list of all the indirect costs and indirect benefits.** Taking TCO to the Classroom has a good [TCO checklist](#) and a [guide to IT staffing costs](#) to help you get started. Again, take a look at [our list of TCO/TVO Questions](#).
- **Also consider TCO when you're drawing up your annual budget,** your strategic plans and your technology plans.
- **Make assumptions, if necessary.** The first time you set out to measure the total cost of technology in your library, you may find that your information is incomplete. Feel free to make educated guesses until you can fill in the blanks. However, document these guesses. As you track the cost of technology over time, use the same sets of assumptions that you started with.

Stories from the Field

I am a big return-on-investment girl. For example, the best example I can give you was we have a telephone notification server and when we got that, it was expensive. It was about 20 grand by the time we bought all the hardware and the software. I kept trying to say this will save us so much money and people were saying 'We don't understand why.' Well, I calculated how many people could have their notices sent to them on a telephone because we'd been mailing them all out and we were mailing about 1400 notices a week. The notification server cut it down to 200 or so every week. We saved 1200 items, and you can do the math. It was 32 cents at the time, so we saved \$400 a week basically if we sent out the notices on the phone. And of course, I calculated staff time as well because someone had to process all the notices. So I made a little chart up and said look, 'here's the deal — in three years, this will pay for itself and the server's probably going to last five or six so you basically get two years for free of saving money.'

*Michelle Foster
Boone County Library System, KY*

And so it's like, I'm buying a \$1,500 computer; I put aside \$2,000 so that three years from now, I have enough money to buy another one. And in fact, we talked to, you know, the city manager and he suggested we only change them out every four years, it's not changing that much and it's taking too long to install. So our goal will be by four years, we'll be totally changed out. So they've got all of their computers on retirement schedules, and the funding there to help offset those costs. I mean, I thought, to me — I set that up seven, eight years ago. I still find people are stunned to find out that you would do that. It's just a good business practice, it's not anything else. It's not a fancy idea.

*KG Ouye
San Mateo Library, CA*



Well, when I consider total cost of ownership, what I'm taking into account is sustainability. We can do this great project, or install this great piece of software, or buy this piece of equipment that we'll offer to the public. But how much staff time is involved in creating that project or supporting that project, and how much staff time is involved in maintaining it? Can we maintain it really well or not? We think, 'If we just buy this new software product, it'll help us check out books ten times faster.' Okay, maybe it helps you check out books faster but maybe it's more of a burden on the IT department. Are you solving problems, or are you shifting responsibility to different departments? And we ask ourselves [IT staff] the same questions. When we do an IT project we think, 'How does that impact the staff?' If it's going to make the staff have to do ten more steps, how much staff time is that costing us? Maybe it's not really an efficiency thing. Maybe it's not really saving time. Maybe we're just moving that inefficiency around. I think a lot of times people try to use technology as the silver bullet to solve problems that aren't really technology problems. Maybe they're staffing problems, or training problems, or workflow problems.

*Jim Haprian
Medina County Library District, OH*

We don't buy a computer around here unless we have a plan for purchasing its replacement three years from now. We don't say, 'Well, I think we're gonna be able to raise more grant money.' If the grant money isn't already in the bank, then we don't buy it. We don't want to build up a level of service that then is going to get reduced.

*Paul Ericsson
Bemidji Public Library, MN*

I think in the situation with Useful, it was a tremendous total-cost-of-ownership advantage because they didn't have to hire somebody to actually physically run the network because she could depend on having the support staff. I think it does save us a lot of staff time on cleaning up the computers. We don't have to run spyware programs and we don't have to empty temporary Internet files and that sort of thing. That's all taken care of already. We don't have to worry about viruses. We don't have to worry about any of that.

*Brett Fisher
Flathead County Library, MT*

Further Resources

Whether you just need a few basic pointers about TCO methodology or you want to dig a little deeper into the subject matter, we have plenty of additional [resource recommendations](#).



Evaluations and Metrics

OK, so your library is one of the 7 Wonders of the Modern World. Now how do you prove it to your funders and your community? Evaluations and metrics! Or maybe you're a little more humble and you want a better sense of your library's strengths and weaknesses, or you want to know whether you've done what you set out to do with a particular service or project. How do you find out? Evaluations and metrics!

Why Measure the Impact of Technology in Your Library?

- **Again, it's all about the money.** You want to demonstrate that technology is expensive, but also that it's worth the expense. How is your community benefiting? How are the politicians and town council members benefiting? How are their constituents' lives improving? You can use general, abstract arguments, but numbers and stories have more of an impact.
- **If you don't measure benefits and outcomes, you're driving blind.** You and your staff may have an intuitive sense that a service is succeeding, but intuitions are sometimes wrong. And even if you're right, there's always room for improvement.

Key Actions

- **If you are interested in measuring statistics related to your online databases, electronic journals and e-books, start by taking a look at the [E-metrics site](#), especially the [tutorials](#) and the [catalog](#).** It also offers measurements related to patron training, public computer usage, and other technology services.
- **If you want to know who visits your website and how they use it** check out [this article on Web analytics from Idealware](#).
- **Plan to conduct a lot of online surveys of patrons and staff.** [There's an article from TechSoup](#) that will tell you how to choose the right tool. There are also dozens of articles, such as [this one](#), that provide advice on writing good survey questions.

Technology Metrics

- There are hundreds, if not thousands, of ways to obtain concrete and specific information about your technology services. Some common metrics include:
- Who's visiting your Web site?
- How often are they visiting?
- What do they do when they're on your site?
- How many laptop users are there in your library on an average day?
- Who's using your public computers and what are they doing with them?
- What word processing skills did your patrons have after your class that they didn't have before?



Evaluation Methods

If you're manufacturing widgets, it's fairly easy to determine the types of things you should measure. You want to know:

- The number of widgets produced per hour and per day
- The average cost of each widget and the average profit margin
- Something about the reliability, quality and safety of your widgets

Libraries, on the other hand, deal with outcomes and results that are much less tangible. We're trying to teach people and helping them to teach themselves. We're encouraging folks to adjust their behaviors and attitudes. We're helping them build new skills. But how do you bring these vague, high-flown aspirations down into more concrete, specific language that politicians and bureaucrats will understand? **Try following these two evaluation steps.**

STEP	LINK AND LEARN
1. Decide what it is you want to measure. This is sometimes known as the outcome, the result or the return on investment. Defining precisely and in detail what exactly you're trying to do is tough. The first part of evaluation is figuring out exactly what we're trying to change.	For a fuller of definition of an outcome, see this FAQ from the Institute of Museums and Libraries especially the second and third questions ("What is an 'outcome' and how do you evaluate (measure) them?" and "What is the difference between outputs and outcomes?").
2. Decide how you'll measure that outcome or result. In other words, what evidence and data will you collect? There might be a single measurement, or you might measure several things. These measurements are often referred to as success indicators. The good ones are usually concrete, observable and countable, but some projects also rely heavily on collecting stories.	For more information on success indicators, refer again to the Outcomes FAQ from IMLS , especially the section titled "What is an indicator?"

Further Resources

For additional resources on technology evaluation and measurement, check out the [Further Resources](#) section. .



Keeping Up With Technology

Finding the Web sites and technology resources that appeal to your learning style and level of understanding takes some patience and some trial and error, but the long-term payoff is huge. The wild proliferation of online educational resources will seem overwhelming at first, but its also incredibly empowering. If you're a visual learner, there are video lectures, slide shows, photos, graphs, charts and diagrams. For the auditory learner, there are millions of podcasts and streaming audio files. If you prefer hands-on experimentation, you can find countless step-by-step tutorials. Moreover, you can create a learning experience that mixes all these different styles.

Why Investigate New Technology Resources?

- **Understanding your patrons.** MARC records, article databases and other library-centric technologies take so much time and energy that it's easy to forget about the constantly changing digital culture outside our walls. However, just as library selectors read a wide variety of book review sources to correct for their own biases and preferences, library technologists need a broad, diverse array of inputs in order to understand what patrons are doing and what they expect from us. Some of the following resources are library-oriented, but most of them come from the wider technology community. These books, magazines and websites are setting trends, influencing your patrons and shaping their expectations.
- **Better patron service.** Of course, the outcome we're all aiming for is better service to patrons. The professional development resources, such as the following ones, are full of great ideas about new programs and improvements to existing programs.
- **Cost savings.** There's a low-cost or no cost alternative for almost every category of software now, and in terms of reliability and usability, the free software sometimes exceeds the proprietary options. The following resources will keep you up-to-date as technologies that used to be expensive become affordable for small and medium-sized organizations.
- **Research skills.** As librarians know better than most, research is the foundation skill. It's the skill that lets you develop other skills. There's nothing more frustrating and wasteful than trudging through Web site after Web site because you have no idea where to go for a particular information need. Spending an hour now and then to look at the following resources and will save you time later on when you need to troubleshoot a computer, look up product reviews or absorb some new ideas.
- **Communication, dialog and collaboration.** New technologies let you learn from your patrons and learn from your colleagues. This idea has been repeated ad nauseum lately, but it's true nonetheless. Moreover, the library is a place for patrons to connect with each other, both online and offline.



- **Work can be more effective and efficient.** The buzz about collaboration, dialog and “Web 2.0” obscures the fact that technology is still getting better and better at supplementing our faulty memories, organizing our messy lives and automating our boring, routine activities. Every day brings four or five new applications for managing time, recording expenses, organizing information resources, etc. The resources in [Places to Learn about Technology](#) will help you find the productivity tools that best suit your situation and your working style.
- **Outreach, advocacy and demonstrating impact.** Web-based software has democratized outreach and marketing in ways that would have sounded laughable and far-fetched 20 years ago. Online photos, blog postings, videos and podcasts let you tell stories about events and services at your library, but more importantly, these technologies let patrons demonstrate their enthusiasm and preach on your behalf. When someone creates a blog post, a comment, a Flickr photo or a YouTube video to proclaim their love for the library, it has a bigger impact than anything you or a marketing firm could ever come up with. However, you have to find these library advocates, give them access to online tools if necessary, respond to their ideas, and take your lumps from time to time. In other words, you need to be as responsive to bad feedback as you are to good feedback. To know where your patrons are and what they’re saying about you, you have to be plugged into the digital culture, and the following resources will help with that.

Key Actions

- **Understand and take advantage of the many different ways you can find out about new and emerging technology.** Be sure to review our [Places to Learn about Technology](#) tool.
- **Subscribe to five RSS feeds.** If you’re looking for library-related RSS feeds, this [list from Meredith Farkas](#) is a good place to start. If you’re looking for general technology blogs, the [Top 100 list at Technorati](#) is a good source. They’re not all about technology, but most are. If you’ve never used RSS and have no idea what it is, we recommend [RSS in Plain English](#) from the folks at Common Craft.
- **Subscribe to a tech magazine.** Make sure you’re skimming at least one tech magazine every month. To start with, grab a copy of five or six tech magazines from your own serials section and see which ones appeal to you. Then subscribe to the one or two that you like best. If you don’t have a lot of tech magazines in your library, see [Places to Learn about Technology](#) for some suggestions, or visit your nearest bookstore.
- **Designate at least one computer as your test machine.** This should be a PC that you feel comfortable messing around with, so your primary work computer is not a good choice. Nothing beats hands on, interactive learning, within reason. In other words, you shouldn’t treat your live Web site as a personal learning lab.
 - If possible, find an old computer and turn it into a sandbox that you can use to play with different types of software.
 - Another option is to look into virtualization software. Virtualization programs let you install and explore multiple operating systems on a single machine, and



they let you switch easily between the different operating systems. In other words, it turns one computer into many.

- Talk to your IT department before you start playing with virtualization, and make sure you have enough power and memory on your PC to support this software (the memory requirements are quite heavy).
- For more information, see [Virtualization 101](#) on TechSoup.

Stories from the Field

I always think it's useful to get outside. I get emails from various hardware manufacturers and they'll have Webcasts trying to sell you something, but a lot of times when they do these webcasts or Webinars, they will have a 15- or 20-minute introduction to the subject in general about a problem you're confronting, say how to do backup efficiently for low cost and with the least amount of hassle. Now, of course, again they're going to try and sell you their product because they think it's the best but what I found is that again they'll give you really a good grounding in understanding what the problem is and what some of the various solutions are. And once they start to get into their sales spiel, a lot of times I'll not pay as much attention because what I really wanted was to understand do I know all the challenges? Have I thought through the problem that we're facing and what's their opinion on some of the solutions?

I mean when you get into the larger vendors like Cisco or somebody or Microsoft they've got so much free material, archived Webcasts, white papers, all of those type of things that really provides just great background for many of the problems that libraries may be facing as far as technology infrastructure or implementing new solutions and those type of things. If you're looking to find out what other people are using, again I think almost every vendor, whether it's a hardware or software vendor, especially the larger ones will have some type of resources oriented towards small and medium businesses. Some of them also will have small office/home office markets, and I think, depending on the size of your library, those are great places, too.

*Chris Jowaisas
Texas State Library, TX*

The Southern Maine library district started a little IT group of librarians who are not just doing IT. It may be the assistant director who does IT. They're just trying to get the people that handle IT together so that they can see what problems they share and what they don't so they just get together four times a year and just talk. I actually just went to the last one in PC reservation systems. I went 'cause they were sharing information about that and then they were sharing information about open-source. And the library that was hosting it was a small library whose tech person is a volunteer high school student and he just installed OpenBiblio on a Mac to run their catalog, and so he was talking about his experience with that.

*Janet McKenney
Maine State Library, ME*



Further Resources

Quick Guides to Technology Planning

- If you don't have time to read a lot, and you want to jump right into the process, look at these four documents:
- MaintainIT's [first cookbook](#) (pages 6 through 10) has a great overview of tech planning from the viewpoint of a small library. However, these suggestions apply to mid-sized and large libraries as well.
- Some [tech planning ideas for small libraries](#).
- A short list of [tech planning suggestions from WebJunction](#).
- [Some suggestions from Bob Bocher](#), written with e-rate requirements in mind.

NEW IDEAS AND INITIATIVES FOR YOUR LIBRARY

Several state library organizations have created technology standards for libraries. In other words, what sorts of skills, tools, infrastructure and procedures will you find in an ideal library? What do the backup procedures look like? What sort of Web presence is there? What computing services are available to the public (e.g. printing, hands-on assistance from staff, etc.)? How many public computers will you see there? If your library is small, it'll be difficult to implement all of these suggestions in a single planning cycle, but this [standards document from the South Carolina State Library](#) and these [five short checklists from the Illinois State Library](#) will help you brainstorm and set goals for yourself.

IN-DEPTH INFORMATION ON TECH PLANNING

WebJunction has [lots](#) and [lots](#) and [lots](#) of information on tech planning. The most thorough roadmap to technology planning in libraries can be found in Diane Mayo's book, *Technology for Results: Developing Service-Based Plans*. An [excerpt from the book](#) can be found at WebJunction. Because it's so thorough, it's also time-consuming, and may not be appropriate for smaller libraries.

FREE TECH PLANNING SOFTWARE

[TechAtlas](#) has a series of questions and surveys to help you create a technology plan. After you've registered for an account and logged on, click on the Surveys tab. Once you've taken the assessments, TechAtlas will give you recommendations on how to improve your digital infrastructure. This guided approach is a great way to take the uncertainty and guesswork out of tech planning. The Illinois State Library has a [similar online questionnaire](#). As with TechAtlas, you have to register and log on before you can use the assessment tool.



Key Decision Makers

- Becoming a key player in terms of local technology is no different from becoming a leader in terms of education, culture or economic development, as emphasized in [a process outlined by Ellen Miller and Patricia Fisher](#) at WebJunction.
- WebJunction also has [a wonderful set of resources](#) related to [making the case for your library](#) when you're talking to key influencers. However, as you're advocating for what you believe in, be sure to listen carefully as well (preferably before you start making your case). This list of questions can help you draw information from the decision makers in your community.
- Also for tips on improving your communication skills, check out the resources listed in our section ["What Do You Need to Know About Technology Decision Makers"](#).

Strategic and Technology Plans

- If you're new to strategic planning, take a look at [this description of key concepts and terminology](#). The same site has [an overview of key success factors](#) and [a quick review of the most popular strategic planning models](#).
- If you're ready for more, check out [New Pathways to Planning](#) from the Northeast Kansas Library System. This tool emphasizes the importance of community evaluation and internal library audit.
- Also take a look at [these needs assessment resources compiled by WebJunction](#) and another [list of strategic planning resources](#) compiled by the Outagamie Waupaca Library System. Scroll to the bottom of the latter page for some real strategic plans from public libraries.

Building a Technology Team

- For an in-depth discussion of managing your tech team, check out [this workbook from NPower](#). In particular, this article talks about some of the obstacles you might encounter in building your tech team. It also discusses the value of having a technology vision statement and a "Commitment to Success" letter, two documents that can help direct the work that your team is doing.
- [This article from WebJunction](#) gives you some advice about the mix of folks you'll want for your technology team. You don't have to fill every role listed in this article, but it'll give you some ideas about the types of people you should look for.
- Finally, this [success story](#) from the Perry Carnegie Library in Perry, Oklahoma, demonstrates the value of having an engaged, active tech team.



The Costs and Benefits of Technology

The overall accounting and fiscal management process is way beyond the scope of this site, but here are a few resources related to good accounting (i.e., measuring the costs) to get you started:

- Since the money management cycle usually begins with the creation of a budget, we've pulled together some resources on budgeting in general and technology budgeting in particular in our [Writing a Technology Budget](#) tool.
- There's no getting around the fact that accounting and budgeting and financial management are painful subjects to learn about. But if you're in any sort of management position, you'll have to know at least a few concepts. The SEC has [a useful discussion of the basics](#), though this article is geared towards investors and businesspeople. [The Accounting Game](#) is a lively, book-length overview of the same subject.
- After you've mastered some of the universal principles, you might need some grounding in government accounting, which is significantly different from corporate accounting. You'll find plenty of [books](#) and Web sites devoted to this topic. The official organization for state and local government accounting standards is the [GASB](#). This [overview of accounting in schools](#) might also have some useful information. Finally, the State Library of Michigan has posted [an extensive guide to financial management in libraries](#), though due to some site design issues, a Google search is the best way to navigate the whole document.

Total Cost of Ownership (TCO)

Here are two possible learning scenarios to help you get up to speed on TCO.

SCENARIO	WHERE TO GO
<p>With everything else you have going on, you probably don't need to understand the whole TCO methodology.</p>	<ul style="list-style-type: none"> ■ There's a quick description of TCO at TechSoup, and another at LinuxPlanet, that are really enough to get you started. The TCO in the Classroom site has another great introduction, though this one is a bit longer. Our TCO/TVO questionnaire will also help you understand this concept.
<p>If you do want to understand TCO in more detail, there are a lot of great resources to explore. Start off by reading a few pages on one of the sites mentioned here. It's dry, difficult reading, so reviewing the information in small chunks is the most effective approach.</p>	<ul style="list-style-type: none"> ■ The TCO checklist was written for school administrators, but a lot of the same considerations apply to libraries. ■ This article has a formula for deciding how many IT staff an organization needs (scroll down to the second half of this page). ■ How does TCO relate to staff development? This article has some answers. ■ A real world example of TCO with relevance to libraries is the TCO spreadsheet from ALA. It is designed to help you figure out if it makes financial sense for your library to filter its computers. Even if you're not in the midst of that difficult decision, if it's a useful tool, because it translates an abstract methodology into real budget line items. ■ Finally, this look at the TCO of open-source software poses some good questions that apply to just about any technology purchase.

Good Evaluations

There are several evaluation frameworks to help you figure out which measurements best suit your situation. Outcomes-based evaluation, return on investment and cost-benefit analysis are three of the better-known methodologies. They all take some time to learn and implement, but it's worth the extra effort if you're working on a complex, expensive, high-profile project.

- This [WebJunction article](#) provides some links to help you better understand all of these different ways of measuring your effectiveness.
- The [outcomes-based evaluation \(OBE\) method](#) is especially well suited to libraries, and more information can be found on the IMLS Web site.
- The "How Libraries and Librarians Help Method (HLLH)" elaborates and expands on OBE. For an introduction to HLLH, see [this excerpt on WebJunction](#). [The full book](#) can be purchased at ALA's Web site



Tools

It doesn't hurt to have an extra set of tools around when you are creating a strategic technology plan for your library.

Technical Computer Competencies Assessment

Use the following chart as a guide to set expectations around the competencies that can help you succeed.

MAINTENANCE AREA/TOOL:	COMPETENCIES:
Disk-Protection	<ul style="list-style-type: none"> ▪ Familiarity with the software components that require regular updating so that you can configure disk-protection to keep those changes (e.g., Windows updates, anti-virus definitions, MS Office updates). ▪ An understanding that disk-protection greatly affects how the computer handles changes you make to a computer (e.g., patrons cannot save work to the protected system drive, you have to turn off disk-protection to install software). ▪ Familiarity of hard drive partitioning so that you know which sections of a hard drive are protected and understand how to create parts that are unprotected to save work, if desired. For an overview of hard drive partitioning, see http://en.wikipedia.org/wiki/Partition.
Lock-down computers	<ul style="list-style-type: none"> ▪ An understanding of computer user accounts and how they limit or grant access to various pieces of the computer's operation (e.g., an administrator should have the ability to change other users' passwords, but regular users should not be able to do this). ▪ Familiarity with Microsoft Policies (or Group Policies) to modify user permissions and access is helpful. For an overview of Microsoft Policies, take a look at http://www.infopeople.org/resources/security/workstation/policies.html
Imaging and cloning	<ul style="list-style-type: none"> ▪ The capacity and the ability to manage large files (2 GB and greater) on various media (e.g., recordable DVDs, portable hard drives, servers). Imaging copies the contents of the whole hard drive to one file. This creates "big" files (anywhere from 2 GB on up, depending on what software you have installed on your computer). ▪ Familiarity with hard drive partitioning to understand the sections of a hard drive being imaged. Some people will store a copy of an image on the hard drive of the computer, making it much easier to clone the computer if the need arises. It is important to maintain a copy of these images elsewhere as a backup. For an overview of hard drive partitioning, see http://en.wikipedia.org/wiki/Partition. ▪ An understanding of available imaging and cloning tools. Some tools, especially older versions, may require the creation of bootable CDs, floppy disks, or flash drives. Newer versions of cloning software are more flexible and offer ways of imaging/cloning that don't require boot disks. Most imaging software includes tools to create boot CDs. ▪ An understanding of third-party imaging and cloning tools. For example, BartPE http://www.nu2.nu/pebuilder/ is an outstanding and free boot CD creation tool, but requires advanced knowledge of Windows operating system and hardware device drivers. There are other options at http://bootdisk.com.



Six-Step Technology Planning Tool

KEY ACTIONS (OR DECISIONS)	RESOURCES
<p>Step 1: Find the real IT decision makers in your community and schedule meetings with them.</p>	<ul style="list-style-type: none"> ■ Read this article on dealing with key decision makers. ■ If you're not sure what questions to ask your IT decision makers, use this interview guide.
<p>Step 2: Do a technology inventory to figure out what hardware, software and networking equipment you already own.</p>	<ul style="list-style-type: none"> ■ A thorough technology inventory takes some time and planning, and it requires that you have the right tools. Our Technology Assessment page gives you some tips on doing an inventory and some links to free software to get you started.
<p>Step 3: Look at your library's strategic plan or long-range plan and think about how it will affect your technology plan.</p>	<ul style="list-style-type: none"> ■ Check our Strategic and Technology Plans.
<p>Step 4: Pull together a technology team and schedule your first meeting to discuss the information you've collected in steps 1 through 3.</p>	<ul style="list-style-type: none"> ■ This step is complicated, so be sure to review Building a Technology Team. We've included plenty of resources.
<p>Step 5: Write the technology plan.</p>	<ul style="list-style-type: none"> ■ For guidance on the actual writing and brainstorming process, see the following list of additional resources.
<p>Step 6: Revisit and evaluate your technology. Plan on a regular basis (every 6 to 12 months).</p>	<ul style="list-style-type: none"> ■ Your technology plan should be rewritten entirely at least once every three years. For more information on the evaluation process, check out this article and these resources from WebJunction.



Quick Reference: What Do You Need to Know About Technology Decision Makers?

The following are some thoughts and questions you can use to learn more about the key influencers and decision makers in your community.

Who are they?

Who makes the final decisions when it comes to IT? It could be one person, but since technology is so vast and complex, responsibility and influence are often widely distributed. More confusing for you is the fact that in some organizations no one has taken ownership of the IT turf. However, in this environment there are also opportunities.

Your bosses' boss

Your supervisor has a supervisor, who in turn has a supervisor. It's easy to forget that key influencers have reporting and accountability requirements. Do your best to find out who they report to and how their performance is judged.

Laws and regulations

Most key decision makers are circumscribed by a set of laws, regulations and policies. Some of these can be changed, others are set in stone. Get a sense of what's in these statutes and policies, and obtain copies if you can. You don't have to read them all, but you should have them on hand for reference purposes.

Criteria and concerns

What other criteria do your IT decision makers use in approving or rejecting IT projects and IT purchases? Are those criteria written down anywhere? What are their fears and concerns? Are they operating under a tight budget? Have they been burned in the past by network security problems?

Presentation and communication

Everyone has a different learning style, and everyone absorbs information differently. Therefore, one decision maker in your community will respond to charts and graphs, while another responds to stories about patrons, and another prefers statistics. What types of arguments and evidence do they respond to?

Initiatives

Are there any big technology initiatives already underway?

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Where does the money come from? Which budgets can you use to cover technology costs? There may be funds in your community that you are not currently aware of.

Technology planning

Has someone else already written a technology plan? If you like the plan, that's great, there's less for you to do. You can sign off on the existing plan or use it as a foundation for your own work. Even if you disagree with the direction of the existing plan, you have to take those decisions into account and understand why they were made.

Tech teams

Is there already a technology team in place? If there's a system-level, city-level or county-level tech committee, try to get a seat on the committee or at least sit in on the meetings. You may decide that your library needs a tech committee of its own. If this is the case, the two teams have to be aware of one another, and if your committee is the less powerful, the responsibility for contact and communication will probably fall on your shoulders.



Who Are Possible Key Decision Makers?

- City council or county council members
- Mayor or city supervisor or county supervisor
- City or county IT department
- Library's IT department
- Trustees or library boards
- A regional library co-op
- A state library – State libraries often have rules with regard to technology planning, budgeting and reporting, especially if they provide funding to your library.
- Federal grant agencies (IMLS and USAC) – If you apply for any e-rate discounts you're accountable to USAC, and if you receive any money from IMLS, you have to play by their rules as well.

Please note some possible key decision makers who can assist in your library technology planning.

NAME:	TITLE:	CONTACT INFORMATION:



Technology Assessment Checklist

When you're creating a technology assessment, this list might help you to get started. For more information on why you should perform an assessment see [Technology Assessments](#).

What's Included in a Technology Assessment:

- What technology skills does your staff possess? How much do they know about different hardware and software topics?
- Do you have any written policies relating to staff and public use of technology? Do you have any informal, unwritten policies?
- What are your procedures and policies with regard to data backup, computer security, purchasing, change requests, tech support, etc.?
- What's the current state of your ILS, your website, your local network, your Internet connection and other key technologies? Are there any weaknesses or threats that need to be addressed?
- Who do you turn to for advice about technology?
- Who are your technology vendors and sales representatives?
- Who provides your Internet connection? How fast is that connection? What sorts of networking equipment (routers, switches, firewalls) do you have?
- What are the major technology services you provide to your patrons? Do you offer one-on-one or classroom-based technology training?
- Are you currently working on any new technology projects or services?
- A technology inventory.



10 Rules for Building and Managing a Tech Team

1. Include at least one frontline staff person on your team (i.e. a circulation staff person or a reference librarian). They see a wide variety of patrons and in some respects they might understand patron needs better than the patrons themselves.
2. Include at least one non-techie on your team.
3. If possible, include a techie who doesn't work in a library. Someone with an IT management background would be ideal, but any well-informed technology professional will do.
4. Include a library techie on your team. If you don't have an IT department, just invite someone on your staff who's enthusiastic and knowledgeable about technology.
5. Prepare for each meeting. Gather relevant information and develop some questions that will generate discussion. Send these out to the team at least a week before each meeting.
6. Spend the first meeting or two educating your team about the current technology environment in your library, the library's strategic vision and budget constraints.
7. Bring in examples of successful programs and services from other libraries. Use the MaintainIT Cookbooks and other resources to help your team understand what's possible and what's worked for other libraries.
8. Teach your team about the community and about the needs of the people you serve. If you don't have community members and patrons on your team, do some demographic research, observe patrons in the library, interview community leaders and talk with the patrons themselves.
9. When you're discussing the needs of your community (#8), talk about the technology needs of people who don't visit the library on a regular basis.
10. Follow through on the team's recommendations.

Writing a Technology Budget — Ideas in Action Chart

IDEA	TAKE ACTION
If you're a fiscal novice, learn a little about budgets and decide what type of budget you'll be using.	It's hard to recommend one type of budget over another, because the decision depends largely on your situation and your audience. This article from the Infopeople Web site will introduce you to some of the main types of budgets.
Pick a software tool to help you with creating your budget.	<ul style="list-style-type: none"> ■ If you're on a shoestring budget, you can start with a Microsoft® Excel spreadsheet or the TechAtlas inventory tool. It will help primarily when you're doing your technology budget, but you can export the results from TechAtlas and roll them into your larger organizational budget. ■ TechSoup offers steep discounts to libraries on accounting software from Sage, Intuit and Microsoft ■ For more information, read A Few Good Accounting Packages on the TechSoup website.
Decide what expenses you'll include in your budget projections.	<ul style="list-style-type: none"> ■ If you have a recent technology budget, it helps to look there first, but if that's all you do, it's easy to perpetuate the oversights you made last year and the year before. If you're worried that you might be forgetting something, take a look at a few sample technology budgets from the NPower Web site. ■ Another budgeting model that might help you think specifically about your technology spending is called total cost of ownership. ■ As we mentioned earlier, ask other libraries and other city government departments if you can see their technology budget. They may have included items that you forgot.
Think about e-rate	<ul style="list-style-type: none"> ■ Always look at the suggestions of the e-rate administrators (USAC) if you plan to apply for e-rate discounts in the near future (under the section titled "Elements of a Technology Plan" look at the third element). If you don't follow their advice, you may receive an unpleasant visit from Mr. Auditor. ■ The Alaska State Library has created a worksheet to help librarians track their technology expenses in terms that the e-rate administrators will understand. ■ If you search for "erate budget requirements" on Google, you'll find similar documents from other state libraries.



TCO/TVO Questions You Should Be Asking

Total cost of ownership (TCO) refers to the hidden costs of a new technology. Total value of ownership (TVO) is the flip side of TCO and refers to the hidden benefits. Following are a few questions you can ask yourself to help uncover these hidden costs and benefits. However, this list is only partial. For more considerations, check out our additional resources:

Total Cost of Ownership Questions

- **IT staff support:** How much time will your IT staff spend supporting and maintaining the new technology?
- **Vendor fees:** Will you be paying any ongoing support or licensing fees to the vendor?
- **IT training:** For any complex technology, your IT staff will need ongoing training. They might need formal classroom training, or they might make do with books, websites and advice from colleagues. However, whatever technique they choose, they'll need paid time to absorb the new knowledge.
- **Staff training:** Any time you replace a major productivity tool such as your ILS or your Microsoft® Office productivity suite, staff will request some formal or informal training.
- **Bandwidth costs:** Will you need a faster Internet Connection to handle the new technology? For instance, if you begin a project to digitize local history resources and put them online, and you include high-quality photos and streaming audio files of interviews with residents, will your connection be able to handle the traffic? Certain applications will also increase the traffic between branches, so you might need to upgrade your wide area network connections.
- **Hardware costs:** Does the software you're considering require new hardware? For example, a lot of enterprise class technologies run best on dedicated servers or single-purpose hardware appliances. Even if you have an unused server in your library, is it compatible with the new software?
- **Infrastructure costs:** Computers need electricity, and they have needs in terms of temperature and humidity. Will a new technology initiative require that you upgrade your HVAC system? Will you need more electrical outlets? Will you need a new electrical panel? Will you need more network drops, more patch panels or more switches?
- **Electricity costs:** If you're running more desktop and laptop computers, you'll be paying more each month for electricity. Servers also use electricity, but they might have additional costs related to maintaining stable temperature and humidity.
- **Technology replacement:** How long will it be before you need to replace this technology, and how much will it cost?

Total value of ownership questions: You can turn any of the previous questions on their head and ask yourself what the benefits and savings of this new technology are.



- **Service to patrons:** It's hard to measure the impact that a new technology will have on patrons, but it's obviously a primary consideration that can easily outweigh all the other factors on this list.
- **Library visibility:** Some technologies generate excitement and publicity. For example, video game events are still controversial in some quarters, but journalists like to write about them. On the other hand, your new disk-cloning software probably won't get a write-up in the local paper.
- **Staff productivity:** Will library staff be able to do their jobs faster with the new system you're considering? If you're tracking your income and expenses using a clunky, ten-year-old piece of software, could you save time in the long run by upgrading? How many extra steps and unnecessary workarounds does your staff use to deal with the quirks and limitations of your ILS software?
- **IT staff support:** If a new technology is more reliable and user-friendly than the solution you have in place, your staff will spend less time fixing problems and answering support calls.
- **IT training:** Again, more reliable, user-friendly software may reduce the amount of time your IT staff spends trying to learn the intricacies of the technology.
- **Staff training:** Ditto. User-friendly technology means less staff training.
- **Hardware costs:** It may sound counterintuitive, but some technologies can reduce your long-term hardware costs. For example, you may be running a technology in your library that requires its own piece of hardware, while the replacement option you're considering is happy to run alongside other programs on a shared device. If you run a lot of server-based programs that all require their own dedicated hardware, [virtualization software](#) might let you consolidate those applications and run them all on the same server without any conflicts. Thin client solutions such as [Useful Desktop](#) can also reduce the amount of hardware in your library.
- **Infrastructure costs:** Again, any technology that reduces the amount of hardware in your library (see the previous item) might lower your long-term infrastructure costs by reducing the number of electrical outlets and network drops that you need.
- **Electricity costs:** Is the new technology you're looking at more energy efficient? For example, LCD monitors use much less electricity than older CRT monitors, and computer manufacturers are making strides in terms of reducing the energy consumption of their products. Also, anything that reduces the total number of PCs and servers in your library will probably reduce electrical costs as well.
- **Bandwidth costs:** Some vendors are more conscientious than others when it comes to conserving precious bandwidth. In other words, the software you're looking at may use less bandwidth than your existing solution and could, therefore, save you money. Bandwidth management tools are specifically designed to reduce your bandwidth usage.

What additional TCO questions should you be asking about your specific technology purchases?

- _____
- _____



Places to Learn About Technology

- **Magazines** – Most technology magazines are available online in one form or another, but since a lot of these Web sites are often difficult to navigate, many folks still buy or subscribe to print magazines.
 - For a general overview of technology, check out [Wired](#) and [PC World](#) ([MacWorld](#) or [Linux Magazine](#) are the Mac/Linux equivalents), but there a lot of magazines that cover the same ground.
 - [Fast Company](#) and [Business 2.0](#) also do a good job of writing about technology for a general audience. They're usually interested in entrepreneurial applications of technology, but some of those ideas apply to libraries as well.
- **Enterprise-level magazines** -- If you're managing technology for a large library system, [InformationWeek](#), [eWeek](#) and [CIO](#) can keep you apprised of developments in the enterprise IT realm.
- **Blogs** – As mentioned previously, Meredith Farkas' post on [library blogs](#) will introduce you to the library technology blogosphere, and the [Technorati top 100](#) will introduce you to the wider blogosphere.
- **Web sites** – If you're looking for product reviews or in-depth, detailed news about specific technologies, some of the enterprise magazine sites mentioned previously (eWeek, CIO) can help. Also check out [CNet](#), [Slashdot](#) and [Ars technica](#).
- **Conferences** – State, regional and national conferences are great places to learn and get inspired.
 - [Computers in Libraries](#) and [Internet Librarian](#) are entirely technology-focused.
 - The Public Library Association (PLA) and the American Library Association (ALA) vary in their coverage of technology from year to year, but they usually feature a good selection of tech programs.
 - The Library of Information Technology Association (LITA) tends to be more focused on academic libraries, but it has some sessions that might be useful to public librarians.
- **Classroom training** – Classroom-based technology trainings often cost several thousand dollars for a week-long course, but for those who learn best in this environment, it's a worthwhile investment.
 - State libraries and state library associations occasionally sponsor free or low-cost technology trainings, so keep an eye out for those.
 - Also, the OCLC regional cooperatives frequently offer online and face-to-face training on technology topics.
 - New Horizons is probably the best-known national provider of technology training, but there are thousands of local businesses that offer the same services.
 - Some prefer community college technology courses because they're often cheaper and less exhausting than the intensive New Horizons type class. Instead of learning eight hours a day for five days straight, college adult education courses let you attend class one or two evenings a week.



- **Webinars and e-learning** – Free technology Webinars (aka webcasts) are easy to find these days. Webinars are real-time, interactive Web presentations with some mix of lecture, demonstration, Q&A, and student participation. Of course, as often as not, you'll learn about a Webinar after it takes place, in which case you can usually access an archived version with all of the original content but none of the interaction. Chris Jowaisas from the Texas State Library attends Webinars put on by tech vendors. Microsoft, Symantec, Cisco and others put on thousands each year. These Webinars usually begin with a broad discussion of a particular type of technology or a particular problem that IT folks frequently face. According to Chris, this is the informative piece. Once the presenters begin selling their own solution, he often drops off the Webinar.
 - If you're looking for free Webinars that address library technology issues without the vendor pitch, keep an eye on the [WebJunction](#), [MaintainIT](#) and [OPAL](#) Web sites.
 - WebJunction offers [dozens of free and low-cost technology courses](#). Most of these are self-paced tutorials, so you don't have an instructor/presenter.
 - WebJunction also maintains the [E-learning Clearinghouse](#), a large collection of self-paced and instructor-led online courses, all geared towards librarians.
- **23 Things** – About a year and a half ago, Helene Blowers (working then at the Public Libraries for Charlotte and Mecklenburg County) developed a hands-on collaborative curriculum for learning new technology, especially Web 2.0 software. It's been wildly successful, and dozens of libraries have used this model. However, you don't have to be part of a group. Almost all the tools that Helene highlights are free, and her exercises are easy to follow. The original [23 Things](#) site has everything you need to get started, and a search for "[23 Things](#)" on del.icio.us will pull up related sites from other libraries.
- **Vodcasts and podcasts** -- If you're more of a visual or audio-based learner, there are thousands of technology-related video and audio presentations available for free on the web. These presentations go by various names depending on the technology being used (e.g. vodcast, podcast, video-on-demand, streaming audio, etc.), but you can view most of them in your Web browser.
 - If you want software designed specifically for viewing audio and video, check out [iTunes](#), [Joost](#), or [Miro](#).
 - If you want to search for a video on a particular topic, try [Blinkx](#) or [Google Video](#).
 - If you want library-specific vodcasts, check out [SirsiDynix Institute](#) or the [Library Gang](#).
- **Mailing lists and discussion boards** – Neither is a cutting edge technology anymore, but they're consistently popular.
 - [Web4Lib](#), [LibNT-L](#), [SysLib](#), [PubLib](#) and other lists all feature excellent discussions, and most are archived.
 - The [discussion boards](#) at WebJunction also receive heavy use.



- **RSS feeds** – This is mainly a tool that facilitates information skimming. You can scan the titles of a hundred blog posts in five minutes or so and get a good sense of what’s going on in the tech world and the library world. Feed readers are also great for targeted searching. Most of them let you search for a keyword across all of your feeds or within a particular subset of your feeds (e.g. all your feeds about Web 2.0 category or all your feeds about management). In effect you’re searching 20 or 50 or 100 of your favorite sites and filtering out the billions of sites that you haven’t vetted.
 - [Google Reader](#) and [Bloglines](#) are popular, and if those two don’t appeal to you, there are lots of alternatives to choose from.
 - If you’ve never used RSS and have no idea what it is, we recommend [RSS in Plain English](#) from the folks at Common Craft.
- **Social search and social news** – In a sense, all search engines rely on social search features. For example, Google’s PageRank search algorithm returns results based on how many other pages link to a particular site. However, other Web 2.0 companies are harnessing collective intelligence more directly to create information retrieval services that filter out irrelevant, poor-quality content.
 - For instance, [del.icio.us](#) is a social bookmarking site that lets you collect and organize your own information, but it also lets you search across everyone else’s bookmarks, seeing which sites on “[RAID](#)” or “[Ubuntu basics](#)” have been bookmarked most often.
 - [Digg](#) and [reddit](#) are social news sites that let users determine the most important tech stories in the world on any given day.
- **Wikis** – Many people frequently start out at [Wikipedia](#) when researching a topic that they know little or nothing about. It’s especially good at showing how a particular technical topic relates to other subjects, and you can usually find one or two useful links at the bottom of each article. For library-related technology, try the [Library Success Wiki](#).
- **Books** – A lot of folks can’t stand technology manuals, but they’ve improved a lot in terms of design and readability.
 - For tech beginners, we’ve heard a lot of good things about [Bit Literacy](#). Another good book is [Rule the Web](#) by Mark Freudenfelder.
 - For intermediate and advanced topics, pay close attention to Amazon reviews, and spend some time in the computer section of your local bookstore.
 - You might save some money in the long run by paying for a subscription to [Safari](#) or [Books 24x7](#). Both are online, searchable collections of IT manuals. Your library or another one in the area may already have a subscription.
- **Geektastic** – If you’re looking for inspiration, and technology is a passion of yours and not just a job requirement, there are several great online resources that provide a deeper, broader perspective.
 - The annual [TED](#) (Technology, Education, Design) Conference gives scientists, entrepreneurs and big thinkers the chance to imagine the future of science and technology, and discuss long-term trends in culture, business and the environment. The presentations are available online, and they’re consistently fascinating.



- [Fora.tv](#) and [BigThink](#) also have lots of high-quality science and technology videos.
- [Technology Review](#) is a magazine put out by MIT, and it provides high-level insight into emerging technologies, along with a description of the science that underpins these developments. *Wired* and *Fast Company* also includes regular articles about big-picture trends in the tech world. All of these sites will challenge you and they might get you revved up and enthused about IT, but they won't have much impact on your day-to-day management of technology.
- **Co-workers** – If you're lucky enough to have some engaged, informed techies on your own staff, you probably already rely heavily on them for advice.
- **Other library techies** – If you have the opportunity, talk to the other accidental library techies in your area and set up a technology interest group or library technology meetup. In *Stories from the Field* at the bottom of our article on [Keeping Up with Technology](#), Janet McKenney describes a small group in southern Maine that meets four times a year to discuss library technology issues. They have five or six core members and other librarians and techies drift in and out, attending some but not all of the meetings. In other words, you don't need a huge group in order to start your own regional library technology association. You can have formal presentations, facilitated discussions, informal conversations or a mix of all three.
- **Computer user groups and technology clubs** – Get in touch with local techies outside the library field. Not every town has a computer user group, but a surprising number do. Some of these clubs have a general focus, while others concentrate on a specific platform or technology. The groups listed at the [Association of Personal Computer User Groups](#) include more hobbyists and enthusiasts, while the groups at [Culminis](#) seem to focus more on enterprise IT. Both sites include Windows-centric associations, but if you're looking for more leads in that direction, check out [User Groups: Meet and Learn with Your Peers](#) on the Microsoft site. [Linux.org](#) and [LinuxLinks](#) both host a directory of Linux User Groups (LUGS), while the Apple site has a [Macintosh User Group \(MUG\) database](#).



Communication and Partnerships

Communicating is often a mysterious process, even when it goes smoothly and all sides understand one another. But when the topic under discussion is technology, the participants rarely share the same ideas, experiences, and terminology. Also, the technology lexicon is notoriously vague. One word often refers to multiple concepts, and multiple words often refer to a single concept. To help you avoid misunderstanding, we've included some helpful communication advice, as well as lots of stories and suggestions from your fellow librarians. The topic is approached from both the viewpoint of the techie and the viewpoint of the non-techie. Also included are some key resources about the various stakeholder groups you might find yourself talking to about technology.

IN THIS SECTION

[Technical Communication Basics](#)

[Talking with Techies](#)

[Talking with Non-Techies](#)

[Discussing Technology with Library Stakeholders](#)

[Effectively Collaborating with Other Libraries and Partners](#)

[How Libraries Can Develop Collaborative Partnerships](#)

[So...What Valuable Assets, Resources, and Attributes Does the Library Bring to Collaboration?](#)



Technical Communication Basics

It's often impossible to fix a misunderstanding where technology is concerned. If you haven't identified and communicated your needs clearly at the beginning of a technology project, there may be little or no room for changes later on. Software systems have so many dependencies that a seemingly minor change can ripple outward and cause dozens of unforeseen, undesired consequences. Therefore, a change that might have been easy to implement early on is virtually impossible during the later stages.

Why Does Communication Matter Where Technology Is Concerned?

- **As with anything, misunderstandings in the technical realm lead to wasted time and effort.** Anyone who's worked on a help desk can tell you about a time when he or she spent hours researching and troubleshooting something for a client, only to realize later that they were solving the wrong problem. Of course, this is a loss for the end user as well, who has to wait that much longer for an answer.
- **Of course, poor communication often erodes good will and poisons office relationships.**

Key Actions

You should ask yourself several questions whenever you have a major conversation about technology, whether you're talking to an individual or a group:

- **Who is my audience?** Are you talking to a techie or a non-techie? How should you alter your language and mindset when you're dealing with these two different audiences? We cover this topic in [Talking with Techies](#) and [Talking with Non-Techies](#).
- **Where do they stand?** How does the person you're talking to fit into the library universe? What attitude adjustments should you make based on your audience's relationship to the library? This topic is covered in [Discussing Technology with Library Stakeholders](#).
- **How are your basic communication skills holding up?** If you feel like you need a refresher on some of the basics of interacting with your fellow humans, there are hundreds of short, common-sense articles, such as [Do You Make These 10 Mistakes in a Conversation](#) and [How to Have a Great Conversation](#).



Talking with Techies

There are really only two types of technology conversations: the ones you have with techies and the ones you have with non-techies. For the purposes of this discussion, a techie is really just anyone who knows more than you do about technology, and a non-techie is someone who knows less.

It never pays to over-generalize about a group of people, so take the following advice with a giant grain of salt. However, a few themes come up over and over when folks discuss their successful, and their not-so-successful, interactions with tech wizards and IT folks.

If you are a non-techie looking for some tips on how to bridge the communication gap between you and your IT staff, we suggest you check out our [“Building a Better Relationship with Your Techies”](#) tool.

Key Actions

- **Use consistent and precise terminology** when you describe a problem.
- **Describe the symptoms carefully** and don't jump to conclusions.
- **Don't be shy** about telling your techies when you're having a computer problem.

For elaboration on each of these points, see the following “Stories from the Field.”

Stories from the Field

Challenge your techies

Well, when we told the guy who's devising this new profile the types of things we wanted and what we wanted to use it for, he introduced some ideas to the staff, some of it being the Linux stuff: Edubuntu and stuff like that. And that gave him motivation and interest, because we were asking him to provide his expertise in what he knew about. So I feel like if you show them what you want and you give them a challenge, they will rise to that type of level if they're really good. We've got some really excellent guys that are working there, and they do rise to the challenge.

*Claire Stafford
Madelyn Helling Public Library, CA*

Use consistent and precise terminology

Try to learn the proper terminology, and try to use it consistently. I don't know how many times I've heard 'the system is down' when what happened was the on/off switch on the monitor got pressed. The person starts using terminology like 'system' without actually evaluating the system. They didn't turn the mouse upside down to see if the light is still on or is the green light on the CPU on unit, things like that.

*Paul Ericsson
Bemidji Public Library, MN*



Describe the symptoms carefully and don't jump to conclusions

Be observant and don't jump to conclusions. The story that I tell on this one is that when I was in college, I took an experimental psych class where we ran rats through mazes, and the professor would pound into us that we couldn't always draw conclusions on cause and effect. And so what I find people frequently making mistakes on is they'll describe to me a conclusion rather than focusing on what the symptom is that they're really seeing.

*Paul Ericsson
Bemidji Public Library, MN*

Instead of getting an email saying, 'Well, this computer went down and here's what happened. The patron was doing this and got this error message.' That's what I need to help to fix the problem. Instead, I get an email saying, 'It's broken.' And it's like, well, then I've got to spend twice as long going down there and actually doing the research and investigation to figure out what happened, what was going on, whereas if they'd spend just a couple minutes longer to help me I can help them faster. That's always a problem.

*Matt Beckstrom
Lewis & Clark Public Library, MT*

Read about the latest technology trends, and play with gadgets

Well, I would recommend looking at things like *Wired* magazine and some of the other introductory PC magazines just to get used to the language. Scan the environment; know what's going on out there so you can talk to them intelligently about trends. Get a gadget. Have an iPod. Try and make iTunes work on your home computer. Just experiment with it and realize that it can be fun. And you're learning new things while you're doing it that can help you in your job. I think that's really [the] key. And ask your IT guys for help if you're confused or if you have a problem at home or if you have difficulty with a gadget. It opens the conversation and the lines of communication.

*Stephanie Beverage
Orange County Public Library, CA*

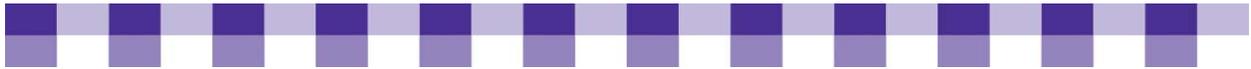
Your techies aren't miracle workers...

When you have non-technical staff, they don't always understand why things don't work and why you can't just push a button and have it fixed tomorrow. I frequently get complaints such as, 'Well, this worked yesterday and it doesn't work today.' Well, it's a webpage that went down. There's nothing that I can do to fix that. You can't control when the Internet goes down from the ISP. There's nothing I can do about that except call them and hope they get it back up right away.

Anonymous

I think a lot of IT people who are interested in trying to meet the needs of the user are also worried that they're the ones who are going to end up taking the blame if something blows up because they left a system more open than they would have preferred in the beginning.

*Chris Jowaisas
Texas State Library*



...But don't be shy about telling them what's going on in your library

And we're in Minnesota, and we've got this fabled 'Minnesota nice.' And it's true: People will not do something that they think will put somebody out in a lot of cases. And if our staff thinks that we're too busy, sometimes they don't even call. And sometimes they'll call and say, 'Are you busy?' And you have to say, 'Well, yeah, we're always busy, but we need to help you if you need something.'

*Jay Roos
Great River Regional Library,
St. Cloud, MN*

Because people are aware that I'm a department of one, sometimes they don't want to bother me because I'm too busy to hear about their little problem — for example, maybe the keyboard doesn't work sometimes. Well, I wish they'd tell me, but they don't. So, a lot of times, I hear about things if I visit a branch where problems have been ongoing, and no one's told me.

*Eric Brooks
Placer County Library, Auburn, CA*

Further Resources

We've included a few [resources](#) that cover the fine art of managing communication with techies. Most have been written from a corporate perspective, but the underlying advice is universal.



Talking with Non-Techies

It may sound odd to you if you're the "accidental techie" in your library or if you're a newly employed librarian, but sometimes, you actually know a lot more than your colleagues do. When you're pushing technical innovation in your library, how do you avoid the temptation to speak over everyone's head? How do you put your colleagues at ease when they're feeling overwhelmed by all this new hardware and software?

Key Actions

Be patient.

Teach your colleagues so they can help themselves.

Remember...your less tech-savvy colleagues often know more than you think.

For elaboration on each of these points, see the following "Stories from the Field" section.

Stories from the Field

Good tech support involves lots of training

In the long run, I try to be more of a teacher than a doer. If somebody has a problem doing something, I'll go downstairs, even if they call me on the phone, to show them how to fix it or show them what happened or why it happened. That way, it won't happen again. That prevents a lot of repeated issues. I have one branch that has connectivity problems periodically, and they're a pretty busy branch, and now they know how to reset their network equipment, and they just do it every morning to deal with the fact that their lines go down all the time. So you go show them and you give them written instructions, and now they just do it.

*Eric Brooks
Placer County Library, Auburn, CA*

Develop tools that facilitate communication

A problem I have here is constant, absolutely constant, interruptions with minor computer questions that they won't put in writing. They just walk into my office and want to take up half an hour of my time. And I don't have the time. So I developed a form, a very simple form. Make it easy for people, make it simple to click, make it as automated as you can, and put it on their desktop. They just have to fill it in and click "email" and it's sent to me by email.

*Alice Weiss
St. John the Baptist Parish Library, LaPlace, LA*



Listen to non-techie librarians and frontline staff; they know the public better than you do

Our non-tech staff, especially the front desk staff that are working with the patrons, they're the ones that the patrons come up to tell if a computer's not working. Because they see the public so often, through process of elimination, they sometimes end up with a really good idea of what a problem might be, but they don't necessarily know how to explain it in tech terms. [However,] their input can solve the problem for the tech if they just have good lines of communication.

*Loren McCrory
Yuba County Library, CA*

A lot of librarians are amateur technies, and they know as much as you do about the latest technology trends

It's something I found online that was cheap, and it was so funny because they finally came back to me, well, maybe six months to a year later saying, 'Well, I guess we'll go with this one that you showed us initially. I guess it'll work.' And that was back when I used to get frustrated by those things. I'm now used to that kind of process. It takes a little getting used to 'cause they don't expect librarians to know. That's part of the problem and why I was saying that you really do have to keep up with stuff in order to talk with the IT staff, because if you've got ideas about things, they're not going to believe you the first time you tell them anyway.

*Loren McCrory
Yuba County Library, CA*

Have a sense of humor and avoid the blame game

Yeah, and then I think from the geek end, from the technology side of this whole communication process, try to use consistent language and have a sense of humor. And don't get into the blame game. I think there's nothing that will more quickly shut down an end user than if they start feeling that they're being held accountable for something. For the technology person to start saying, you know, 'This was done wrong and that was done wrong,' well, boy, forget it, all communication is gone at that point. So everybody needs to stay away from the blame game.

*Paul Ericsson
Bemidji Public Library, MN*

Remember how complex and confusing technology can be

The communication issue is always going to be something that's challenging just because a lot of times you forget, especially after you've been doing this for many, many years, how confusing this can be. So that naturally has to be kept in mind when talking to people who don't use technology on a regular basis.

*Robin Hastings
Missouri River Regional Library, MO*



IT staff should cultivate a customer service mentality

Do your best to keep open relations with the frontline staff. Let them know that you and systems people are there to serve them. We talk about having internal and external customers. So we serve both the staff and the patrons. When it comes to things like what you need for new computers, where you need them, what your plans are going to be, it's really the frontline staff who are going to be driving that. I never want to start with technology and then find a use for it afterwards. Because it's not about the technology; it's about the people and it's about the public.

*Aimee Ffarek
Scottsdale Public Library, AZ*

Keep the Library Context in Mind When Deploying and Maintaining Technology

I think the IT guys have a different attitude toward the computer than we do. We supply the computers for the public, and within reason, we want them to be able to do what they want, including playing games on the computers. Sometimes, what I hear is the IT guys don't want the games on the computers, and they think that the computers should only be used for research, which is silly. And when they give us a newly reimaged computer, it won't allow anyone to play bridge or anything like that. I do know how to get in so that it will allow games, but every time they reimage a computer, I have to remember to go back in and do it all.

*Robyn Holden
Mendocino County Library, CA*

Get Constant Feedback about Major Projects

I learned at my last library job how to ask for feedback on projects as I worked, to try to get people to feel like they were part of the process while at the same time not just saying 'So, what do you guys think of the new website?' Getting responses on the new website design that indicated I should change the colors, add more photographs, or rework the layout when we were a few days away from launching made me gnash my teeth, thinking, 'But I've been working with you on this all along, for months...!' and yet their responses indicated that clearly I hadn't been, not in a way that was genuine to them.

*Jessamyn West
librarian.net*

Further Resources

To find out more about communicating with non-techies, check out our [Further Resources](#) section.



Discussing Technology with Library Shareholders

Imagine a library where the director makes *all* the decisions and controls every last detail of the organization. The director is, of course, benevolent, well informed, and creative, with unimpeachable judgment. Have you ever encountered this library in real life? Probably not because, in reality, we only have full control of very small projects. With anything else, we have to turn to stakeholders, both inside and outside the library. We need *their* support, funding, advice and approval. The following resources can help you talk about technology with some of the biggest “library stakeholders.”

Funders, Politicians and Other Key Decision Makers

The governor has just walked through the door, along with Bill Gates and the Pope. Quick, say something! This is your chance to get some money for your new building! In management jargon, you’re face to face with some “key decision makers.” Of course, every decision maker has different values and interests, so there’s no script that works in every situation. But a few pieces of advice will serve you well:

- For a good introduction to this delicate topic, see this article on [Talking to Power](#) at the WebJunction site.
- Also, take a look at [Key Decision Makers](#), which tells you how to locate major players and uncover their interests.
- Keep in mind that talking to key decision makers is just one part of the larger process of advocating for your library, demonstrating your library’s value and building partnerships. There are a slew of great articles on this topic in WebJunction’s [Funding Strategies](#) section.

IT Department and Other Technology Employees

See [Talking with Techies](#) for details.

Colleagues and Supervisors

Mary Niederlander at [librarysupportstaff.com](#) has compiled an excellent collection of quotes and links about [Co-worker Relationships and Communication](#). Also, check out Michael Stephens’ [Ten Steps to Ensure Staff Buy-in for Technology Projects](#).

Vendors

The subject of communicating with vendors is covered in Vendor Selection and Management, which discusses the purchasing equation.



Consultants

The right technology consultant can make or break a new initiative. Sometimes, you can “fake it until you make it.” In other words, you can struggle with a new technology project or a new subject and figure it out as you go along. But sometimes, you just don’t have the time, and even if you feel equal to the task, it’s sometimes useful to get an outsider’s perspective. However, if you hire the wrong consultant and give him or her too much control, you’ve just thrown away a lot of time and money.

TechSoup has several excellent articles to help you get started. Read the following articles, roughly in the order listed:

1. [Do You Really Need a Consultant?](#)
2. [Defining the Consultant Project](#)
3. [Choosing the Right Consultant](#)
4. [Writing a Contract](#)
5. [Managing a Consultant](#)

Patrons

A lot of the conversations we have with patrons happen informally and spontaneously while answering reference questions. The same rules apply to these situations as during any reference interview. However, if you run into tricky situations, you can also look at our advice on [Talking to Non-Techies](#) or you can look at WebJunction’s resources on [Patron Technology Training](#).

One specific situation...and challenging conversation...that often arises in libraries is the unsolicited computer donation. Accepting an outdated PC can actually end up costing you money as you struggle to upgrade it and replace parts. Also, a library full of mismatched, nonstandardized computers can be frustrating and time-consuming to support and maintain. Consider creating a written donation policy that outlines what you’ll accept and what you won’t accept. For more advice, see TechSoup’s [Donated Computers for NonProfits](#) and [Six Tips for Accepting and Rejecting Donated Equipment](#).

Stories from the Field

Communicating with Library Boards

So I usually go to the board meetings, and a lot of them are not really technically minded and they kind of trust me; it’s like, well, we know that Matt knows what’s good for the library. And so I don’t make outrageous requests, and they’re pretty good about it. But just have an open dialogue so that everyone along the way knows what it is you’re doing. Last year, I was asking for a lot of money for a program called VSpaces, which was a federated search portal application. And it’s like, if you went to a board and said, ‘I want this amount of money for a VSpace; it’s a federated search platform.’ They’re going to say, ‘I don’t know what that is.’ So as long as my accounting department knows what it is, the director knows what it is, and the board knows what it is, those communications are there. I think that makes a big difference. And sometimes, you have board members who are resistant to things, and we’ve had board members in the past who questioned everything and wanted details about why



did you buy this many computers and why was it over this amount? And it's just a matter of working with them on communication.

Matt Beckstrom
Lewis & Clark Public Library, MT

Communicating With Consultants

I sort of played dumb when I called the companies and asked what they would charge per hour and how they would support us. I had one man, I can't remember, it was a couple of years ago. And I told him what we were running on our servers and how many servers we had. He kept saying, 'Well, you have to upgrade to Server 2003', and he said, 'I can do that for you.' So I said, 'Well, we can't upgrade to Server 2003 because our library automation system has said they're not supporting that yet. They will eventually, but at the moment, they can't.' But it was like he didn't listen. He just kept saying, 'But you need to upgrade to that.' So I wrote him off right off the bat. I just said flat out, 'We're not interested in using you as a company because you're not listening to me. And you're trying to sell me things that I can't use right now.' So I think that was sort of a combination of not listening and not really understanding the library part of it.

Becky Heils
Dubuque County Library, IA



Effectively Collaborating with Other Libraries and Partners

Why is It Important to Collaborate?

Many libraries encourage staff to participate in opportunities for the library to actively engage in the community outside library walls...with good reason:

- **Collaborations can enhance the library's ability to serve your community and make library services more visible and valued.** The purpose for collaboration should be at the heart of your library's mission. By working across traditional boundaries, the library can deliver better service, value, and outcomes for your library's customers, stakeholders, and communities.
- **Working collaboratively opens up possibilities and enables libraries to share and conserve resources, reach new audiences, and expand services and programs.** Collaboration allows libraries to provide more than they could alone.
- **Collaborative behavior is the only way to connect to the many library customers using new social technologies.** By establishing relationships with varied people from different community groups whose purposes align with the library, including local agencies, religious organizations, local schools, and parents groups that share the library's goals and philosophy, the library can increase its knowledge of the community and its needs while expanding the library's sphere of influence.

What are the Benefits of Collaboration?

- Successful collaboration can have many benefits including:
- Maximizing the power of participating groups through joint action and building human capital and community support
- Avoiding unnecessary duplication of effort or activity
- Sharing talents and resources
- Providing superior quality services
- Developing and demonstrating public support for an issue, action, or unmet need
- Increasing funding and grant opportunities
- Expanding programming and outreach by reaching new audiences, creating and enhancing programs and services
- Assisting with marketing library programs and services or heightening awareness of the library
- Increasing staff job satisfaction and a better understanding of their roles in a broader perspective
- Fostering cooperation among grassroots organizations and community members



- Being visible not to just those who are library patrons but also to those who can provide funding
- Taking part in community meetings, city council meetings, etc allows the opportunity to voice the importance of libraries and form partnerships that might not have been formed otherwise.
- Creating community connections
- Accomplishing more than any single organization could



How Libraries Can Develop Collaborative Partnerships

Some Good Examples of Partnerships

Partnerships can range from short-term agreements to share a venue and the associated costs of a single program, to long-range arrangements between government agencies or businesses to provide ongoing services.

Examples include:

- Sharing technology skills and technology costs with neighboring libraries or community groups through consortiums or committees
- Collaborating on shared program development and promotion such as computer training classes, consumer health information or resources for new immigrants
- Sharing the expense of employing a computer trainer, Web designer or tech support person
- Online sharing through blogs or discussion groups that disseminate local expertise and information
- Sharing the expense of purchasing and maintaining one web server among several small libraries
- Training and funding partnerships
- Partnering to build and share audiences
- Fostering political alliances
- Working with local and state agencies to provide business development workshops and research
- Providing career centers for locating and applying for employment opportunities online.
- Cross-promoting of events though flyers or online means

Who Are Compatible Library Partners?

Collaborations start with relationships; it is all about interactions between people. Common interests can be a great starting point as well as personal connections that already exist through the library board, trustees, staff and volunteers. Each community is different, and every library serves different constituents. Look locally to find complementary organizations. Many libraries find collaborations successful with national organizations that have local affiliates. Other partnerships include those with libraries of same type and other types, museums, schools, healthcare organizations, community groups, literacy councils, businesses/chambers of commerce and economic development organizations.

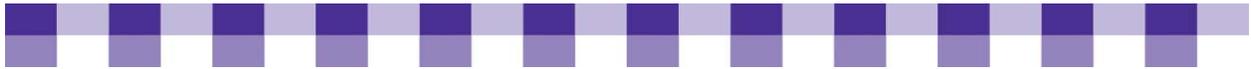
For a helpful list of possible partners, read our [Compatible Library Partners Chart](#) tool.



So...What Valuable Assets, Resources and Attributes Does the Library Bring to Collaboration?

Resources can be either tangible (funds, facilities, staff or customers) or intangible (reputation, goodwill, connections or useful information). Libraries are often valuable community collaborators; however, many organizations don't always immediately think to include them at the table. Libraries shouldn't just be *at* the table. They should own the table. Invite the community to your library and share with them the some of the key benefits of collaboration, as outlined here.

- **Brand and reputation:** The library's enduring standards of inclusiveness and accessibility are valued by other partners. Public libraries represent the common good as trusted and credible institutions. Libraries often have a proven track record of delivering what we promise, and partners will value our participation. Businesses want to support specific causes and be public with their support to give their companies identifiable personalities, showing that they support the community and the people in it. Libraries can help them connect to customers, investors, employees and the community.
- **Neutral institution:** Libraries are perceived as fair and ethical with no political agendas and with support of democratic ideals.
- **Information clearinghouse:** Libraries provide help with research and data collection.
- **Community center and meeting place:** Libraries offer programming and community linkages.
- **Service orientation:** Libraries provide good customer service.
- **Promotion of lifelong learning:** Libraries provide many learning opportunities and tools.
- **Economic development:** Libraries provide career assistance, business resources and support community and neighborhood development.
- **Infrastructure:** Libraries can provide publicity, space, project supervision and research expertise.
- **Staff involvement:** Library staff are committed to serving and supporting their community.
- **Strong skill base:** Libraries are often leaders in the area of information technology, particularly in the area of content development and management. The information skills of staff are relevant in a variety of environments.



Tools

The essence of collaboration is suggested by the word itself. Collaboration is about co-labor; it occurs when people from different organizations work together through shared efforts, resources and ownership of a common goal. Strong partnerships occur between organizations with similar backgrounds; clear loyalties and interests; clear communication channels; responsibility and accountability for success and sharing of resources, risks, and rewards.

The following tools are designed to help you form strong, collaborative partnerships inside and outside of your organization. Each of these tools can be accessed and viewed online and printed individually.



Building a Better Relationship with Your Techies

Be as specific as possible. Have you ever called tech support and started a conversation with “My computer won’t turn on,” or “The Internet’s broken”? These sorts of calls will make your IT department prematurely grey. Help-desk technicians prefer to spend time diagnosing and solving problems as opposed to figuring out exactly what you were doing when the problem occurred. For example, instead of saying that the Internet’s broken, tell them exactly what program you were in, what Web page you were trying to visit and what type of error message you received. Also, if you know something about network troubleshooting and you’ve done some work to narrow down the problem, let your IT folks know what steps you’ve already taken.

Be empathetic. We ask our IT departments to implement technology that’s reliable, secure, user-friendly and cheap. That’s a lot to ask of anyone, so keep in mind the pressure your techies are under and the competing interests they have to balance.

Don’t pretend to know more than you really do. If you fake it by smiling and nodding your head, they’ll bury you in jargon and you’ll walk away with a headache. Don’t be afraid to stop and ask for an explanation of some basic terms and concepts. You’ll learn more that way, and they’ll respect you for your honesty and willingness to learn.

Challenge your techies. A lot of tech folks love to solve thorny problems and grapple with new ideas. Take advantage of their curiosity and their thirst for knowledge (they want you to). If you don’t have any big projects for them to research or difficult problems for them to solve, make sure they have some time each week to pursue their own interests.

Talk to the techies in your organization in a relaxed, informal setting. Ask them about their workflow, their projects, the things that motivate them and the technologies they’re excited about. Like anyone else, techies want to be heard. If you listen carefully to their enthusiasms and their concerns, they’ll be more likely to do the same for you. Moreover, as you listen to IT staff talk about their projects, you’ll start to absorb a lot of IT lingo and knowledge.

Become an amateur techie. The more you learn about technology, the more likely it is that your techies will see you as a peer and the more willing they’ll be to trust your instincts when it’s time to make a decision. Some good ways to become an unofficial member of the “tech collective” are as follows:

- **Talk to techies and ask them questions.**
- **Do a little research on your own.** Subscribe to [PC Magazine](#), [PC World](#), or [Wired](#) (these magazines cost between \$10 and \$30 a year), and skim each issue when it arrives. Then read the three or four articles that look most interesting. When you encounter terms you’re not familiar with, look up the definitions on [Webopedia](#) or [Whatis](#). Of course, you can read the Web versions of these magazines, too, but you may find the print version more congenial.
- **Learn a little about “geek culture.”** A good starting point is [Wired’s Geekipedia](#).
- **Play and experiment with computers.** If possible, have an old PC around (at home or at work) and use it to download interesting software. If you want to do this at work, make sure you clear it with your IT department, because a “sandbox” computer can be a security risk. Even if you’re doing it at home, be careful about the software you download. Programs that are downloaded from disreputable sites are often filled with viruses, malware and spyware.
- If these suggestions seem too basic, see our article on [Keeping Up with Technology](#).



Possible Resources and Tools for Establishing Library Collaboration

RESOURCE/TOOL	ACCESS
Clubs and Organizations	Research your local community directory at http://fdncenter.org/getstarted/topical/sl_dir.html and Michigan State University's list of service clubs and civic organizations that provide funding at http://www.lib.msu.edu/harris23/grants/servicec.htm . Your library friends groups, board, staff and local directories may also help identify clubs and organizations that are potential collaborators.
MaintainIT and TechSoup	MaintainIT (http://www.maintainitproject.org) and TechSoup (http://www.techsoup.org) are both sources for collaborative information and resources.
National Network of Libraries of Medicine	<i>Public Libraries and Community Partners: Working Together to Provide Health Information.</i> (http://nnlm.gov/libinfo/community)
State Libraries	http://www.publiclibraries.com/state_library.htm
State Library Associations	http://www.ala.org/ala/aboutala/offices/cro/chapters/stateandregional/stateregional.cfm
Urban Libraries Council; ULC Collaborations Database	http://www.urbanlibraries.org/research/database.html
WebJunction	http://webjunction.org There are many articles and discussions around the topic of collaboration and partnerships. A good example is WebJunction's Focus on Demonstrating Impact 2006: Building Partnerships http://webjunction.org/do/DisplayContent?id=12377



Compatible Library Partners Chart

POSSIBLE PARTNER	DESCRIPTION
Businesses/Chambers of Commerce/Economic Development Organizations	Local employers, small business owners, visitors' centers, chambers of commerce, economic development councils, industry councils, real estate agents, restaurants
Community Services Organizations/Associations/Clubs	Literacy organizations, YMCA, AARP, AAUW, American Red Cross, Kiwanis, Lions, Rotary, United Way, neighborhood associations, organizations serving the homeless, Salvation Army
Cultural Groups	Theater groups, art leagues, dance supporters, arts commissions, historic preservation groups, state humanities councils
Educational Organizations	Public schools, private schools, colleges/universities, PTA or PTO groups, school boards, home school organizations, multilingual programs, higher education institutions/organizations, tutoring organizations
Ethnic Organizations	Ethnic chambers of commerce, NAACP, tribal councils, Latino/Hispanic groups, Asian groups, Urban League, refugee rights associations, refugee/immigrant centers/services, refugee rights association
Family Services Organizations	Family service agencies, social services departments
Financial Representatives	Bankers, credit unions, financial planners, stockbrokers
Government/Political Representatives	Mayor, city/county manager, city council, county supervisors, city/county fiscal office, city/county planning office, law enforcement officers, job training programs
Health Organizations	American Cancer Society, American Heart Association, hospitals, public health nurses, public health clinics, National Network of Libraries of Medicine
Legal Organizations	Legal aid, ACLU, bar associations
Library Representatives	School media center staff, college or university librarians, special librarians
Media Representatives	Newspaper, radio, TV, ethnic media, local magazines, community newsletters
Organizations of/for People with Disabilities	Center on Deafness, Council of the Blind, state/county/city health and human services, Easter Seal, Goodwill, independent living centers, United Cerebral Palsy
Professional Groups	Medical associations, board of realtors, bar association, business and professional women's groups
Religious Groups and Organizations	Churches, ministerial alliance, youth groups, Jewish community centers, Young Life, Catholic Services
Senior Centers/Service Organizations	Area Agency on Aging, senior centers, RSVP

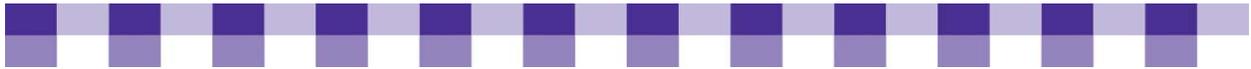


POSSIBLE PARTNER	DESCRIPTION
Technology Experts	Computer clubs, consultants, community colleges, Internet providers, universities
Youth Services Organizations	Big Brother/Sister, Boy Scouts, Girl Scouts, FFA, FHA, child abuse agencies, city/county recreation programs, Junior Achievement, Head Start, Even Start, child care associations, local Association for the Education of Young Children, school-age care and enrichment programs
Women's Centers/Service Organizations	Women's shelters, YWCA, National Organization for Women, Junior League, Soroptimist, sororities



What to Consider When Entering into a Collaborative Process

- **Assess needs.** It is important for you to really examine your community and see how the library can most meet the needs of its members. Evaluate your library and community goals, and incorporate existing strategic plans based on community needs. Envision what your library could be in the future to consciously make the choices to get you there.
- **Use appreciative inquiry to examine opportunities.** What is working well? What services are most used and valued in your community. For example, are there long lines for computers or people wanting to share computers, such as teens or families? What could be done to support this service?
- **Build sustainability to support your programs and projects into the future.**
- **Look locally for partners that will help make an impact.** Collaborative efforts should center on finding an answer, making a difference or taking charge of a community issue.
- **Determine if there is strategic alignment.** Will the collaboration help fulfill the library's mission and goals? Find common ground between the library and community organizations that can help with implementation of library services and goals.
- **Focus on the cause and the people — whether it concerns literacy, children, unemployment, etc.** Be careful to not get caught up in focusing on how the individual organizations could benefit, but on what you can accomplish *together* to serve your community members.
- **Specify shared goals and rewards that your partnerships will foster.**
- **Use open communication; share timetables and have periodic meetings to share information with your partners.**
- **Clearly define roles and responsibilities in any collaboration.**
- **Ensure the ability to make necessary decisions for situations that arise.**
- **Consider what your library has to offer and how you can better reach out to your community.**
- **Complete a SWOT analysis.** Determine the library's strengths and weaknesses, as well as the threats and opportunities in the community.
- **Examine the implications of sharing resources.**
- **Consider the chances of success for each partnership.**



- **Create a memorandum of understanding for collaboration.** Clearly communicate what is expected of the collaboration and what the responsibilities are. Use a detailed, signed agreement that confirms expectations in writing. Terms not to use, as they could denote a legal arrangement, include partnership agreement (this can imply equal liability and shared profits and losses) and also joint venture. Some things to include:
 - Summary of assets and needs identified
 - Description of target audiences and constituencies
 - Description of goals, objectives, purpose and shared agreements
 - Resources and equipment needs and how needs will be fulfilled
 - Defined roles and responsibilities
 - Milestones, timeline, what happens when
 - Key contacts and decision-making process and approval
 - Expected deliverables
 - Termination procedures: what to do if the collaboration doesn't work out
 - Plan for program documentation and evaluation. What will success look like? What information needs to be gathered for evaluation, and who will be responsible?
 - Budget and funding sources and responsibilities
 - Plan for public awareness and marketing



Tips and Techniques for Creating Strong Partnerships

- Build from existing relationships.
- Make sure the library is in the right place at the right time.
- Join existing coalitions and networks.
- Target groups and initiate specific strategies.
- Conduct focus groups to stay aware of community needs and opportunities.
- Organize a committee or meetings with community leaders.
- Contact members individually or meet one-on-one with leaders informally.
- Identify local groups and potential community partners.
- Include individuals and organizations that are well connected to the community.
- Make sure there are benefits for all parties.
- Utilize effective communication strategies.
- Have designated and responsible representatives.
- Focus on a specific project, program or issue.
- Put the right people in the right positions. Because collaborations are built on trust and convergent goals, the major determinate of success lies in the human factor.



Ten Examples of Successful Library Collaborative Projects

Tempe Public Library is located in Maricopa County, Arizona, the fastest growing county in the nation. With a constant flow of newcomers, the library is one of the only non-commercial places for residents to gather, learn about their new communities and exchange social and educational information. The library offers special opportunities to bring families with young children together and to build social connections between older adults, young parents and relevant community services.

One of their strategies emphasizes collaboration and co-location. Tempe Library has located its branches near other public services, such as the Escalante Community Center, which operates under the city's Community Services Department and houses the Tempe Community Action Program, the Escalante Senior Center, the Youth Assistance Program, summer camp programs, health services, adult employment services and recreational activities as well as a library branch. The library offers opportunities such as the Family Place Libraries program to bring families with young children together and to build social connections between older adults, young parents and relevant community services. The library's outreach staff collaborates with colleagues at the Escalante Community Center to maximize possibilities for community engagement.

Tempe Public Library also obtained funding for the construction and operation of the Tempe Connections Café and program space through a \$547,644 grant from the Virginia G. Piper Charitable Trust. Civic Ventures (www.civicventures.org) is a community-focused think tank that partnered with Tempe Connections and is part of Civic Ventures' national initiative, The Next Chapter, which encourages communities to create new approaches that help retiring adults transition to new life phases by providing a supportive community for ongoing learning, development and societal contributions.

The Friends of the Tempe Public Library operate the café and program space, with all profits used for the support of Connections programs and services. Community collaboration and citizen involvement is a key part of the Tempe Connections program. During the planning for the grant, Tempe Task Force on Aging members provided input, and now a Connections Advisory Council sets project goals, hires staff and plans for operations. More than two dozen community organizations and educational institutions partnered with the city of Tempe to participate in the planning and delivery of program offerings. A few highlights include:

- Lifelong learning and new career opportunities in partnership with Arizona State University, Maricopa County Workforce Development and other partners
- Life planning workshops
- Wellness classes, screenings and exercise programs provided by St. Joseph's Hospital and Medical Center
- Civic engagement through peer mentoring
- Volunteer information through Civic Ventures' Experience Corps and Tempe's Volunteer Office



Salt Lake City Public Library has established itself as the community-gathering place. The city block it occupies, called Library Square, includes retail outlets such as The Community Writing Center of Salt Lake Community College, a nonprofit artist's cooperative, public radio station KCPW, a delicatessen, a coffee shop and Night Flight Comics, a graphic novel and comics shop. The library's contract with the retailers stipulates that they must be community-focused. They share programming, training, broadcasting and implementation of large events. More than 1,000 other groups and organizations meet at SLCPL, including the League of Women Voters, Wasatch Coalition for Peace and Justice, Utah Quilters, Utah Storytelling Guild, the Authors Club, Women in Recovery and Leukemia and Lymphoma Society. Most of these groups partner in programming with SLCPL, making the library not only the place to meet in Salt Lake City, but the place to develop events as well.

Laramie County Library System, Wyoming, was *Library Journal's* Library of the Year 2008. Some of the many agencies and organizations with which LCLS has formed alliances include The Wyoming State Museum, Old West Museum, Laramie County Head Start, Stride Learning Center, Cheyenne Animal Shelter, YMCA, Cheyenne Boys and Girls Club, Cheyenne Lions Club, Cheyenne Rotary Club, Cheyenne Eye Clinic, Starbucks, Cheyenne Women's Civic League and Susan G. Komen Breast Cancer Foundation. *Library Journal* selects a library of the year annually. Online profiles of these libraries demonstrate the commonality of great collaborations as evidence of a strong and valued community library.

Nashville Public Library and their community partners provide a constant stream of programs in literacy, culture, public affairs, education, design and local history. Partners include the Vanderbilt Symphony, the Hispanic Chamber of Commerce, the National Association for the Education of Young Children, the Nashville Kurdish Association, the Women's Bar Association and the Intermuseum Council. To educate the community about the significant role that Nashville citizens played in the civil rights movement, the library built a Civil Rights Room and presents programs with the National League of Cities, Fisk University, the First Baptist Church, the First Amendment Center and the Winter Institute for Racial Reconciliation. According to the Tennessee state librarian, the Nashville Public Library is "a diverse and welcoming activity hub and a center for public discourse....The library is committed to building strategic community partnerships and responsive public programs that enhance the lives of all residents of the Nashville community. It demonstrates the power of libraries to inform and bring communities together."

Boston Public Library's Kirstein Business Branch provides business development services to new immigrants. A microlending program in New England sends aspiring immigrant entrepreneurs to the Kirstein Business Branch. The library developed a Spanish version of a popular workshop, Getting Started in Business, in partnership with the Small Business Center at the University of Massachusetts.

The September Project is a grassroots effort that encourages libraries and communities to come together in meaningful ways throughout the month of September. September Project events explore issues that matter — like peace or freedom — and can include book displays, panel discussions, civic deliberations, film screenings, theatrical performances, community book readings, murals, kids' art projects and so much more. The September Project began in 2004 and continues to grow. In 2007, there were more than 500 free September Project events organized



locally in libraries in 30 countries including public forums, discussions and round tables. <http://www.theseptemberproject.org>

Brooks Memorial Library in Vermont partnered with their local college IT department to get computer donations to use as backups when the library computers are in service so that they can still provide the public with basic Internet and word processing services (source: MIT interview, Jerry Carbone).

Southwest Harbor Public Library in Mt Desert Island, Maine, created a computer committee. Libraries are creating technology advisory committees to help with planning, tech support and community needs assessments. “The computer committee is a group comprised of patrons and several staff members. It’s all volunteer. There are about five or so core folks with experience in computers because of their professional background or out of interest. It’s an opportunity for me and for other staff members to bring up things that have come up in our daily computer interactions, and it’s also an arena through which we can plan. This has been a focus that we’re trying to move towards, and it’s been really great to have outside information and ideas. It’s like a think tank, and when I get frustrated I can say, ‘Hey, I really don’t know what’s going on. Does anyone? Have you heard of this?’ These are folks that I can email or call. They’ve just been really quite invaluable.” Kate McMullin, MIT interview

Pryor Public Library collaborates with the local high school to support their technology needs. Shreffler, who teaches the high school computer classes and acts as Pryor Public Library’s technology consultant, explained that when the current librarian wanted to spend money to hire a full-time IT staff member, he stepped in and offered his students’ services instead. “I have students that are available about every hour, and we train them to help,” Shreffler said. “And it’s a good thing for us and it’s not a lot of trouble.” Shreffler and his students visit the library several times a week to perform a variety of maintenance chores on the computers, including replacing malfunctioning computer components, installing software and troubleshooting occasional connectivity problems. Because most of the computers are more than four years old, having a regular maintenance team has been especially useful in keeping Pryor Public Library’s machines functional. MIT interview

Richland County Library in Sidney, Montana, collaborates with local businesses. For example, Renee Goss said she received a lot of free help from the local computer store in exchange for letting the store train its employees on library computers. Goss has also been working with local electronic stores to offer discounts on mp3 players for library card holders. “I think it’s in collaboration that you learn about your community, they learn about you and you figure out how you can pair up with somebody,” she said. “Collaborative efforts are the key to whatever it is you’re doing. Work with as many groups as you can.” MIT interview Renee Goss, Director, <http://www.maintainitproject.org/files/Renee%20Goss.pdf>

Princeton Public Library Discussion on WebJunction: Unconventional Partnerships by Janie Hermann, <http://www.webjunction.org/advocacy-outreach/resources/discussion/4285184>

“I just thought I would share a few of the unconventional partnerships that Princeton Public Library has established over the years to increase our level of programming without incurring too much additional cost.



“One of partnerships is with local theaters to provide previews and pre-performance lectures or ‘meet the cast’ sessions prior to the show opening. One series is called ‘McCarter Live @ the Library,’ and we normally have anywhere from 75 to 100 people show up for these programs. We also do ‘Passage Theater Previews.’ The theater benefits with a bit of extra promotion, and our patrons love having a chance to mingle with the cast and crew and to hear about the behind-the-scenes making of the productions.

“We have also teamed with the local arts council to create an art gallery in our reference section. They change the installation every three months and feature the works of two artists per show. When the installation is complete, we host an ‘Art Talk’ with the artists — the library provides food, the arts council brings wine and it is a classy night. Attendance ranges from 50 to 100.

“Another unique partnership is with a local Italian restaurant that pays the public performance rights for our Italian films series and then hosts a reception at the restaurant after the films. We have a large Italian community that just loves this event.

“We also collaborate with a local poetry group to do a ‘Poet Invite’ every month. They select the poets and host the evening; we just provide space and PR.

“There are several other partnerships, but the one thing that all of our partnerships have in common is that we get quality programming for minimal expense.”

Create a culture of collaboration. Library leaders should not just understand the value of collaboration; you also need to convince and inspire others to initiate collaborations and work to help them succeed. One of the first steps in this process is to articulate and promote a vision of collaborating without boundaries — not just as a short-term response to an immediate need, but as a critical element of the library’s long-term strategy. Management has to make it clear in both word and deed that everyone needs to find potential collaborators to help them solve problems and create opportunities. Speak about it and model it. Celebrate successes and make the benefits clear to everyone at the library. Encourage library staff to attend meetings and networking opportunities outside of the library.



Further Resources

Talking with Techies

[How to Manage Geeks](#) on the Fast Company Web site

[11 Ways to Motivate Geeks](#) at TechRepublic

[Understanding Geeks](#) at Inc.com

Talking with Non-Techies

David Lee King has collected [some links on how to communicate with people who don't know as much as you do about technology](#). Also, check out [Bridging the Gap Between Techies and Non-Techies](#) and [Seven Tips for Talking with Nontechnical People](#). Of course, this sort of conversation occurs when you're talking with patrons, trustees, directors, politicians and even IT folks themselves, but the same logic applies in every variant of this situation. Be patient, be understanding and listen carefully to their concerns.



Buying and Deploying Technology

Even if you follow the technology industry, keeping up with every change in processor speed and every new software feature is a big challenge. While we can't take the complexity out of the buying process, we can provide a few questions and answers to help you focus your research.

Once you make a technology purchase, there's bound to be some work involved in getting the hardware from the box to the desktop. The same is true of new software. How will you get that software from the installation CDs out to the end users? As with all of the stages in the technology life cycle, it's worth taking some time to plan for deployments, installations and upgrades.

Although it's helpful to think about the specific decisions that have to be made during the installation of new hardware and software, it's also worth studying the broader, umbrella subject of IT change management. Change management is beyond the scope of this project, but if you're interested, check out [How to Develop an IT Change Management Program](#) and the [Wikipedia articles](#) on this topic." These are fairly technical, but when boiled down, they all stress the importance of communication, documentation, planning and testing.

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Technology Deployment and Installation

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[Installing and Patching Software](#)



Why Plan Carefully for Major Purchases

There are five good reasons why you should think through and carefully plan for the technology you bring into the library. Here's a quick summary:

- **Save money.** Any time you buy in bulk, by yourself or in cooperation with other organizations, you'll probably save money.
- **Save time.** Buying technology takes a lot of effort, especially when you have to cope with local government paperwork and the never-ending process of applying for e-rate discounts. If you cooperate with other players at the state, regional and local level, you might be able to bypass the paperwork or get someone else to help you with it.
- **Limit ongoing costs.** As we discussed in the [Total Cost of Ownership](#) (in Chapter 1 – Planning and Decision-Making), all technologies have ongoing costs, and you want to control these as much as possible.
- **Get the best support.** If you buy technology from an unreliable, unresponsive company, you might wait forever for fixes, upgrades and improvements. Or they might stop supporting your product altogether. On the other hand, quality training and responsive tech support can make your life a lot easier.
- **Avoid vendor lock-in.** Some companies are better than others at allowing their technology to work with other products. For example, you'd like to integrate your ILS and your PC reservation software, but the ILS database won't allow this, and the vendor won't work with you to develop a solution. Or if you want the systems to work together, you have to buy the PC reservation system approved by your vendor. Or you want to buy a new firewall, but it doesn't work well with your existing networking equipment. This situation is known as vendor lock-in.



Vendor Selection and Management

Unless you know how to build your own computers from scratch and write your own software, you'll have to talk with IT vendors sooner or later. Librarians have a lot of leverage when it comes to building and managing these relationships, but we don't always know how to exercise our power. Getting the best service and the best price takes some thought and planning.

Here, we break down the process of working with vendors and recommend a few good online resources for each step along the way. We've used fairly vague, general language ("project," "purchase," "purchasing decision") because our advice applies to a wide variety of situations. You may be looking to buy a workstation, a printer, a suite of productivity software, an ILS system, or an operating system. On the other hand, you might be in the market for a consultant or a contractor to build a database or a Web site.

Why Pay Attention to Vendor Selection and Vendor Management?

- **You get good strategic advice.** Sales representatives and account managers at computer companies can be great allies for your library. If they're knowledgeable and they're willing to devote some time to understanding your situation, they can provide excellent advice about how to spend your technology dollars.
- **All the reasons outlined under Why Plan Carefully for Major Purchases.**

Key Actions

- **Buy off state contracts.** As we describe in our [Ten Steps to Successfully Working Vendors](#) tool (PDF), state contracts can save you huge amounts of time and lots of money. If you have access to any other consortial or regional buying cooperatives, look into those as well. There's strength in numbers.
- **Look at NPower's overview.** If you're looking for a single document that describes the whole process of vendor selection from start to finish, we recommend [Selecting the Right Technology Vendor](#) from NPower. Should you move forward with this project in the first place? If so, how do you research vendors? How do you write a Request for Proposals (RFP)? How do you evaluate the responses to your RFP? Even if you don't issue a formal RFP, this guide has a great list of criteria you can use when comparing different technology vendors.
- **Check out TechSoup.** It offers [a similar overview of the process](#) in the form of an RFP timeline.



Stories from the Field

I am probably known to have as few vendors as possible to keep things simple. After you're their customer for a little bit, you get free stuff. The place we buy most of our hardware and software from, we get free shipping, free installation of extra parts. I had to have 10 extra serial ports put in for some of the touch screens we use on some PCs we bought for this building, and they put them in for free. There was no installation charge. I've gotten, tons and tons of free stuff from the guy [who is] my main vendor. In terms of networking, some people will have the cable company for this part or different Internet providers; I hate that. I've gotten stuck in situations before where it's a he said/she said kind of thing, where one company says 'Oh, no, it's their fault. Oh, no it's their fault.' I hate that, and then you're stuck in the middle. I'm good, but I'm not so good that I know every single thing in the world, so at some point, you need a person [who] really, really knows and is really, really specialized, and they can say 'No, this is the problem and we will fix it.' It's nice to have one person to call to do that. I find that when you have multiple vendors, sometimes it's really, really hard for someone to say 'Yes, we'll fix it.'

*Michelle Foster
Boone County Library, KY*



Cooperative Buying Strategies

Partnership and collaboration are themes we've hit on repeatedly in the Cookbooks. When you're buying technology, higher volume usually leads to better prices and better service. You can collaborate with state purchasing agencies, state libraries, regional library cooperatives, municipal IT departments, local colleges, K-12 schools, K-12 libraries and on and on. For more on partnering with other organizations, see [Effectively Collaborating with Other Libraries and Partners](#). Also, be sure to review our [How to Buy Cooperatively Quick Reference](#).

Why Buy Cooperatively?

- **Save money.** Purchasing cooperatives offer vendors access to more customers and high-volume contracts, which give cooperatives an edge. They usually can negotiate better deals than individual libraries.
- **Bypass the RFP process and other procurement rules.** State contracts in particular almost always satisfy local laws and regulations with regards to RFPs and competitive bidding. Other joint buying agreements may also comply with these laws. In other words, depending on the situation, there's a good chance that you won't have to issue your own RFP and wade through the responses.
- **Get better service.** Most vendors assign their most experienced sales representatives to their high-volume contracts. In other words, when you buy through a state contract or a similar joint buying arrangement, you still have someone at Dell, HP, Verizon or wherever who you can turn to for assistance and advice. Often, it takes months or years to find a competent sales rep and build a relationship with that person. When you buy off a state contract, the relationship is already in place. You might also find that the contract guarantees a higher level of tech support. In short, you might get replacement parts quicker or your calls might bypass the less-experienced, first-tier help desk technicians.

Key Actions

- **Talk to local experts or do your own research to ensure that you're authorized to buy off of a particular contract.** States and localities have different rules about setting up purchasing cooperatives and buying off of contracts that someone else negotiated.

Stories from the Field

In Montana, a lot of people don't know this still, and I've been trying to educate people, but our state government, when they negotiate contracts with vendors for software or hardware, they almost always throw in the clause that local government agencies are allowed to purchase off those contracts. So we get a pretty hefty discount for a lot of things – not only hardware, but software and services like my cell phone; my business cell phone is through a state term contract....We're lucky enough in Montana that our state government has a contract with Novell. It's called a master license agreement, or MLA, and when they negotiated that MLA, they also put in a clause that local governments are allowed to purchase off that contract. So whatever



list price is, I get, like, 42 percent off list price. And it's a licensing thing, so I've got, I forget my numbers, but it's, like, 40 some desktops that use ZENworks. So I pay an annual maintenance fee on those licenses, which means I get support and product upgrades for free.

*Matt Beckstrom
Lewis & Clark Public Library, MT*

I don't even look at the retail pricing anymore. Even if I called Dell, for example, and I ask for a quote, they already know that I have a state contract, so I get the state contract pricing by default. I don't know what pricing I would get if it wasn't for that. But I was looking at a laptop, and it was at least \$500 difference between what was on their Web site versus what the state contract pricing was. It's great...I found out about it just because the person before me was aware of it. And I have a feeling that the way we got onto it in the first place was [that] we were using a state contract for purchasing vehicles. And you know vehicles are such a significant purchase. You're always looking for the best way to get it. Ongoing paperwork is nothing. It's just fill in your organization address and send a check to participate in the Cooperative Purchasing Ventures, as they call it in Minnesota. And the fee is small. I'm guessing it's just to cover administrative costs.

*Jay Roos
Great River Regional Library, MN*

Many times, they'll have a state contract and then they'll have a rep for a particular piece of that state contract, so that person will know about the differences on that particular piece of the contract and can tell you who to get in touch with and that type of thing. Another advantage is that a lot of times, at least in Texas, the way that contracts work is if you buy off the state contract, it's legally binding. It meets all bid requirements, regardless of what local bid requirements are or anything like that. So from that point of view, it makes it easier because you don't have to mess with doing all the legal stuff. In some states, if you go above a certain amount, you have to go out and get three bids or something like that. In a lot of places, if you have that state contract, you don't have to go out and get those bids. You already have. It's already been negotiated.

*Chris Jowaisis
Texas State Library, TX*

And you don't have to buy off the state contract if you can find a better deal somewhere else. You're not limited to the state contract. It's just that if you do buy off the state contract, then there's something called the Uniform Procurement Law in Massachusetts, and it governs when you have to get three bids for something. It has thresholds for when you have to get three bids for a service or when you have to do a sealed bid. If you buy off the state contract, then parts of that process are already done for you and you don't have to go through all of it. But you're not restricted to the state contract if you can find a better deal somewhere else.

*Sia Stewart
Kingston Public Library, MA*



Standardizing Your IT Infrastructure

IT standardization is a strategy for minimizing IT costs within an organization by keeping hardware and software as consistent as possible and reducing the number of tools you have that address the same basic need. It may take the form of ensuring that every computer has the same operating system, or of purchasing hardware in bulk so that every PC in your office is the same make and model. Standardization often goes hand in hand with *centralization*, the process of giving your IT department more control over purchases of hardware and software, and more control over what staff members are allowed to do with their office computers.

While imposing equipment standards can help you streamline your IT infrastructure, simplify decision making, and minimize purchasing and maintenance costs, the process of standardizing itself can be complicated. In the following section, we'll show you ways to gauge the level of standardization your organization requires, highlight some of the benefits of standardization, and offer tips for standardizing your equipment while balancing organizational and staff needs.

Why Standardize Your IT Infrastructure?

- **Reduce the burden on IT staff.** Your IT department faces a learning curve with each new piece of technology you bring on board. If you're supporting four types of **antivirus** software in your library, each of those applications uses a different procedure for updating and patching. The troubleshooting and support skills needed for each application are different. The online resources for each piece of software are different.
- **Avoid compatibility problems.** It's difficult to find replacement parts and match the right part with the right computer if you're supporting 15 different models. Also, the more software and hardware you have, the more often you'll encounter conflicts and errors that are hard to isolate and fix.
- **Improve communication.** Finally, it's hard for your IT staff to communicate with frontline employees about troubleshooting issues if there's no standard. Neither side really knows what the other party is talking about.
- **Other benefits.** A more thorough discussion of the ways you can standardize is available in "Benefits of Standardization" later in this document.

Key Actions

- **Buy in quantity.** Dell, HP, and other vendors change their models constantly, so the computer you buy this week is different from the one you bought last week, even though the model number is exactly the same. It may have a different network card, a different hard drive or even a different motherboard. If someone has to have a computer right away, try to reuse your existing machines until you can put together a larger order. To roll your smaller purchases into larger purchases, focus your attention on planning and asset tracking.
- **Buy business models.** When you're buying new computers, look at the business models instead of the home models. Manufacturers (Dell, HP, etc.) change the components in their business machines much less frequently. They might freeze your



model for six or nine months, and when they do make a significant change, they'll notify you in advance.

- **Plan ahead.** If you speak with a broad cross-section of your library employees and department heads during the process of writing your technology plan, you'll know roughly how many new staff members you can expect during the coming year and if your library plans to add any new public computers.

Stories from the Field

Yeah, when I first started here at the bottom of the totem pole about eight years ago now, there was no standardization at all. And in fact, there wasn't any kind of automated process for distributing software. So it took a whole day for somebody to sit down and install the software on a PC, which automatically led to a lack of standardization. You're always gonna make a mistake when you're doing it manually. And then there were multiple models of computers, because they would just buy whatever could be purchased whenever the money was available rather than making large bulk purchases and keeping it standardized.

*Jay Roos
Great River Regional Library*

Right now, one of the biggest problems in our old building is that everything was different. Like, we would buy a PC here and a PC there and get one donated, and everything was different, so maintaining everything was hard. And the goal now is we're just going to turn over everything all at the same time, and so all the PCs in the building, at least the public PCs, would all be the same. And right now, they're all exactly the same systems, with exactly the same hardware loaded on them, and they all work the same. So it's easy for the public when they come in — no matter what workstation they sit down at, it's exactly the same as any other. And it's easy to maintain them because the people [who] are working with [them] know what's on there and the different glitches with them and whatnot. And so our goal is to have this turnover where we just put money aside every year for this big purchase every four years, and then you get a good deal on PCs. You're buying in bulk.

*Valerie Meyerson
Charlevoix Public Library*

What I try to do is replace whole branches at a time. When I do the main branch, for example, there'll be, like, 100 computers that I buy, and I'll buy them all at one time. But then the smaller branches, I group them together so that I'm replacing several branch computers at the same time. Honestly, I don't like to buy fewer than about 50 PCs at a time, just because we try to stay on a five-year cycle — not even five years, four years. So I try to buy as much as I can at one time. Then when I do buy some more computers, I try as often as possible to get similar hardware configurations.

*Michelle Foster
Boone Public Library*



Buying Refurbished Computers

While nonprofits may hold on to hardware equipment until the last bit of life has been squeezed out of it, many corporations abandon working computers in good condition after just three or four years of use. While this equipment may be outdated for the bleeding-edge needs of a large enterprise, that doesn't mean that it doesn't have years of life that it can offer your organization — especially when its components have been examined and updated by a professional refurbisher.

You can find laptops, desktops, servers, PDAs, and most other types of hardware, all from a wide variety of manufacturers, with a wide variety of components and specifications. Bear in mind, though, there are many ways to buy refurbished computers, and as with anything else, it pays to do some research and planning.

Why Buy a Refurbished Computer?

- **Help save money.** Refurbished desktop computers usually cost between \$100 and \$300, depending on the components. However, monitors are often sold separately. Overall, refurbished machines generally cost about half as much as a comparably configured new computer. Of course, these PCs are also closer to the end of their usable lives.
- **Help save the environment.** Refurbishing keeps working computers out of landfills, storage, or out of countries where equipment may be dismantled under unsafe conditions.

Key Actions

- **Carefully think through your current and future computing needs.** A three-year-old refurbished PC may have enough juice to run Microsoft Office, but it might choke on the latest video-editing software. A quick Google search or a glance at the packaging will tell you the minimum and recommended requirements for a particular piece of software. Make sure your computers meet at least the recommended requirements for the operating system you plan to install, and anything else you will need to use on a regular basis. A [Technology Plan](#) and a [needs assessment](#) are good ways to ensure that you know what computer power your staff and patrons will require in the near future.
- **Always buy from a qualified refurbishing company.** If you buy used computers from a flea market or the classified section, you probably won't be happy with the results. Refurbishers, on the other hand, test each computer they receive thoroughly, repair them if necessary, and may do some simple upgrades.

Other Key Questions to Consider...

- **As with new computers, try to buy machines with identical parts.** Refurbishers often receive hundreds or thousands of PCs from a particular company, so you can buy a batch of 50 computers that have the “same” hard drive, motherboard, sound card, etc.

- 
- **Pay attention to the warranty and the return policy.** You probably won't get a three-year warranty on a refurbished machine, but a three-month warranty to cover any out-of-the-box problems is fairly standard. Also, how quick is their response time when a machine needs repairs?
 - **Check the refurbisher's "fail rate" or "return rate."** According to Jim Lynch, Computer Recycling & Reuse Director for TechSoup's [Green Tech](#) Program, the industry standard has a less than 12 percent failure rate, which means it's worth finding out if the refurbisher you're considering has a higher or lower rate of returns or failures for the equipment they sell.
 - **Find out the operating system, if any, that you'll get with the computer.** Some refurbished computers come with Windows Vista or Windows XP, but others will have an older operating system or no operating system at all. This may not make a difference if you plan to image the computer. Since many refurbished computers arrive with little or no software installed, disk-cloning is often the best way to quickly and efficiently prepare the workstation for deployment.
 - **What peripherals are included?** Refurbished computers rarely come with a monitor, so be sure to include that in your budget. Also, if you need DVD drives, wireless network cards, or other optional components, look at the details of the specification sheet to make sure those are included.

Stories from the Field

[Off-lease computers] are used computers. They're leased to corporations instead of purchased. And when the lease runs out, they're replaced with newer computers, and then the ones that they had previously are usually bought out by various companies that are in this business. And they refurbish them and make sure they're all working, and they turn around and sell them as used computers that have come off of a lease. They're usually business-class computers. They're not the consumer kind that you find at Wal-Mart. And they've been working for three years, so you know they're going to probably work for at least another three, if not longer. And you get pretty good deals with them.

*Jeff Hawkins
Lassen Library, CA*

Further Resources

To learn more about buying refurbished computers and/or for a list of suppliers of refurbished computers, check out our [Further Resources](#) section.



Leasing Computers and Other Equipment

As with cars, TVs or any other large, expensive outlay, you don't have to own the technology in your organization. You can rent desktop machines, servers, networking equipment, and just about anything else. And while you usually pay a bit more in the long run, some organizations find it easier from a purchasing and accounting viewpoint. But before you lease any technology, you need to take some time to consider the advantages and disadvantages.

ADVANTAGES	DISADVANTAGES
<ul style="list-style-type: none">■ Budgeting: When you buy equipment, your expenses can vary wildly from year to year. With leased equipment, you don't have to work so hard to balance your annual budgets. Instead, the costs are spread evenly over the term of the lease (usually from one to three years).■ Cash flow: If your cash on hand is less than you'd like, leasing might cost you less in the long run than taking out a bank loan or using a credit card. An accountant can help you weigh your options.■ Technology currency: If your leases run for short periods of time, you'll always have fairly up-to-date equipment (i.e., every three years or so, you'll be returning the old computers and getting the latest, fastest PCs.)■ Disposal: It often takes time and money to properly dispose of the outdated equipment you own. When your lease is up, however, you usually send the leased hardware back to the vendor, unless you decide to pay the buyout cost and keep the equipment.	<ul style="list-style-type: none">■ Loss of control: There might be significant restrictions on what you can and can't do to leased equipment.■ Vendor tie in: With some lease contracts, you may be tied into using equipment from one vendor for several years. If your needs change suddenly, will you be able to get out of the lease without paying unreasonable penalties?■ Extra expense: When you lease, you're paying a premium because the vendor is taking on certain risks and obligations that they wouldn't have if they just sold you the computer outright. Lease Versus Purchase from TechLearning will give you some idea of the extra costs you incur when you lease.■ End-of-lease terms: Handling the return of the leased equipment in a way that you avoid unexpected fees and penalties can sometimes be difficult.

What to Examine in a Lease Agreement

No one wants to get caught in a lease agreement that is too restrictive or too vague. We recommend that you check out our tool, [Examine a Lease Agreement](#). It offers a complete set of guidelines on what to look for, and consider before you sign on the dotted line.



Stories from the Field

One of the advantages of doing the lease is that we have a consistent budget year to year to year, because one quarter of that lease is paid each year, so the budget is well planned and consistent.

*Thomas Edelblute
Anaheim Public Library, CA*

Yes, being as technical as I am, I'd rather buy the machines. I hate the idea of not being able to, because I've talked to libraries [that] have done these leasing programs where the company comes in and puts a server in and puts in a bunch of same clients or something like that. But if there's a problem, you've got to call them, and they've got to come out and fix it. So there are advantages to it. I could see for someone who doesn't have someone in-house, like me, that would be a great way to go. Then you don't have to worry about it; if it breaks, you call somebody, and they come out and fix it. But I've never considered the idea of leasing machines. I know that it used to be a big deal. I remember every time I'd go to buy a computer, they'd always be, like, 'You could lease this today for \$28.00 a month,' or something like that. I never considered it.

*Matt Beckstrom
Lewis and Clark Library, MT*

I have been talking to other libraries that lease computers, and that's an option that I could be interested in looking at, but not in the current economy, because I could imagine leasing all of our machines and then not being able to renew the lease because we didn't have the funding. At least if we buy the machines, we own them.

*Sia Stewart
Kingston Public Library, MA*

Two YMCAs I work with each bought technology with a lease...In one instance involving a leased a server, we had great difficulty closing the agreement and getting the equipment packed and ready to return in order to avoid lease-end buyout fees. The entailing phone tag and multiple emails caused us as much grief as being pushed to replace a server on the timetable dictated by the lease's expiration date.

Another lease problem I encountered concerned a photocopier; the person who set up the contract was no longer with the organization, and when the lease expired, no one knew to ask for a buyout option. As a result, the organization kept paying fees for an extra 18 months when the lease converted to a month-to-month agreement.

*Dave Welp
Information Technical Director, Scott Family YMCA
Shared Wisdom, Learning from Technology Mistakes
<http://www.techsoup.org/learningcenter/techplan/page5729.cfm>*



Buying Hardware and Software

Hardware Purchases

We've covered some aspects of hardware buying in [Leasing Computers and Other Equipment](#) and [Buying Refurbished Computers](#). To find out more about other key factors to consider when purchasing computers or other hardware devices, we suggest you check out our [Buying Hardware Checklist](#) tool.

Software Purchases

We've talked about managing your [vendor relationships](#), the [benefits of standardization](#) and the value of state contracts, all of which apply when you're buying software. Our [Buying Software Checklist](#) tool gives a more detailed look at factors to consider and resources on this topic.



Warranties and Service Plans

Is an extended warranty on a computer really worth the extra money? The answer, as usual, is “It depends.”

Why Should You Pay Attention to Warranties?

When you’re buying a computer, a server or another piece of hardware, the manufacturer may try to cut costs by offering a substandard warranty. On home computers and consumer-grade equipment, a one-year warranty is standard, but you should expect a three-year warranty on most business-grade equipment (e.g. servers and workstations). Networking equipment such as routers and switches will often have a five-year warranty. Furthermore, a good service plan or warranty on your mission-critical equipment can allow you to recover quickly and gracefully from a hardware failure, rather than waiting for days and weeks for a crucial replacement part.

What’s the Difference Between an Extended Warranty and a Service Plan?

- **An extended warranty** simply extends the term of the standard manufacturer’s warranty. In other words, if the original warranty lasts a year, an extended plan might insure your computer during years two and three. Most, but not all, systems administrators I’ve talked to avoid extended warranties on commodity items such as desktop computers, especially when they’re buying business-class computers, which often have a three-year warranty. However, some sysadmins opt to purchase an extended warranty for mission-critical equipment such as servers.
- **A Service Plan** generally offers you a higher quality of support and service than you’d normally receive. For example, most manufacturers’ warranties don’t cover accidental damage to a computer. However, for an additional fee you can purchase accidental damage protection. Again, many systems administrators avoid this type of enhanced service plan unless the item is mission-critical. For example, you might want 24-hour parts replacement or top-tier phone support on your Web server or your Windows domain controller.

QUESTIONS TO CONSIDER WHEN EVALUATING WARRANTIES

- If you’re buying a lot of computers from the same vendor, can you get an extended warranty or an upgraded service plan thrown in for free?
- Does your credit card offer an extended warranty? Some cards will extend the manufacturer’s warranty automatically.
- Is the money better spent elsewhere? Extended warranties typically cost between 10 and 30 percent of the retail price of the item. With desktop PCs, consider putting this money into a repair and replacement fund that you can use when and if your machines break down.
- How much time do you have to troubleshoot and support your computers? If you don’t have a full-time systems administrator and you’re tired of fixing your own PCs, a



service plan might offer you on-site repair or premier phone support. If you have more money than time, it might be worth it, but do some Web searches to get a sense of the strengths and weaknesses of the plans you're looking at.

- How much expertise do you have? Again, if you don't have much experience with technology, it might be worth it to pay for top-tier phone support or on-site support. However, trial and error is often the best way to learn, so think twice about letting someone else do all your troubleshooting.

Stories from the Field

Typically for the library, you know, the sort of standard warranty that comes with the computers...varies, depending upon the vendor. Most of the time, we don't do extended warranties. We've had pretty good luck with the machines. Part of that is, you know, we're able to actually replace parts that go bad. If a hard drive goes bad, we'll just [replace it] and, you know, pay the cost of doing that...individual pieces. Probably the biggest replacement that needed to happen was [after] a lightning strike a few years ago. And essentially, the insurance took care of replacing all of those. So, you know, on a normal basis, no, we typically don't go with the extended warranties or extended, extended warranties from the vendors.

*Brian Heils
Dubuque County Library, IA*

We do. Some small stuff we can and do fix here, but the majority of the stuff, Dell, I know, is the only one I've had to actually use, they do next-day service, and they're real good about getting out here and getting us going again for big stuff that we don't want to tackle. Replacing motherboards and that sort of thing....Until they become OPACs, generally, our computers are all under warranty while they're in general use. Once we move them down to the OPACs, that usually means they're out of warranty, so if an OPAC dies, I just grab it. If it can be fixed easily, great; if not, then we switch out another one of the older computers and set it up.

*Robin Hastings
Missouri River Regional Library, MO*

On warranties, I like the PC to have at least a three- to four-year warranty. Sometimes, depending on the season or the mood of the computer company, getting that extra fourth year can be really expensive. So I don't always get that. But most of the business machines I buy come standard with a three-year warranty. And sometimes you can save a little bit of money if you shave off things like onsite repair, because a lot of times, they'll want to sell you the warranty, and it's an expensive one because they'll send someone onsite to replace that power supply. And I don't need them to send someone onsite. I can do that myself. Or a lot of times they have weird gold tech support or they have silver and platinum tech support with different prices, or they like to do things, like for an extra 50 bucks a year, you can keep your hard drive if it fails and we'll send you a replacement, and then you can swap them out and mail them back. They have little ways you can shave more money off the contracts. But standard, I like three to four years with machines. Printers, I like to have a good five-year warranty; and you can push a printer a lot longer than a PC. And then [with] notebooks, I'll go with three to four years as well.



*Matt Beckstrom
Lewis & Clark Public Library, MT*

We do that. We purchase the warranties. That has been a big help to us to have those warranties in place. We don't feel the stress financially if we know we've got warranties on them.

*LeeAnn Jesse
Adair County Public Library, KY*

Further Resources

For additional articles and resources about computer warranties, check out our [Further Resources](#) section.



How to Standardize Your IT Infrastructure

How Standardized Do You Need to Be?

Being open and adaptive to new technologies can be important to both your organization's mission and its ability to operate efficiently. Likewise, being flexible when it comes to individual preferences can help employees work better and encourage creativity.

Yet every technology you introduce to your nonprofit — whether you implement it organization-wide or just on one computer — comes with hidden and not-so-hidden costs. Every new piece of software you add to your IT arsenal requires installation, maintenance, staff training, repair, patches, upgrades, and more.

How you address this tension between innovation on the one hand and the need for consistency on the other depends on your size, your organizational culture, how many IT staff you have, and how tech-savvy your staff is. While some organizations are very centralized — purging unsupported hardware or software as soon as it's detected — other organizations eschew strict enforcement in favor of a more balanced, less time- and resource-intensive approach. These organizations may allow staff to download unsupported software, for example, but refuse to troubleshoot it and will uninstall it if it conflicts with other programs. (Note that this more flexible route carries with it an increased risk of spyware and virus infections, however.)

For these reasons, it's important to adopt a standardization policy that fits your situation and needs. Though there are many benefits to centralizing your purchases, decide what makes the best sense for your organization before making sweeping changes to your current setup.

Standardizing Your Equipment

If you work in a library with multiple models and versions of software and equipment, the task of standardizing everything can be overwhelming. Starting from scratch by buying all new equipment is probably not an option for most (if any) organizations, but there are a few steps you can take to standardize your equipment over time. We suggest you read our [Eight Smart Tips for Standardizing Your Equipment](#) tool, also available in PDF.

Balancing IT Needs and Staff Needs

If your organization has traditionally allowed departments to choose and customize their own equipment, it can be difficult to convince employees to switch to a more centralized, standardization-friendly IT purchasing system. Yet there are ways to streamline your purchasing procedures without ignoring staff needs.

- **Involve frontline staff in the technology planning process and purchasing decisions.** Representatives from each department can be a part of the team that writes your organization's tech plan; if staff members don't have time to participate directly, you can interview them about their technology priorities and concerns. If you're making a major purchasing decision, be sure to ask staff from various departments to weigh in on the packages offered by various vendors.

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- **Train your frontline staff.** If your staff doesn't know how to use the official, supported programs, they're more likely to fall back on unsupported software.
 - **Create a list of "preference" software.** Many organizations have a list of "preference" software that employees can request from the IT department. These applications are supported, but not installed by default on every machine. This model gives employees access to specialized software, while controlling cost and complexity.
 - **Allow unsupported software,** but make it clear that staff uses it at their own risk. If it causes headaches for IT, they can uninstall the program or reimagine the hard drive if the situation is dire enough. This approach can cause extra headaches for your IT department if staff doesn't remember what they've installed or doesn't disclose it. On the other hand, your frontline staff might discover useful applications that IT eventually adopts for the whole organization.

The Benefits of Standardization

Hardware and software aren't the only aspects of an IT system that you might consider streamlining. We've highlighted some of the advantages of standardizing everything from your operating system to your vendor relationships in the following sections.

OPERATING SYSTEMS

It's hard for techies to stay on top of new releases, updates and information when they're supporting more than one operating system. Moreover, because each operating system supports different software, you may end up supporting two versions of every piece of software, or different pieces of software that serve the same purpose, if you fail to impose a standard operating system at your organization.

HARDWARE

- Computer manufacturers change their models almost weekly in response to fluctuations in price and the availability of new components from their suppliers. This can cause problems for IT departments, who often want to support a minimum number of hardware configurations.
- You'll also have an easier time finding and tracking replacement parts (e.g., hard drives, network cards, etc.) with standardized hardware.
- If you use disk-cloning software, a new hardware model might force you to build and test a new image. See "Disk-Cloning in Libraries" later in this document for more information.

SOFTWARE

- Some users feel comfortable with their ancient, serviceable software, while others will always clamor for the latest applications and features. However, you can save a lot of time and hassle when your entire organization uses the same version of the same software.
- When you have more software, it's harder to automate the installation of security patches and software upgrades.



- With fewer programs, it's easier to test new programs and upgrades for conflicts. If your organization plans to upgrade from Windows XP to Windows Vista, for example, the IT department has to look at every major piece of software in the organization to make sure it works with the new operating system. More software equals more chances for software conflicts.
- Sometimes you can allow for some customization by allowing staff to choose software off an approved list. This reduces the number of supported applications without eliminating choice altogether. This will also discourage staff from clinging to old, outdated software.
- Training staff on new software will also decrease their dependency on old, non-standard programs.

VENDOR RELATIONSHIPS

Dealing with too many vendors can be confusing from a billing, tech support, and interpersonal perspective. You may be able to reduce the number of vendors you work with by purchasing your printers and servers from the same company that sells you desktop PCs. Technology resellers — businesses that buy equipment on your behalf — can also often be a good place to purchase hardware and software from different manufacturers from one central point of contact, simplifying the purchasing process.

MISCELLANEOUS

Servers, printers, scanners, copiers and other pieces of hardware are cheaper and easier to support if you're buying in bulk from the same vendor. However, only large organizations buy these items frequently enough to make bulk purchases. On the other hand, since successive models from the same manufacturer often have a lot in common, even small organizations can build on their existing skills by staying with the same company over time.



Disk-Cloning in Libraries

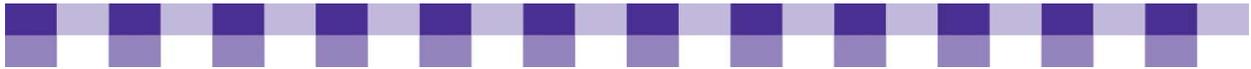
Disk-cloning software, also known as disk-imaging software, is a time-saving program that creates a sector-by-sector, low-level copy of an entire hard drive (or partition). Symantec Ghost and Acronis True Image are two well-known examples, but there are a few dozen others to choose from.

What's the Difference Between Disk-Cloning Software and Backup Software?

Disk-cloning software is primarily designed to save time, while backup software is designed to protect data files in case of a hard drive failure or other disaster. Also, backup software copies the contents of a drive at the file level, while disk-cloning software makes copies at the bit level. Disk-cloning programs can also provide some protection against data loss, but their main purpose is to capture a particular configuration of software and operating system. That snapshot can then be pushed out to another PC with similar hardware components (e.g., similar motherboard, similar processor) or to dozens, or even hundreds, of PCs.

Why Is Disk-Cloning Important, or...Six Ways Disk-Cloning Software Can Make Your Life Easier

1. **New computer staging and deployment:** If you buy a batch of new computers and you want to install a specially configured, unique combination of software and operating system, cloning software can save you days, or even weeks, of duplicated effort. Install the operating system and the software on your "source" machine, tweak all the settings, and then let the cloning software do the rest. However, keep in mind that for this solution to work, your computers must have similar hardware components. The motherboard and the processor need to be identical or at least similar. The hard drive on the destination machine needs to be as large as or larger than the hard drive of the source computer. If the video card, network card, etc. aren't identical, you may be able to work with a single image, but there'll probably be some extra work involved.
2. **Standardization:** You'll save yourself a lot of time and frustration by making sure your computers are as consistent as possible. When you use disk-cloning, you ensure that your computers are as close to identical as possible. If you do each installation and configuration individually, it's almost guaranteed that each computer will be a little bit different. For more information, go to our section on [Consistency and Standardization](#). Also be sure to check out our [Guidelines for Disk-Cloning](#) tool.



3. **Restoration of your computer after it fails:** You should be backing up critical files on a daily basis or even more frequently, but having a reliable data backup is only the beginning of the recovery process. Over months and years, you've probably installed several dozen pieces of software and tweaked the settings in a hundred different ways. It could take you days to return your crashed computer to its original state. If you have a recent snapshot (e.g., a recent disk image), you'll be up and running in an hour or so.
4. **Preventive maintenance and troubleshooting:** Some libraries don't wait for a complete hard drive failure. Instead, they use cloning software to fix relatively minor problems. The cloning process takes a few minutes to an hour, depending on the speed of your network, and you don't have to watch it as it runs. Overall, it's fairly predictable. On the other hand, you often have no idea how long it'll take to repair a problem with somebody's software. It could take minutes, or it could take days.
5. **Training labs:** Many libraries with training labs and public computers reimage these machines periodically to eliminate any developing problems, viruses, spyware, patron downloads, abandoned files, etc. Disk security programs, such as Windows Steady State, Clean Slate, or Deep Freeze, have the same effect, but they use less bandwidth and fewer server resources.
6. **Migrations and hard drive upgrades:** If you're buying a new computer or putting a new hard drive into an existing computer, you can save your existing configuration to a disk image and then restore from that image. Bear in mind, however, that the greater the hardware differences between the two computers, the more trouble you'll have with the migration if you use this technique.

Key Actions

Try to make your computers as consistent as possible. The more consistent and standard your hardware, the easier it is to implement a cloning procedure.

Stories from the Field

Well, I know Dell will actually take an image from us or make an image and do it there, but that's an extra charge. So when we got those 12 computers in, we took one and made it exactly the way we wanted to. And from that point, we took Ghost and made a ghost image from that. And we did those other machines in a day and a half. So we imaged 11 machines in less than nine hours. So it's a pretty quick process that way. And if we had to do it by hand, one by one, it would take the three of us a good week to do those 12.

*Jarvis Sims
Hall County Library System, GA*



Honestly, too, we don't spend a lot of time trying to figure out why something doesn't work. We image everything, so if a desktop is down, we just image it, and it's done in six minutes or whatever in our main building. If we do it over the [wide area network] WAN — I'm here at the main branch and let's say I had to do one at Walton — it takes about 25 minutes. If there is some configuration issue, it's just faster to reimage it.

*Michelle Foster
Boone County Library, KY*

And I do my best to make sure that I've tried every possible combination, and within minutes after I put it out, someone finds something I didn't think of; but that's okay. Once that machine is configured and running, and I know it works well, I create an image of that machine on a portable hard drive, and then I can just clone it. I just push that image out and apply that image to all the other machines. So right now, every morning, the computers in the lab are all identical — same image, same hardware — and that works really well. I spend a good amount of time getting one machine working, and then I just copy and paste it to the other machines. Initially I do each machine one at a time in my office, because that way, I can test the image to make sure it worked. Sometimes, something goes weird. But yes, if someone calls me up and says, 'Gosh, number 12 in the lab is not happy,' I can go into my network software and say reimage this machine and then tell them, 'Go ahead and restart the machine.' And when it restarts, it'll image itself.

*Matt Beckstrom
Lewis and Clark Library, MT*

Further Resources

If you only buy a handful of computers every year, you could take what you get from the manufacturer, add all of your software and call it good. However, this doesn't scale well. It can take hours to set up and configure all of your applications. And if you're installing your own operating system as well, you're looking at three or four additional hours. Exhausted by the tedious swapping of setup CDs, many mid--sized and large libraries use disk--cloning software to automate this process. If you would like to find out more about disk-cloning analysis, check out our [Cookbook For Small and Rural Libraries](#) and review [Meal Plan 2: Meat and Potato Public Computers](#).

There you will find a variety of resources and information on the value of disk-cloning.



Deploying New Computers

Whether you're rolling out a single new computer or a hundred, you need to first ask yourself some questions about the who, what, where, when, why and how behind your deployment decision.

To help in your deployment efforts, we recommend you review our [Deploying New Computers — What to Ask and Why](#) tool.



Installing and Patching Software

Software is the big payoff. It's the reason we all use a computer to begin with, but it can also be a huge source of frustration and wasted time. To minimize your trouble, consider how you'll address software testing, deployment, asset management and patch management.

Why Concern Yourself with Software Installation?

- **The need to be efficient and save time.** As with any major, recurring activity, you're investing a lot of time in software installation, and anything you can do to make it more effective and efficient is worth thinking about.
- **The need for easier maintenance.** When you automate this process, your software has the same settings on every computer and it's installed to the same directory. This type of consistency will make it much easier to troubleshoot problems later on.

Key Actions

Consider a phased rollout of new software or major software upgrades.

Use an asset management program to keep track of where you have software installed and related information concerning license agreements and activation keys.

SOFTWARE TESTING AND PHASED ROLLOUTS

Ideally we'd hire someone to spend weeks testing every new application we install in our organizations, but realistically, we often have to rely on the manufacturer for due diligence and hope for the best. And no matter how much testing you've done, your patrons and staff will still find some glitches that you and the vendor didn't catch. To mitigate the effects of these problems, you can roll out your new software slowly. Install it on a few targeted computers and let those end users know that they're your guinea pigs. Or install it for an entire department. If any problems arise, you'll hear about it from a few individuals rather than your entire organization.

SYSTEMS MANAGEMENT SOFTWARE

Walking from machine to machine with an install CD is "so 1998." As with many other routine activities, software installation can be largely automated these days. Systems management software is a type of software that bundles together several different utilities that can make an administrator's life easier. For example, it lets you specify standard, scripted answers to all of the questions that normally come up during the setup wizard. You generally roll up these preferences into an installer file (aka a software package) and then deploy it to all of your computers. This is sometimes called an unattended installation because once you start the process, it finishes on its own without your intervention. With most systems management software, you don't even have to visit the computers you're trying to install to. After you've created the installer package, the systems management software will push it out to the computers you specify and start the process automatically. Alternatively, you can let end users initiate the install process. This way, staff who don't need the software won't waste a valuable license. Systems management software also handles a wide variety of other administrative tasks, such as patch management, asset management and network



monitoring. If you're interested in learning more, check out the Further Resources section and/or take a look at [the Wikipedia article on the topic](#) and the [accompanying list of software](#).

ADVANTAGES OF SYSTEMS MANAGEMENT SOFTWARE

- You (or your IT department) tweak the software settings once rather than typing them in at every machine.
- You answer the questions in the installation wizard once.
- The software you've deployed is the same on all the machines in your organization. If you install the software on each machine individually, you often end up with differences in each installation, which can make the software harder to support.
- You can decide which machines receive the new software, based on who the end user is, or based on how much power and disk space the computer has.
- You can specify what time of day the installation occurs.

OTHER SOFTWARE INSTALLATION TOOLS

Software installers (often used with Windows systems) and package managers (often used with Linux/Unix systems) can also help you with software rollouts, but they're not as powerful as a systems management suite. They allow you to pre-configure your software and create a standard installation, but you usually can't push the package out so that it runs automatically on all your machines. Instead, you have to carry the installation files around on a CD or download them from a network location. [InstallShield](#) and [Wise Package Studio](#) are two programs of this type.

SOFTWARE ASSET MANAGEMENT

Whatever system you have in place for tracking software licenses, you need to activate it when you install new software. As soon as possible, record the number of licenses you've purchased, the number of copies you've installed and the location of the installed copies. Also, be sure to keep track of your installation CDs, passwords, and license keys.

PATCH MANAGEMENT

In between major releases of a program, software vendors release dozens of small patches to fix problems and close security loopholes. Some applications can be set to automatically download and install these patches, but IT departments often reject this approach due to concerns about compatibility. Before they allow a new piece of code into the organization, IT wants to make sure that it won't corrupt the operating system or cause critical software to malfunction. Also, depending on how the computers are set up, end users may be able to turn off these automatic updates. Patch management software is a more centralized, reliable solution. Again, some programs are designed specifically for patch management, but, in many cases, patch management software will come as part of a systems management software suite.

If you're interested in learning more, go to our [Further Resources](#) section. Check out [How to Handle Patch Management](#) and [the patch management articles on Microsoft's Web site](#). Also, WindowsSecurity.com has [reviewed some of the better-known patch management tools](#).



Stories from the Field

Once you create the auto-install package, you can push it out to multiple computers at a time, so you could do a whole library in one sweep, and supposedly, the thing can also be scheduled to run, say, in the middle of the night when the computers are thawed anyway. Although I've had limited success for whatever reason. Sometimes it runs, and sometimes it doesn't. I just haven't had a lot of time to play with it, but if I ever get it down, I could actually set the thing to do an upgrade in the middle of the night, and you come in the next morning, and they're upgraded and ready to go.

*Rick Moody
Birmingham Public Library, AL*

Our patches are done centrally, and we use Microsoft's patch management software...The Windows updates and the antivirus updates are automatically updated through a server on that network that is updated via the Web, and then all of the public terminals are updated via that server.

*Jim Buston
City of Auburn, AL*

Novell ZENworks is an application initially designed for desktop management. And they've added to it over the years, and now it has many different aspects to it. So, for instance, if you were to come and sit down at one of my computers right now, after you get through our PC reservation system and you get logged onto the computer, you will see an empty desktop. There are no icons on the desktop. The Start menu has nothing on it but Log Off. And the only thing that will open on the machine is a window. And that window is from Novell's ZENworks — it's called Application Monitor. And so I, as an administrator, create basically an icon. I'll create an icon for Internet Explorer, for instance. And I will tell the network that anybody logged into either this computer or anybody logged into the network as this user gets this icon. And they can't have anything else but this icon. So, like, right now, you'd sit down at my computer, you'd see a window, and in that window would be the icons that I say they can have. So there's Word, Excel, PowerPoint, Publisher, Internet Explorer. In some cases, [there are] games, and I create those icons. I tell the Application Monitor window which icons to display. And I can say stuff like, if the executable for Word doesn't exist, don't show the icon, because otherwise, people would be clicking on it and getting an error message.

Also, I can do things like application updating. So if they release a new version of Adobe Acrobat Reader, I can create a package on my desk and say this is the update to the Acrobat Reader. Now go ahead and do that to all 500 of my computers. I don't have 500 computers, but if I did, and it would go and install itself on all those machines. Or update it on all those machines. Or I could actually uninstall applications remotely, too.

It also does imaging on the PCs, so I can build a workstation, put all the applications on it and then make a copy of it on a remote disk. I just plug it in and say, 'Now push this image down, push this image down,' so that I can clone machines really fast. And they're all identical, which is nice. It also does remote management so that I can connect PCs remotely. It also does policy management. And that's what I use for our public workstations. I can create a policy package [that] is basically a bunch of registry entries. And I can tell the system, 'Okay, anybody on this computer gets this policy.' And then I can change the policy up here from my desk, and every PC who



logs in that uses that policy gets those changes. It also does application and hardware inventory so that I can do a quick glance and find out how many Dell GX520s I've got, how much RAM is in them [and] what applications are on them. I can do license metering, so I can see, oh, I only purchased 20 licenses of Microsoft Word, but I'm using 22, so I'm out of compliance. You know? And it does a lot more than that, but that's the beginning.

*Matt Beckstrom
Lewis & Clark Public Library, MT*

Further Resources

Adding new software or upgrading software on computers that you've already deployed is a process with its own set of variables. We've included [additional resources](#) on the topic of software patching and installation that you might find useful.



Tools

There are so many things to consider when buying library technology. Where are the best deals — the city, the county or the state? Perhaps cooperative negotiations are the best way to go for you. Then there's the actual job of deployment and installation. You've got to plan ahead for that. Fortunately, we've provided a few tools to help you in this endeavor and make the whole process a bit easier.

Ten Steps to Successfully Working with Vendors

ACTION	TO LEARN MORE
Determine if this is the right time to make this purchase.	The NPower guide mentioned previously offers five criteria for deciding if you're ready for a particular technology project. See the "Assessing Feasibility" section.
If the project involves considerable time and labor, decide if you should outsource it. In other words, do you need a vendor...or should you keep the project in-house?	Summit Collaborative offers guidance for answering this question in its article Determining Whether to Outsource
Figure out your organization's needs. What are you trying to change in your organization by buying this product or service? What are the outcomes you're trying to achieve?	The article What Do You Need from a Provider? can help you define your needs up-front. If you create a formal requirements document (also known as a needs assessment) that defines your required and desired outcomes, you can use this as the basis of your RFP and your vendor evaluation matrix.
Determine if you should write an RFP. Call your city attorney, IT department, purchasing agency and ask for the policy on RFPs. Frequently, RFPs are required above a certain dollar amount (e.g., \$5,000 or \$10,000).	The article The RFP Process: An Overview explains the difference between an RFP (request for proposal), an RFI (request for information) and an RFQ (request for quotation), and provides guidelines to help you decide between a formal and an informal RFP process. Remember, by buying off a state contract, you can often satisfy local requirements and avoid the tedious process of writing your own RFP. See the following "State Contracts" section for more information.
Become an RFP pro. There are a number of excellent resources that can help you get started.	The articles Writing an RFP and The RFP: Writing One and Responding to One provide helpful RFP checklists to get you started. Beyond the Template: Writing an RFP That Works offers additional advice on making your RFP stand out from the crowd.



ACTION	TO LEARN MORE
<p>Research possible vendors.</p>	<p>TechSoup's Nine Tips for Navigating the RFP Research Phase recommends places to turn to when you're researching a vendor's track record, while TechRepublic's Follow These Guides on the Road to a Valuable Vendor Relationship emphasizes the importance of checking a vendor's references.</p>
<p>Develop vendor selection criteria (see the following "Vendor Selection Criteria Specific to Libraries" section).</p>	<p>Idealware's article Vendors as Allies: How to Evaluate Viability, Service, and Commitment offers some great suggestions about the criteria you should apply when choosing a software vendor, especially when the software in question is large, complex, and mission-critical. Ellyssa Kroski focuses her analysis on choosing an ILS vendor.</p> <p>NPower's Selecting the Right Technology Vendor includes a thorough list of evaluation criteria in its appendix.</p>
<p>Negotiate and write the contract. Work with an individual or department in your organization that is the expert in contract rules and regulations. Turn to them first so that you abide by the relevant laws and policies. However, for large, complex, important projects, make sure you and your colleagues are involved in drawing up the contract.</p>	<p>TechSoup's Writing a Contract offers helpful guidelines on contract negotiation, while CASAnet's Putting Agreements in Writing outlines the key elements of a written contract.</p> <p>It may be appropriate to put a service level agreement (SLA) into some contracts. An SLA defines the performance level a provider is bound to. For more information, see HelpDesk Journal's Service Level Agreements Boot Camp and ComputerWorld's SLA 101: What to Look for in a Service-Level Agreement</p>



ACTION	TO LEARN MORE
Manage your vendor relationships. You can't just sign a contract and then ignore your vendor.	For tips on how to keep that relationship running smoothly, read Marc and Beth's article on TechSoup
Evaluate your vendor relationships. Examine the market and your library's needs on a regular basis. The best vendor last year won't necessarily be the best vendor this year. On the flip side, a long-term vendor relationship can pay off in service and perks. Also, a well-written contract often includes benchmarks that you can use later to evaluate the vendor's performance.	



How to Buy Cooperatively Quick Reference

Buy off state contracts. In most states, the government has negotiated deals with a variety of vendors, obtaining steep discounts that local government agencies can take advantage of. You can buy hardware, software, supplies, even cars off state master contracts. For nonspecialized hardware and software, the prices on the master contract frequently beat the prices you can negotiate for yourself. However, you probably won't find highly specialized items, such as print management software or ILS software. Not every state has this great arrangement, but most do. Also, the details vary widely from state to state. If you don't know anything about state contracts and you want to learn more, get in touch with your state library or state procurement office, or do a Google search for "state contract *your state*."

Buy off the city or county contract. In some cases, you'll be partnering with other municipal agencies, whether you want to or not. If the library is under the legal authority of the town government and local policy dictates that everyone has to buy computers through the IT department, that's what you'll do. However, if your library is administered independently, it could still be worthwhile to meet with the town's IT folks. They might be able to negotiate a better deal for you than you can get on your own, or they might have some good advice about bargaining with vendors.

Let a library cooperative negotiate for you. In many areas, the state library or a statewide library cooperative negotiates steep discounts for members and constituents. Some of these cooperatives only negotiate the licensing of online databases from vendors such as Proquest and Thomson-Gale. Others focus on a wider range of library-specific products, such as books, magazines, furniture, preservation materials, barcode scanners, etc. In other words, these library cooperatives often complement the work done by state government purchasing agencies (see the first bullet item above), though there might be some overlap. You're more likely to find desktop computers, servers and other commodity technology on the state contracts. [The Colorado Library Consortium](#) and [Minitex](#) are two examples of consortia that negotiate on behalf of member libraries.

OCLC regional service providers. If your library system or your state library has paid for membership in an OCLC regional consortium, you're probably eligible for discounts on library-related supplies and services. Of course, these organizations begin by negotiating deals with OCLC itself, but they also negotiate with other vendors. For the most part, the regional service providers represent multiple states. BCR, Amigos and Solinet are prominent examples. [Wikipedia](#) has a full list.

Set up your own cooperative purchasing arrangement with other libraries in your area, local colleges, K-12 schools or area non-profits. It can be time-consuming to create a consortium, so ask yourself if the long-term benefits outweigh the initial effort. Also, talk to lawyers and accountants who know the local laws and regulations. They can probably guide you to templates that you can use as a basis for your purchasing agreements. For more information on using local partnerships to buy broadband and other telecommunication services, see [Internet Access and ISPs](#).



How to Examine a Lease Agreement

Do your homework and read the terms of the lease carefully before signing. The following are some questions you'll want to consider:

1. **What happens at the end of the lease?** In the past, some leasing companies required that you return to them the exact same machine that they sent you originally, and they checked the serial number to make certain. However, more and more, companies are willing to be flexible and accept a computer that's comparable in most respects to the one they loaned you.
2. **Do you have a good asset-tracking and management system?** Even though companies are becoming more patient and understanding about end-of-lease arrangements, you still have to return something to them in fairly good condition. If you constantly have trouble tracking and locating your equipment, you should buy rather than lease.
3. **Are there other end-of-lease terms?** Can you buy the equipment and at what price? How strict will they be about the condition of the computers? Don't be afraid to push back if the leasing company gives you trouble, because you may be negotiating a new lease at the same time you're returning the old equipment.
4. **Who is responsible for maintenance and repair?** While vendors will probably replace defective parts during the period of the lease, they usually don't repair damage done by patrons, whether accidental or intentional.
5. **Does the lease lock you into any financial issues downstream?** If possible, show the lease to your accountant, your director, your CFO, or whoever it is that balances your books. The structure of the lease could have unforeseen consequences on your budgets and your cash flow, so you want to get their approval if possible.
6. **Does the leasing company require an up-front down payment, security deposit, proof of insurance or some other hedge against losses on their part?** Most likely, as a government agency, you won't have to bother with this stipulation, but check the leasing agreement to make sure.



Buying Hardware Checklist

ACTION	KEY CONSIDERATIONS
<p>Pay attention to your users.</p> <ul style="list-style-type: none"> – What are they actually doing with their computers? – What software do staff and patrons use most often? 	<p>In most libraries, staff and patrons aren't using resource-intensive applications, so you don't need the latest, greatest, fastest computers. However, if you're buying machines for teen gaming or video editing, you may need something more robust.</p>
<p>Think about obsolescence.</p> <ul style="list-style-type: none"> – You don't need to pay a premium for the speediest PCs, but if you buy bargain-basement equipment, will it cost you more in the long run? 	<p>Remember, every few years, Microsoft releases a new, resource-intensive operating system (e.g., Windows Vista) and then stops supporting one of its older operating systems. So it's important to strike the right balance. For a quick take on buying desktop machines, see A Simple Guide to Buying Computers. If you want a more detailed discussion, read Desktop Computers for Your Business.</p>
<p>For labs/public computing environments, consider business-model computers rather than consumer computers.</p>	<p>Business-grade machines tend to be more durable.</p>
<p>Ask some questions about the vendors on your shortlist.</p> <ul style="list-style-type: none"> – How long have they been in business? How stable are they financially? – What's the average failure rate and/or return rate on their equipment? 	<p>It's often hard to get a reliable answer to this last question, but it doesn't hurt to ask.</p>
<p>Find out if the company offers imaging and installation services.</p> <ul style="list-style-type: none"> – Will they install the operating system and the core software? – Will they install customized software and peripheral devices? – Will they come to your library and put all the equipment together? 	<p>All of these services cost extra money, but they're worth considering if your IT department is short-staffed. For more information, see our chapter on Deploying New Computers, and Disk-Cloning.</p>



ACTION	KEY CONSIDERATIONS
<p>Ask about vendor support after installation.</p> <ul style="list-style-type: none"> – What’s their initial response time to a tech support call? – What’s the time to resolution (e.g., the time between your initial call and the time the problem is fixed)? – Which problems will they help you with? 	<p>For more information, see the following section on warranties and service plans.</p>
<p>Determine whether you should do business with the manufacturer or with a hardware reseller.</p>	<p>A reseller with multiple manufacturer relationships can sometimes simplify your life by serving as a single point of contact, handling multiple purchases on your behalf, and presenting you with a consolidated bill. A reseller might also be closer to you geographically and better able to offer personalized service. On the other hand, resellers will charge you extra for this added value. For details, read Where to Buy a PC and What Is a Value-Added Reseller.</p>
<p>Check out the vendor’s disposal policy.</p> <ul style="list-style-type: none"> – Can you return out-of-date equipment to the vendor, knowing it will be properly disposed of? – What do they charge for this service? 	<p>For more information, see our section on Reusing, Recycling and Replacing Old Computers.</p>
<p>Talk to an e-rate expert. Certain networking equipment purchases (e.g. routers, switches, firewalls, wiring) qualify for e-rate discounts if your library is located in a high-poverty area.</p>	<p>If you plan to apply for e-rate discounts, you have to abide by certain rules when selecting a vendor. The eligible services list will help you decide whether a service or a piece of equipment is eligible for discounts. Better yet, get in touch with someone who really understands the e-rate system and ask them if you might qualify for Priority Two discounts (also known as Internal Connections discounts).</p>



Buying Software Checklist

ACTION	KEY CONSIDERATIONS
Do some research and testing.	If possible, download a trial software application on a machine that closely matches the typical library computer, so you can see if it's compatible with your existing hardware and software. For major software purchases, ask librarians and patrons from different departments and backgrounds to help with testing.
Look at TechSoup Stock to see if you qualify for discounted software.	TechSoup only charges an administration fee, so you're only paying between 5 and 20 percent of the retail price. All public libraries in the U.S. and Canada qualify for this program, and almost all Microsoft titles are included.]
Pay attention to the software license agreement (sometimes known as the End-User License Agreement or EULA).	Some license agreements will actually tell you that by using the software, you've agreed to install spyware on your computer. While this is more of a problem with free software, it's always a good idea to run through the license agreement. Since most of us don't have time to wade through each EULA, check out EULAnalyzer , a utility that examines each agreement for key words and phrases.
For major pieces of software, such as an ILS system, seek expert advice before signing a contract or license agreement.	You're tying your library into this agreement for years to come, and since this is such a large purchase, you may have more leverage to renegotiate some of the terms. Check out How to Make Software Contract Negotiations Work for Your Business and Reviewing Software License Agreements for more suggestions.
Know your vendor.	10 Things You Should Ask Before Buying Software has some questions you can pose to your vendor.
If you're buying a large quantity of a particular software title, investigate volume licenses and site licenses.	You can often receive discounts for this type of bulk purchase, and software that comes with a site license is generally easier to install and administer. Usually, volume discounts start somewhere between three and ten copies of an application, but it varies from vendor to vendor. Save Money with Volume Software Licensing has more information. Also take a look at Microsoft's documentation on volume license keys .



ACTION	KEY CONSIDERATIONS
If you have a system for tracking your license agreements and installation keys, be sure to input the information about your new purchase.	This is discussed in more detail in Asset Management .
Keep your IT department in the loop from the beginning.	They'll be the ones supporting the software and will probably play a role in training staff. They can also help you test the software.
Centralize software purchases as much as possible to avoid the proliferation of different applications that serve the same purpose and different versions of the same application.	For more information, see our section on Standardizing Your IT Structure.



Eight Smart Tips for Standardizing Your Equipment

- **Buy in quantity.** Dell, HP and other vendors change their models constantly, meaning that the computer you buy this week may be different from the one you bought last week, even if the model number is exactly the same. It may have a different network card, a different hard drive or even a different motherboard. If you space your purchases out over the year, each batch of machines will be a little different from the others. You can mitigate this somewhat by working with your sales representative and buying business-class computers (see the next bullet), but it's still worth it to consolidate your purchases.
- **Buy business-class computers.** When you're buying new computers, consider business over home models. Manufacturers change the components in their business machines much less frequently, and they often will guarantee configuration support for a certain period of time (usually six months).
- **Plan ahead.** If you speak with a broad cross-section of your colleagues and supervisors when you're planning your budget for the year, you'll know roughly how many new computers you'll need and what other types of technology you'll be buying, making it easier to standardize your equipment.
- **Make technology inventories and track your assets.** If you know how many computers you have and how old they are, you'll know roughly how many you need to replace in the upcoming year. Also, you can identify the one-off, non-standard pieces of hardware and software in your nonprofit and then get rid of them as soon as possible.
- **Make purchases centrally.** Although all staff should have some input into your purchasing plans, don't let every department do its own buying unless they're buying off of a predefined list of approved items. Individual purchasing can not only lead to hardware and software incompatibility, but it can also cause confusion on the accounting side as you try to sort through and reconcile bills from multiple vendors.
- **Accept donations selectively.** If you accept every hardware donation that shows up on your doorstep, you'll eventually have an unmanageable patchwork of computing equipment. One way to prevent this is to create a written policy specifying which donations you will and won't accept. This policy can help you politely decline gifts that don't fit with the mission and technology plan of your organization, and direct unwanted donations to qualified computer refurbishers and recyclers, where they will be updated or disposed of responsibly. Unsure about when to accept or decline the offer of new equipment? See TechSoup's article [Six Tips for Accepting \(and Refusing!\) Donated Equipment](#).
- **Adopt standardization policies.** Your policies should reflect your decisions with regard to centralization and standardization. A simple policy entitled "Supported Hardware and Software" is a good start, but your IT purchasing policy, and your computer acceptable use policy should also reflect your approach to these questions.
- **Use systems management software suites.** Microsoft's System Center Configuration Manager ([available on TechSoup Stock](#)) [Novell ZENworks](#) and several dozen other software packages can help your IT department automate routine tasks and control the configuration of end-user machines. Be aware, though, that these programs are often expensive, complex and difficult to implement. Wikipedia has a [list of systems](#)



[management software](#) and [a short definition of this type of software](#). Also if your organization has a Windows domain controller (using [Windows Server 2003](#) or [Windows Server 2008](#), both available on TechSoup), you can use Active Directory and Group Policy to control the configuration of your desktop PCs. However, you won't have all the options and features that you would get with most systems management systems.



Guidelines for Disk-Cloning

What To...

...LOOK FOR IN A CLONING SOLUTION

- **Imaging assistance:** Should you do the imaging yourself or pay a third party? Computer manufacturers, resellers and other companies are happy to clone your computers for a price. The larger your order, the more likely you can benefit from this type of arrangement. Cloning 100 or 200 computers in your library can put a serious strain on your network and your IT department staffers.
- **Maximum limits:** What's the maximum number of computers that the software can handle simultaneously?
- **Efficiencies:** How does the cloning software react to differences in hardware components? If you have two batches of PCs with similar components, you may be able to clone both with a single image. This can save you time and disk space. Also, can you restore individual files from your disk image without restoring the entire disk? In other words, can you browse the image as though it were a file system and pull out a single file or a handful of files? With the current versions of most cloning programs, you can do this.
- **Software capabilities:** Will the software perform incremental updates? In this sense, cloning software is becoming more and more like backup software. It scans your source computer for recent changes and incorporates them into the master image without forcing you to shut down or reboot. Also, creating a full image can really hog your library's network and computing resources. These small, incremental updates are much more efficient.

...CONSIDER WHEN IMPLEMENTING A CLONING SOLUTION

- **Hardware purchases planning:** For cloning to work effectively, you need to have a minimum number of different hardware models. If you buy a few computers here and there, you'll wind up with a patchwork environment, and you'll have to manage dozens of different disk images. More is not better in this case. For more on this topic, check out our coverage of [Standardizing Your IT Infrastructure](#).
- **Master disk images planning:** Who creates the images? Who decides what software to include and how to configure that software? Remember, these disk images may be deployed to dozens of staff computers or public computers, so the affected parties should have a voice in the development of the image.
- **Source image preparation:** Microsoft Windows operating systems come with a utility called [Sysprep](#) that strips out all unique, specific information (e.g., computer name and security identifier) from your source hard drive and gets it ready for cloning. [Nlite](#) is an open-source program that lets you strip out Windows Media Player, Outlook Express, and other add-on features from Windows XP (but not Vista). These preparation utilities are often used in concert with post-cloning tools such as Setup Manager and Ghostwalker. (See "Tweaking and Customizing" for more details on these tools.)
- **Image deployment:** You can always perform a direct disk-to-disk copy of an image. In other words, your source and destination hard drives are connected to the same



computer, or they're connected via a network. The transfer is direct, without any intermediate steps. However, many librarians and systems administrators create a "master image" and then deploy from that. The master image is usually stored on a removable hard drive or a network drive (see "Testing"). When you have a large number of computers to image, you should consider deploying the image across the network. Using a technology known as multicasting, most disk-cloning programs can image dozens of computers at the same time. Multicasting may slow your network down somewhat (do it after hours or during non-peak hours), but it was designed specifically to send lots of information to lots of computers with the least possible overhead and bandwidth use. It won't choke your network as long as your network infrastructure is relatively up-to-date. Also, if you'll be cloning and multicasting on a regular basis, you should consider dedicating a server to the process.

- **Testing:** If you're cloning lots of computers, image one or two and examine them carefully before deploying to your entire library. Check that your image is reliable and uncorrupted. Also, look again to make sure that you haven't forgotten an important setting or an important piece of software.
- **Tweaking and customizing:** Your computers might be 99 percent identical, but that last 1 percent is still important. After you've cloned your PCs, you need to change the name of each one to avoid conflicts on the network. If your computers use static IP addresses (increasingly rare), you should assign these manually to each machine after they're imaged. In a Windows domain environment, you also need to assign a special identifier (called a SID) to each machine. Often, your cloning software will have a tool that can handle this automatically (e.g., Ghostwalker or Setup Manager).
- **Image storage and management:** With most cloning software, you can save your images to a local hard drive, a network drive, a tape backup, CDs or DVDs. Avoid CDs and DVDs if you can. Since most images won't fit on a single CD or DVD, you'll have to span your image across multiple disks. However, once you've saved your master drive to a local hard drive or a network drive, you can use DVDs to create backups of these images.

Deploying New Computers — What to Ask and Why

WHAT TO ASK...	...AND WHY
Who will prepare and deploy your computers?	In most libraries, the in-house IT staff deploys the computers, but if your IT department is understaffed, you can always hire a third party to help you. The computer manufacturer or reseller can handle part or all of the preparation. Finally, to a limited degree, library staff can assist if they're savvy enough.
How will you install the operating system and the core software?	Disk-cloning is the easiest way to do this when you're dealing with more than a handful of computers.
Do you need to install any special software or make other tweaks?	Disk-cloning programs will help deploy a core, standard configuration. However, some librarians work with special applications. For instance, one person needs accounting software, while another needs graphic design software. Also, certain settings are unique to each computer (e.g., computer name, IP address, SID and mapped network drives).
Is there any special hardware that you need to install and deliver along with the computer itself?	For example, circulation computers often need barcode readers and receipt printers, and some users need their own local printer or scanner.
Do you need to migrate data from the old computer to the new computer?	In the best of all possible worlds, library staff save their files to a server, and the IT department backs it up on a regular basis. However, some users insist on saving their data to the desktop or the local hard drive. Before you swap computers, make sure the user has backed up all his or her data to a secure location.
When will you deploy the new computers?	Timing is especially important if you're replacing computers for an entire department or library branch. For larger installations, you should ask the IT department to do their work at night or on the weekend.
Did you get what you paid for?	Consider spot-checking your new computers to make sure you received the components and software that you actually ordered. Run TechAtlas' inventory tool or Belarc Advisor to see how much memory and hard disk space your computer has. Did you receive the processors, network cards and graphics cards that you requested? Are any programs missing?
Should you document all the decisions you've made previously?	Deploying new computers is a complex process. Even if you're the only one involved, it can be difficult to remember all the steps. If you're working with multiple staff members and/or multiple organizations, you need to write it all down. Be especially careful to note what software and hardware you've included with each new computer. Though you can use a word-processing document or spreadsheet for this, you should also consider some sort of asset tracking software .



Further Resources

Buying Refurbished Computers

- There are over 500 Community Microsoft Authorized Refurbishers in the U.S., Canada and Latin American countries. TechSoup has [a list that you can search by ZIP code](#).
- Most of these refurbishers provide low-cost IT equipment to libraries in addition to schools, nonprofits and low-income families.
- There are several large, commercial suppliers of refurbished computers. Some of the better-known companies include:
 - [Redemtech](#) is a Microsoft Authorized Refurbisher that sells Windows XP – installed desktops and laptops with a 90-day warranty plus Microsoft service and support.
 - [TechTurn Refurbished Computers](#) is a Microsoft Authorized Refurbisher selling open-box, refurbished, and scratch and dent inventory with a 90-day warranty and genuine Windows software.
 - [Intechra Outlet](#) sells factory refurbished excess inventory, open-box returns and off-lease computers and monitors with a 120-day parts/labor warranty.
 - [Dell Outlet](#) sells previously ordered new, certified refurbished, and scratch and dent inventory with the same Dell warranty given to customers buying built-to-order Dell systems and a 21-day return policy.
 - [HP Outlet](#) sells refurbished desktops and laptops with either a 90-day or 1-year warranty depending upon the model purchased.
- To learn more about refurbishing, reusing and recycling computers, see TechSoup's [directory of reuse and recycling articles](#). [PC Bargain Hunter](#) also has some advice on buying used equipment.

Leasing Computers and Other Equipment

- Both “[Should You Buy or Lease](#)” and “[Lease Versus Purchase](#)”; both of these resources have good tips on this topic.
- Although there are third-party leasing companies, some IT managers feel more comfortable leasing directly from the manufacturer. For example, [Dell Financial Services](#), [HP Financial Services](#) has a wide array of leasing options.

Warranties and Service Plans

- Check out [Techsoup's What to Look for in a Hardware Warranty](#) , [PC World's Are Extended Warranties Worth It?](#), and [Bullet Proof Your PC's Warranty](#).
- Look at the “[Service Plans](#)” section of Hardware Buying Plans for some more good advice.



Disk-Cloning in Libraries

- TechSoup has another [introduction to disk-cloning](#), and [PC Magazine's Drive Imaging: Beyond Basics](#) has reviews of five leading products.
- Also check out [How to Image Windows XP with Ghost and Sysprep](#) and [Disk Imaging Software Review 2008](#)

Installing and Patching Software

[Microsoft's System Center Configuration Manager](#) and Novell's [ZENworks](#) are two popular systems management suites. Qualified organizations can purchase [System Center Configuration Manager](#) from TechSoup for \$52. In a Windows Active Directory environment, you can also use [Group Policy](#) and [MSI files](#) to deploy software, though this requires some in-depth knowledge to accomplish.



Maintaining and Sustaining Technology

In this section, we address the day-to-day management of library technology. In other words, once you have it, what do you do with it all? How do you keep it running? How do you facilitate communication between frontline staff and IT personnel? How do you hire the best available techies? What do you do with old computers? How do you document your IT environment and keep track of your hardware and software? Should you plan in advance for upgrades and replacements?

If you're new to managing public computers, you may want to start by looking at A Cookbook for Small and Rural Libraries, especially Chapter Two. You'll find solid information there about maintenance checklists, hard drive lock-down tools and related topics. If you're interested in PC reservation software and print management software, check out Chapters 5 and 6 of Recipes for a 5-Star Library. You can find them both on our [Cookbook home page](#).

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Introduction to Help-Desk Management

There are many different ways in which you can manage and automate your help-desk...your approach has much to do with your current library environment and available resources. Do you have policies and procedures in place to help your staff handle tech support issues? Are you large enough that you could benefit from some help-desk management software? Do you have a regular maintenance routine for your computers? Are you making an effort to standardize your IT infrastructure? Our intent here is to give you the information and tools you need to evaluate your help-desk support needs and take appropriate action.

Why Should You Actively Manage Your Help-Desk?

- **Protect your IT investments.** Computers that aren't supported and maintained properly will break down more often and cease to function sooner.
- **Make IT staff more effective.** Remote desktop tools cut down on travel, and help-desk management software helps your techies manage their time and their workflow.
- **Boost staff productivity.** The longer your colleagues have to wait for tech support, the less work they can do.
- **Avoid “shadow” tech support.** If staff has to wait too long, they'll often try to fix problems on their own or find workarounds. This usually winds up costing you more lost time and productivity. Also, staff can sometimes make a problem worse with their fixes, and their workarounds may pose a security problem.

Key Actions

To help you better understand your tech support situation, we have created a [Library Tech Support Evaluation Sheet](#).

Stories from the Field

We just have to figure it out. We are a very small library, and we don't have some of the services that bigger towns have. Last resort, there is one place in town we could hire a technician from, but the library's budget doesn't have a lot of money for things like that. So usually what I've done in the past, if there's just something that I can't figure out, I call other librarians from surrounding areas and ask them if something like that has happened to them and what they've done. For instance, we actually got a grant from Gates, and one of the librarians from Miles City came and helped me set up the computers because I was new. Well, I wasn't new, but my job had changed, and I went from cataloging to more of the technology part of what our library does. And she came down. She helped us. It was phenomenal and amazing. It was Hannah Nash from Miles City. We have such great contact and support from other libraries that if I can't figure it out myself, that's how we usually get things done.

*Dawn Kingstad
Glendive Public Library, MT*



It can be very frustrating thinking, 'All I want is this one little thing fixed.' But he knows that we're functioning okay without it. It's not going to cause the system to shut down. And he may have another client whose system is shutting down. So we keep saying, 'Would you please hire more people? Hire some more people, we need more time.' And I think the distance is also a problem. If he were just down the road or 20 minutes away, that would be really helpful. But it's an hour and a half to two hours for him to get here from his office. So it isn't just an hour quick fix. It's an hour quick fix plus three-hour round trip drive.

*Drusilla Carter
Carter Chesterfield County Library, SC*

I do most of the tech support because we have an extremely small budget for technology. My IT guy also works for some of the rural schools in our area, and he lives 20 miles away from here as well, so he's not readily available. And so I do a good majority of the IT work and then when I run into things that I just can't deal with or don't have the time to deal with, we call him in and usually he'll take the computer off premises and take a look at it. I try not to call him very often because we have \$1,500 a year for tech maintenance. And then through another grant from the state I have \$1,200, so altogether I have \$2,700 for technology for the entire year.

*Michelle Fenger
Ronan City Library, MT*

In other consortiums where I've worked at it seems to me that it's a pretty typical model that the central office or the consortium wants to have a single point of contact for technical concerns at each branch library so that there's coordination and communication. It's also, I think, more of a 'train the trainer' kind of model. The local tech person takes on some responsibility and feels empowered to train staff at their local branch. They're all regular library staff. Here, our tech person, she has many, many responsibilities but I believe that she just kind of bubbled up to the top of the heap as the person that's most interested and most adept at technology.

*[Paul Ericsson](#)
Bemidji Public Library, MN*

Further Resources

If you are looking for a few more resources on this topic, check out the [Further Resources](#) section



Remote Desktop Software

Anyone who's tried to support the computers in a multibranch library system will sing the praises of remote desktop software (aka remote control software). Ten years ago, librarians often had to drive 60 miles or more to reset a password or download a software patch at a branch library. Remote control applications allow you to establish a connection with a computer anywhere in your library system, see what's happening on that computer and control it using your own mouse and keyboard. Of course, the user of that computer has to give you permission to do this, or you need to have the administrative password. Also, there usually needs to be some client software installed on that remotely controlled PC. Finally, you may need to open some ports in the firewall at your central location and at the branch libraries.

You can buy standalone remote desktop software, but it often comes bundled with operating systems and software suites. The following are some commonly used tools:

- [Anywhere](#), [Laplink RemoteAssist](#) are two commercial products, while [RealVNC](#) and [TightVNC](#) are open-source solutions. [LogMeIn](#) offers both a free and a paid version of their software.
- Also, [Remote Assistance](#) and Remote [Desktop Connection](#) are two utilities built into recent Windows operating systems. Remote Desktop is the more fully featured of the two, but it only comes with professional and business versions of Windows.
- Finally, remote control software often comes bundled in help-desk management or systems management suites.

Why Use Remote Control Software?

- **It allows you to reduce your travel time between library branches.**
- **You can see exactly what your branch librarians are seeing.** You don't have to rely on their description of a problem.
- **You can sometimes use remote control software to install software or download software updates and patches.** However, there are more efficient ways to do this.



Key Actions

- **As a first step, see if you can use the Remote Desktop feature in Windows XP or Windows Vista between two computers in your main branch.** Remote Desktop is free and already installed on most Windows machines. By playing with it this way, you can see what this software looks like from both sides (the controlling computer and the controlled computer) before asking branch librarians to use it with you. Once you understand the basic functionality, try using it to connect two computers over the Internet or over your wide area network (WAN). Again, depending on the software you're using, you may have to open some ports in the firewall at each location.
- **Be sure you secure your remote control application.** If you don't take the right precautions, you could accidentally give a hacker full control of your machine. For example, if you're using one of the built-in Microsoft solutions, [Securing Your Remote Desktop for Windows XP](#) and [Using Remote Assistance](#) can help.

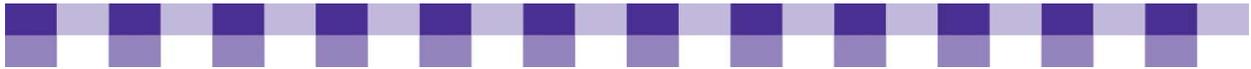
Stories from the Field

For us, the cost really is not in the time of [staff] being there and doing the task. For us, being over 5,000 square miles, the cost is the travel. So we've implemented Remote Assistant and Remote Desktop for our staff so we can actually go in and do things on the staff computers that we need to do. I figured that it takes at least \$1,000 just to drive to and from every one of our branches one time. Remote Assistant is used for troubleshooting, because we like to be able to see what the user sees. We try not to do things for them. We try to say, 'Move your mouse up to the left and click on that.' That's how you need to do it, because hopefully, they'll remember next time, and then they won't need to call us. It'll be faster for them if they can remember and are able to do it on their own.

*Jay Roos
Great River Regional Library, MN*

But we can remote into any of the machines. We have that set up. We're all domain admins here in our shop. We set it up so that we'll have access to anywhere on the domain. And we can essentially either use something like VNC access, or we can actually remote into the machine, since everything has Windows XP right now. We use the Remote Assistant if it's a staff person [who is] having a problem or a patron [who is] on one of the clients and staff has tried to assist but couldn't finish it up. They couldn't figure out the problem. We have them do a Remote Assistant request to us, and we always have someone here all the hours we're open.

*Michael Fettes
Alachua County Library, FL*



In fact, we have started paying for a new service for us to utilize with those libraries, but, again, they need to have a usable, workable Internet connection and a usable, workable browser. It's called LogMeIn. We set up a session on our end, like here at the office, online, and then give them the key over the phone. And they'll take their browser with the machine that they're having trouble with and connect to the site LogMeIn, and use that key, and that'll establish a remote access session between us and them. I can take control of their machine. It's kind of like pcAnywhere. And we do use the remote access for administrative login to their server and do maintenance from there. But I have to actually be out there to do some of the work 'cause a lot of it's been upgrades or physical repair, and the machine doesn't work.

*Adam Beatty
North Texas Regional Library System, TX*

Further Resources

If you are looking for a few more resources on this topic, check out the [Further Resources](#) section.



Help-Desk Management Software

Communication between IT technicians and frontline staff breaks down occasionally, especially in mid-sized and large libraries. Frontline staff submit incomplete information about the problems they're experiencing, and IT staff sometimes lose track of help requests. Help-desk management software offers several features to help improve communication. Most use a form of some kind to elicit detailed information from staff about where and when and how a problem started occurring. When someone submits a request, it goes into a queue so that no one gets preferential treatment. IT managers can distribute the incidents to different technicians, or the software can handle that automatically. As the problem approaches resolution, the techie can update the status and send messages to the person who submitted the request. If IT staff document their fixes, the help-desk software becomes a knowledge repository.

Help-desk software almost always has some form of asset tracking tool as well so you can tie each request to a particular machine. We discuss IT asset management software separately, but the two are often sold together. Also, you might find help-desk software in suite of systems management software. Whether you're investigating an application suite or individual pieces of software, make sure that the components work well with one another.

Why Should You Consider Help-Desk Software?

- **Improve IT workflow.** Help-desk programs give IT departments the tools they need to track their activities and better manage their workflow.
- **Facilitate communication.** Help-desk applications create formal, regular channels for communication between IT personnel and the end user.
- **Uncover recurring problems.** Tracking support problems can help you discover recurring issues. Are a few computers taking up hours and days of staff time? It might be worth it to replace those machines. Are staff members taking up hours of your IT department's time with routine questions about core software (e.g., Microsoft Word, Microsoft Outlook)? This could point to a need for more training.
- **Better reporting, evaluation and planning.** Good help-desk management software will produce regular reports that you can use for planning and evaluation. For example, if it takes your technicians three weeks on average to resolve a routine software problem, they may be understaffed, or they might be managing their time poorly.
- **Avoid duplicated work.** If your technicians record their solutions, discoveries and methods in a help-desk application, they'll have a much easier time solving similar problems in the future.



Key Actions

- **As with all software purchases, the process begins by talking to colleagues and gathering a set of requirements.** Does your library need this particular application? What do they want it to do, and how much can you spend?
- **Try out some free help-desk management tools such as [TechAtlas](#), [OneOrZero](#) and [SysAid](#).**

Help-Desk Software Options

For a clearer picture of the types of help-desk software available to you review our [Help-desk Software Options](#) tool.

Stories from the Field

There's another open-source product I'm trying called OneOrZero, which is a help-desk or a task management system. Same thing, it's an open-source application and you can download it for free, but there are newer versions. They have a unique model where the most recent version is for subscribers only but the previous version is always free. I did subscribe so we pay about \$35 a year, which gets us support too. As our organization grows and as the number of computers that I support grows I had to start looking at a task management system like this to help keep myself organized more than anything. But I'd also like to help my users — both the staff and the patrons -- help themselves a little bit. One thing about this task management system that I like is that once someone opens up a call, I can respond back with the answer of, 'Reboot the computer.' And when I do that I can publish that task to a built-in FAQ. So two months from now when another one of the computers stops printing they can go in and do a real quick search of the archived calls first. Before they contact me they can check and see, 'Oh, I should reboot it first'? And ultimately that would make the end user happy, our actual borrower, our patron, because it would fix the problem faster.

*Matt Beckstrom
Lewis & Clark Public Library, MT*

The SysAid Help-desk...I'm going to start that here as well so we can keep better track of problems, because right now, people are just emailing me, and I'm getting all these emails about a problem, and it's hard to keep up with it. So I've already downloaded the help-desk, and it's just a matter of me setting it up and getting all the branch managers the accounts so that they can keep up with what's going on. It's full-blown help-desk software, and I'm using [the version] where you have to actually have an account. So the branch manager will be given an account to access this help-desk and [can] submit problems under certain designated categories. They will be issued a help-desk ticket, and that way, we can keep up with what's going on.

*Jaketha Farmer
Bossier Parish Libraries, LA*

Further Resources

[Explore](#) tools and resources regarding help-desk policies and procedures.



Help-Desk Policies and Procedures

As with any other department, your IT department becomes more difficult to manage the more it grows. If you're the only employee at your library, you probably don't need formal help-desk policies. However, if there are 500 employees in your system, it's more important to have some written procedures.

Why Formalize Your Support Policies and Procedures?

- **Policies and procedures ensure fairness.** Without some forethought and a written policy, you'll open yourself to charges of favoritism. Why was Barbara's PC fixed before Cindy's even though Cindy submitted her request first?
- **Priorities and standards give your employees some idea of what to expect.** They know roughly how long it takes to fix or replace a hard drive, how long it takes to order a new monitor, make a change to the Web site, etc.
- **Service standards give managers a benchmark they can use to measure performance.**

What's the Library's Procedure for Handling Help-desk Requests?

- **Do you have a central point of contact for librarians with a tech support problem?** If some librarians email Marty, others email Jane, others use the phone, and others just drop by, support issues are more likely to get lost or delayed. Consider designating a single digital point of contact (e.g., an email address or a Web form) and a single analog point of contact (e.g., a phone number).
- **How does IT communicate back to the end user?** Do they send a reply to each support request indicating that the message was received? Do they periodically send updates if the problem can't be resolved in the first attempt? Do they check up afterwards to make sure the problem was resolved to the end user's satisfaction?
- **Do first-level IT staff know how to escalate a problem?** In other words, if a technician can't solve a problem, who do they turn to? It may vary, depending on the type of problem. Sometimes, they'll escalate to another tech; other times, they might escalate to a vendor or a consultant.
- **Can anyone in the library call the help-desk, or do support requests go through a designated person at each branch?** See the following stories from Jaketha Farmer and Paul Ericsson.

What Are Your Help-Desk Priorities?

A simple first-come, first-serve queue makes sense for some problems. But if your Web site is offline and one of your catalogers is having trouble changing his desktop background image, which problem should you address first? OK, that's easy, but other questions are more difficult to answer. For example, is a manager's request automatically given a higher priority? If your Web server and your mail server are both giving you trouble, which one should you fix first?



Help-desk policies often define different “impact levels.” For instance, a problem that affects multiple users or the entire library has a higher impact than something affecting one or two librarians. A problem with no workaround has a higher impact than one with a workaround.

Furthermore, help-desks frequently distinguish between problem tickets, which render a critical component inoperable, and project tickets, such as the installation of new software or the creation of a new user account. Problem tickets usually receive a higher priority.

Should You Have a Service Level Agreement?

A service level agreement, or SLA, goes beyond a simple statement of priorities. An SLA includes formal goals for your IT department to shoot for in terms of reliability and response times. For instance, an SLA might specify that the library’s Web site will be available 99 percent of the time.

Even if you don’t institute service-level standards for every aspect of your tech support, you can establish standards for some of the more important elements. For example, you might associate a standard response time with each of the impact levels mentioned previously. Impact level I (i.e., top-priority incidents) will be resolved within a day.

Of course, you have to talk to your IT department to find out which goals are reasonable and which ones aren’t. Also, you should only set goals for the outcomes you know how to measure. Don’t promise a one-day turnaround on an issue if there isn’t a system in place to track turnaround times and report on them.

Stories from the Field

The technology plan also included a service level agreement with city IT, essentially saying, ‘This is the level of service that we’d expect from IT, and this is what the library staff can do, what our responsibilities are in relation to library technology equipment and how far we’d go for the public.’ And there’s a point where we have to say, ‘Okay, we need to call in IT to take care of this.’ And the service level agreement guarantees a response time and availability of library computers. If something breaks, you need to be here within so many hours [or] so many days, depending on the emergency, and that helped us have a better relationship with the city IT because it sort of said, ‘Here’s really our need,’ and it kind of woke them up as far as understanding what our needs are, and they’ve been more responsive in doing that, and with the agreement, it’s just been a lot better.

*Jeff Scott
Casa Grande Public Library, AZ*

We don’t necessarily have anybody [who] has been having special training at each branch. But as of last week, I required all branches to submit what I called an IT chain of command. Instead of everybody coming to me about problems, support staff, or managers and different people. It got to the point where if I repaired a problem and told anybody who was working at the desk at that particular time, ‘Hey, this problem is fixed,’ I still had people coming to me constantly, constantly, constantly. So I told them to put together an IT chain of command. The number one person on the list must be the branch manager. That is the person who is responsible for the technology at their branch. They have to know what’s going on, when is it going on,



how long has it been going on, has it been fixed, has it not been fixed. Basically, they are responsible for keeping up with IT in their branch. They also have the opportunity to put on a second and a third person. The second person would just take the place of the branch manager when they're not there. If that second person is not there, the third person I encouraged them to put [is] someone who works over the weekend. All three of them are supposed to work together, and they are supposed to know what's going on. And those are the only people [who] I talk to at that branch as far as technology is concerned. Nobody else can come to me and ask me about what's going on. The branch manager is also the person who is going to have access to the help-desk.

*Jaketha Farmer
Bossier Parish Libraries, LA*

In other consortiums where I've worked, it seems to me that it's a pretty typical model that central office or the consortium or regional headquarters or whatever wants to have a single point of contact at the branch library so that there's coordination and communication. [Also, I think] it's more of a 'train the trainer' kind of model so that the branch person then takes on some responsibility and feels empowered to train staff at their local branch. They're regular library staff. Here, our tech person, she has many, many responsibilities, but I believe that she just kind of bubbled up to the top of the heap as a person [who is] most interested and most adept at technology.

*Paul Ericsson
Bemidji Public Library, MN*

Further Resources

Find additional [information](#) about help-desk policies and procedures,



Hiring the Right Techs

Hiring, at its worst, inspires both boredom and anxiety. Wading through resumes bores us, and the thought of hiring the wrong person scares us. And the fear factor is worse when you're a non-techie who's been tasked with hiring IT staff. As with any complicated, difficult decision, success starts with good planning. **Consider the following when considering hiring staff:**

- Do you really know what you're looking for in this new employee?
- Does the job description reflect your needs?
- Should this be a permanent, full-time position or should you hire a contractor?
- Do you have the right people on your interview team?
- Have you thought carefully about the questions you'll ask the candidates?

The last ten years have witnessed a change in perspective with regards to IT staffing. At one point, most managers viewed technology as an obscure, mystical specialty similar to medicine or law. In-depth knowledge mattered more than personality in hiring decisions. Lately, after years of frustration and miscommunication, some business writers have started to preach a doctrine of "hire for attitude, train for skill." The right balance depends in large part on who you already have on your team.

Why Is IT Hiring Important?

The consequences of a bad tech hire can haunt you for years, long after the person in question has left your organization. For example, consider the following:

- **Techies with a lot of in-depth product knowledge sometimes lack the critical thinking/research skills necessary to make good choices and investments.** As we all know, investing in the wrong technology or buying from the wrong vendor can cause significant losses in terms of money and opportunity.
- **Some tech geniuses out there don't understand that the rest of us have limitations.** These folks sometimes want to invest in complicated, powerful technology that their colleagues won't understand. Or they'll customize a piece of software to the point that no one else in the organization can use it or maintain it.
- **IT people without soft skills can alienate other librarians, souring them on everything to do with technology.** Or they may get along with colleagues on a day-to-day basis, but lack the ability to communicate new ideas and build consensus around them.

Key Actions

- **Get some techies to help with hiring.** Find one or two trusted techies who can participate in the hiring process, from the writing of the job description all the way through to the final interviews and selection.
- **Get some not-techies to help out, too.** Find one or two non-techies and ask them to be part of the hiring process, from start to finish. Ideally, these non-techies will work at your



circulation or reference desk. If the candidate can't communicate with them, they're probably not right for your library.

Alternate IT Staffing Scenarios

With shrinking budgets, libraries can't hire a full-time employee to address every one of their needs. So they get creative. One of the following ideas might meet your needs while costing you a lot less than a permanent, 40-hour-a-week employee.

- **Share a tech person.** Mid-sized independent libraries will occasionally hire a full-time tech support employee who divides his or her time between the two systems. Of course, to make this work, you and your partner library need to be close to each other and you have to have a strong relationship. Other libraries rely on shared tech support from the state library or from a regional cooperative. However, if this option isn't available to you already, it could take you years and a lot of hard work to put it in place.
- **Outsource to local contractors.** If your IT tasks require fewer than 40 hours of work per week, consider a local freelancer or IT shop. They may not have a strong understanding of libraries, and they may not always be available when you need them, but this can be a reasonable compromise if you're short-staffed and don't have enough money to hire a full-time techie. A lot of libraries have built a strong relationship with a local contractor.
- **Work with your vendors.** Depending on the warranty and the service plan you've negotiated, you might be able to outsource certain IT tasks to your vendor. However, there are a lot of dangers to this approach. Troubleshooting over the phone and mailing broken parts back and forth often takes much longer than working with someone local. You might have little influence with a larger company, while a small, local IT shop can offer more responsive service. However, if you can't find a reliable contractor in your area, large manufacturers often provide a reasonable alternative. Ask if they offer on-site support and under what circumstances. Also, inquire about RMA'ing of parts. RMA stands for Return Merchandise Authorization, and it generally means that you'll receive a replacement part first, before you have to mail in the broken part. This effectively cuts the turnaround time in half.

Stories from the Field

Some of our hardware and printer repairs and that kind of stuff, it's way cheaper for me to send them out and have them repaired than for me to pay someone here to do it. It's by the hour. Sometimes we outsource hardware repairs, of course. [We outsource] some of our network maintenance. It's part of a contract we have with our local [Internet service provider] (ISP) at Cincinnati Bell, and they take care of our Internet. They do our router maintenance for us. That [type of thing] I consider outsourcing, but I kind of talked them into that as part of the contract, so we get that for free basically — not free, but it's kind of a bonus. The stuff that we don't outsource would be more related to our database and our servers, because those are, to me, so security-sensitive. But yeah, the stuff that we have outsourced, I'm happy, honestly. It saves us money. Let's say I have a tech that makes \$18 an hour, and I can get all my junk together and send it out, and some guy repairs it for a flat fee, for example, or that kind of thing. That saves us money.

Michelle Foster
Boone County Library, KY



In a smaller environment, the library may just want to see if there's a cooperating organization that has somebody who could come to the interview process with them. If they're a library, see if a school district has somebody they could borrow for the interview time, or a local university or tech school, so that they can evaluate the technical part of the interview, and then the person who's not technical can make the decisions about the person's character and the ability to communicate and such.

Jay Roos
Great River Regional Library, MN

Yes, one of our libraries has their own tech person, and I've helped them go through their interview process and come up with a job description. And one of the things in the interview process that I found helpful is having them explain how they'll fix something, even if you don't know, just if they can describe it to you, and you catch a few things, it helps. Or have an example, like the monitor wouldn't come on, what would you do? Or one of our staff says they can't get their email, what would you suggest [they] do? Or a patron is complaining because a Web page won't come up, what would you tell them to do? One job interview that I went on awhile back was at a college, and they asked, 'What would you do if somebody was complaining about another person looking at pornography?' And I thought that was a clever question to ask because it kind of depends on what the policy is. So, I guess coming up with real-life situations to ask that tech person on how they would handle certain situations is a good way to find out if they really do know what they are doing, because some people can talk the talk but not necessarily walk the walk. You can read a book and get the terms, but do you really know how to do it?

Jean Montgomery
Upper Peninsula Region of Library Cooperation, PA

Further Resources

To find out more, see the [Further Resources](#) section



IT Asset Management

IT asset management refers to any set of processes and procedures that helps an organization keep track of its technology resources. At the simplest level, asset management is really just inventory control. What hardware and software do you own, and where is it located? In its more advanced forms, asset management can help you better understand how your staff uses technology, with the goal of becoming more efficient and standardized in your purchasing and decision making.

Most organizations use software to help track their assets. A Microsoft® Excel spreadsheet will do in a pinch, especially for smaller libraries. However, there are also lots of programs designed specifically for asset control. A few of these programs are discussed in more detail in our [Further Resources](#) section that follows. Among other things, an asset management system should be able to record serial numbers, vendor contact information, warranty information, software license numbers, activation keys, hardware configuration and networking data (e.g., IP address, subnet mask).

Keep in mind that asset management is a continuous process rather than a one-time event to help your library comply with regulations and license agreements. Any time you acquire new software or hardware, it has to be entered into the asset management system. Any time you move a computer or dispose of it, those changes have to be recorded.

IT managers and software vendors sometimes distinguish between hardware asset management and software asset management (aka SAM or software license management). The term IT asset management encompasses both hardware and software. As you're doing research, you'll also see reference to asset management as it relates to finance and investment, which is completely unrelated to the topic of this article.

Why Use an Asset Management System?

- **Avoiding duplicate purchases.** When you're managing 20 or 50 or 200 computers, how often do you lose track of what you own? If a colleague needs a new computer, do you have an unused PC in the building? Does it have enough power and memory? Do you have the right software licenses? It's easy to lose track of computers, printers, routers, cell phones and PDAs, and it's even easier to lose track of software CDs and software licenses. Asset management can stop you from buying more than you need.
- **Automating reports and inventories.** How many PCs in your library are more than four years old? Which computers need an update because they have an old version of Adobe Reader or Flash? Which machines don't have enough RAM to run Microsoft® Office 2007? You can answer all of these questions with good asset management software.
- **Renegotiating software license agreements to lower costs.** With asset management, you'll know which machines have an installed copy of a particular program. You might find that you have 40 licenses for Microsoft Office, but you only have 35 copies installed in your library. Or a piece of software could be installed on a machine where it never gets used. Some asset management software will actually keep track of how often your end users are running different applications (this function is sometimes known as software metering). In other words, you may be able to remove unused and under-used copies of



a program and then renegotiate that licensing agreement. Even if you can't renegotiate your licensing agreement, you'll have a better sense of usage patterns so that you don't over-purchase in the future.

- **Complying with software license agreements.** Once you buy a copy of Adobe Photoshop or Microsoft Office, it's easy to start installing the software everywhere, regardless of how many licenses you actually own. There might be three or four people in the organization who think they've been empowered to install software and manage licenses. In other words, lack of centralized asset management often leads to violations of software licensing agreements. If the Business Software Association (BSA) ever audits your library, you could be faced with significant fines.
- **Saving time.** Having all of your IT information in a single, centralized location will save you countless hours of frustrated searching. How many times in the average month do you need to track down a software license number, an activation key, the phone number of a sales representative or a tech support department?
- **Standardizing your IT environment.** After you have an up-to-date inventory of your hardware and software, you may notice that you own three different graphics-editing programs and four different word-processing programs. And you have 12 different hardware configurations. If you're trying to simplify maintenance and troubleshooting by standardizing your IT environment, an asset management system will help you establish a baseline. It also helps you ensure that new technology acquisitions meet [the standards](#) that you've established.
- **Obeying local laws and regulations.** Most libraries are departments of city or county government, and these governments have rules to prevent waste and fraud. If you purchased a new computer within the past few years, the auditors may want to know exactly where that PC is located.
- **Complying with e-rate rules.** If you've ever purchased networking equipment with e-rate funds, that equipment has to be tracked carefully. According to the SLD (Schools and Libraries Division) Web site, "the applicant must maintain asset and inventory records for five years from the date of purchase that clearly show the actual location of the equipment." For more information, see [Demonstrating Compliance](#) and [Transfers of Equipment](#). Also, other grant-making organizations have similar tracking and record-keeping requirements.
- **Planning and budgeting.** If you always have an up-to-date inventory of your current hardware and software, it's much easier to predict your future requirements.



Key Actions

- **Decide what you'll track.** Make a list of the information you're tracking now and discuss with your colleagues whether you should be tracking anything else. This can help you decide on an asset management tool.
- **Pick the right tool.** An IT notebook works fine in a lot of small libraries, and it costs about \$4. If you're ready to go digital, a spreadsheet may be all you need if you only manage a handful of computers. However, even for small libraries there are advantages in using specialized asset management software such as [TechAtlas](#) or [Spiceworks](#).
- **Evaluate free software (e.g., TechAtlas).** [TechAtlas](#) was designed specifically for libraries, and it combines asset management, technology planning and help-desk management functionality. You can use it to document the configuration of desktop PCs, servers, printers, local networks, wide area networks, Internet connections and more. It's easy to use, and [WebJunction](#) provides documentation, training and support. [Spiceworks](#) is another free program with good asset management functionality.
- **Create a baseline inventory.** Once you've picked a tool, do a complete inventory of the hardware and software in your library.
- **Assess your licensing compliance.** Once you have a complete list of all your software, compare it to your current software-licensing agreements and ask yourself if you are under-licensed in any key areas.
- **Look for savings.** Do you have more copies of a program and more software licenses than you really need? You might be able to renegotiate with the software vendor, sell some of your unused copies or plan better so you don't over-purchase again next time.
- **Look for inefficiencies.** After you've completed your inventory, ask yourself and your staff, "Are there any ways we can simplify and standardize our hardware and software so that we're supporting fewer configurations?"

Stories from the Field

They had a lot of software that they were paying for and either didn't need or weren't using, or weren't even aware of. They were spending a lot of money on stuff that they didn't even know they had and they didn't know what it did. When I walked in the door, I didn't have a list of anything as far as who are our vendors, who's the contact person, what is our customer number, what is our license number, how many licenses of this software do we have...I didn't have any of that, but they had all this software running. So, the antivirus [software], for example. It may be on 150 computers, and we only have 100 licenses. That's a problem. Or some of the computers didn't even have antivirus software, and those are the ones that had the most viruses.

*Jaketha Farmer
Bossier Parish Libraries, LA*



I have software inventory, I have hardware inventory. I try to keep track of all the IP addresses that we have going out. So spreadsheets have absolutely been my best friend. I probably have 30 of them on my computer for different things I'm trying to keep track of. Subscriptions, like our antivirus subscription, replacement computers, what computers need to be recycled, and what computers need to be repurchased. Peripherals, where are all my printers, what are all my printers doing, what are the IPs on them. Ink cartridges, because we have so many different printers, we [need] to have specific numbers for each cartridge, and so when I need to re-order one, I can just look it up in my spreadsheet. We have a lot of cost analysis that we are trying to keep track of: printer cost, paper cost. Let's see what I have here. Jack numbers, where everything's plugged in. So, yeah, the list could go on and on.

*Sarah McElfresh
North Madison County Public Library, IN*

Yeah, we use Spiceworks, which is a free product. It's asset management, and it does network protection, looks through the entire network, picks out everything that's connected to the network, which, for us, is almost everything. All our printers are networked and half of our phones are. We use voice over IP (VoIP) for about half the phones in the building, so it pulls all that information off the network and puts it in a nice little graph for me.

*Robin Hastings
Missouri River Regional Library, MO*

This was years and years ago, we needed some kind of a database, just to keep track of things. And I took one of those Microsoft Access templates, those pre-canned asset management databases, and tweaked it and added some fields. And then my brother, who's a database programmer, he came over and helped me make a bunch of changes to it. We added a purchase order portion to it, too. So I have a separate database that handles all of our purchase orders, tracking, and history. And it works well, but it's a really awkward system to work in, so it's not perfect. Just yesterday, I was talking to one of our administrative assistants. She has a separate canned-purchase software that does asset and inventory tracking that she uses for everything else but technology, because I've always had this other one for technology. And we're going to migrate all that data over to her system. And then I've got all these new computers I just got in from Dell that I'm going to have her put those directly into the new system. And it makes more sense, because she pays the bills. So that way, when the invoices come in, she can immediately go ahead and put the serial numbers and stuff into the asset system there and then. We just put the tags on them — we have little property tags that go on the computers themselves. It's a good system and it works well, especially at the end of the year when it comes to auditing. The auditors come in and they start wanting to know, what did you buy and what did you get rid of, and what's the depreciated value of this? You need to be able to pull those kinds of reports.

*Matt Beckstrom
Lewis & Clark Public Library, MT*

Further Resources

We've included a few add [additional resources](#) on the topic of IT Asset Management.



Five Ways to Treat Your Old Computer with Respect

In the life of every computer, there comes a day when you have to pat it on the monitor and say goodbye. It has served you faithfully (mostly), but it doesn't fetch URLs as fast as it used to and it chews up your Microsoft® Word documents.

So how do you treat an old computer with the dignity and respect it deserves?

You have several options. You can:

- **Rejuvenate it.** Would more RAM or a faster operating system make the computer usable again? To learn more, check out [Extending the Life of Your PC](#).
- **Reuse it.** Can you find a new, less stressful role for the computer within your organization? For more information, check out [Extending the Life of Your PC](#).
- **Refurbish it.** Locate a new home for the computer at another organization. [Getting Rid of Old Computers Responsibly](#) discusses computer refurbishers who can spruce up your old computer and then donate it or sell it.
- **Recycle it.** If the machine is so old that no one wants it anymore, send it to a responsible recycler. [Getting Rid of Old Computers Responsibly](#) has information on finding an electronics recycler who will dispose carefully of the parts and materials in your old PC.
- **Replace it.** You can anticipate that most computers will die or reach obsolescence in three, four or five years. Plan carefully so you have money and staff time available when you need them. [Replacing and Upgrading Technology](#) can help you decide when and how to replace your hardware and software.



Extending the Life of Your Computer

Sometimes you'd really like to replace those wheezing, five-year-old computers, but you're a bit short on funds, so you have to make the TRS-80s last a while longer. To help you make the best use of technology that you currently have, we suggest you review our [Prolonging Computer Use Tips and Tools](#). It outlines some of the different ways to prolong the usable life of your equipment.

Stories from the Field

If we do have the money to replace a computer, we still keep [the old one] for as long as possible. We use it as a junkyard or a parts computer. If the power supply goes bad on this computer, I can take one out of the junk computer.

*Sarah McElfresh
North Madison County Public Library System, IN*

Usually, when a machine goes out of service, it gets repurposed. I'll use it as a backup machine over here; or we've got a temporary worker who needs a machine to sit at for a few days. And then, after that, I'll usually store them just in case I have to send a machine back or one's out of service for a while. And even then I'll keep a couple just in case we decide to add another public computer here or something over there. The keyboards and the mice I'll always keep, because we go through those, like a million a year, it seems like — they're always getting broken or busted; the mice take a lot of abuse. And then when it's actually time to get rid of the machine or it's getting close to it, I'll start taking things like the CD-ROM out, the floppy drive, and repurpose those, because the CD-ROMs and floppy drives take a lot of abuse; again, I always need them. I'll strip the memory out, the hard drive out, because I can use those in other machines. Very rarely do I ever sell an old machine. But I can, and I've done it before, through the county. They have a garage sale twice a year, and I usually format the hard drive, and then our board has to declare them surplus. I have to explain how old they were, what they were used for, how much we spent for them, how much the depreciated cost is now, that kind of stuff. Then they will declare them surplus and I can take them down to the county office and they sell them, and I think they give us a percentage of the amount of money they make off of them.

*Matt Beckstrom
Lewis & Clark Public Library System, MT*



Getting Rid of Old Computers Responsibly

When a computer is beyond repair, or if you've decided that you really have no use for it, you have a few options depending on your situation. To help you sort through these options, we've provided a [Computer Disposal The Safe and Easy Way — Quick Reference](#). It outlines different situations along with a list of solutions.

Why Should You Refurbish or Recycle Old Computers?

- **The environment.** The more you reuse and recycle, the less you contribute to the world's overflowing landfills. Moreover, computers contain several toxic substances, which can leak into water supplies if they're not disposed of properly.
- **The digital divide.** By donating to a refurbisher, you're providing free or low-cost computers to individuals and organizations that can't afford new, retail PCs.

Key Actions

- **Always consult your local state and federal regulations.** Many local governments have strict rules about getting rid of equipment. If you ignore these rules, you could find yourself out of a job or worse. Furthermore, if you received state or federal funding to purchase your equipment, you have to abide by the rules outlined by the granting agency. For example, e-rate funding has a lot of strings attached. If you bought any hardware with e-rate funds, take a look at the official requirements for [Transfers of Equipment](#).
- **Create a disposal policy.** After you've reviewed the relevant regulations, create a policy so that everyone on your staff knows the score.
- **Act quickly.** Whether you plan to donate your used computers or sell them, move them along as quickly as possible. They're not gettin' any younger.
- **Reclaim software licenses.** For major, valuable pieces of software, be sure you record the license number, registration number and/or activation key before you erase the hard drive. Also, make note of this information in your asset management system [Section 6: Asset Management System] so that you and your colleagues know which copies are available for future installs.
- **Include the operating system CDs or DVDs.** Frequently, the operating system that came with your computer is tied to that machine, so you can't reclaim the license. If that's the case, you might as well pass it along to the next owner. Include the CD or DVD that you got from the manufacturer, along with the product activation key. With Windows operating systems, the activation key is usually printed on the Certificate of Authenticity that came with the computer.
- **Erase your hard drives.** Make sure you don't leave sensitive or private information on the hard drive of a machine that you're donating or recycling. After you've migrated your data to another machine or a storage medium, you want to overwrite that drive several times with random ones and zeros. Check out "Further Resources" for articles on how to do this.



Stories from the Field

At any rate, when a computer has reached its end of life — it's either four years old or it's just so broken we can't fix it anymore — we have a local place here that takes our computers for free for recycling, so we take them there. The other thing we have to do that I don't know if everybody has to do or not, our library has to make a list of all the stuff we're going to get rid of and it has to go before the board for approval.

*Michelle Foster
Boone County Public Library, KY*

For the last couple of years we've had a public sale for our used computers. I think actually last year, it didn't make it to the public because we let the staff have first pick and the staff bought all of them. But the year before that we did actually have a public sale. We set up in our staff driveway, and it was the first time we'd ever done it, so we had a bunch of stuff that we had stuck away in closets — a lot of old switches as well as older computers that were no longer under warranty that we really couldn't use. We generally transfer the license from one computer to another for XP and all the other software. So we'll wipe the hard drives clean and maybe provide a compact disc of Linux to go with it. If they want to buy their own copy of XP or whatever, they can. But it's really easy to make those installation disks for Ubuntu. I think last year we charged 50 dollars for a computer.

*Robin Hastings
Missouri River Regional Library, MO*

When they're completely unusable, we do recycle. We have a recycling project going on now in our community, which we haven't had in the past, and they do recycle that kind of equipment. Of course, the person in the community that we go to for our computer questions, I always let him look at [the computers] and see if there are any parts he can use before we actually take them to the recycling center. We've even refurbished a couple of them for some of the kids in the school system just so that they would have a word processor to do their homework and that kind of thing on. And actually, our Friends of the Library has started a project where they're going to try to refurbish some for that purpose. They're not Internet-capable, but at least they can run some software applications on them.

*LeeAnn Jessee
Adair County Public Library, KY*

If they're still workable, our chamber here has a 'Computers for Kids' program [in which] different computer companies volunteer their time and refurbish computers for kids who don't have access [to one] but would need one for classes. The school recommends who to give the computers to. But we still had a couple NT machines, and they didn't take those because they just couldn't do much with them. Yeah, so then we destroy the hard drives and throw them out, but usually they're donated to Computers for Kids.

*Greta Lehnerz
Natrona County Public Library, WV*

Further Resources

To learn more about refurbishing and recycling of old computers, check out our [Further Resources](#) section.



Replacing and Upgrading Technology

When you're lacking time and money, it's tempting to wait until a computer breaks or a piece of software becomes obsolete and then think about how you'll replace it. Even in smaller libraries, this approach leads to unscheduled downtime, inconsistent service and funding problems. In large libraries, it's completely impractical. When you replace a batch of computers or upgrade a major piece of software, your budget takes a hit, you may want to do testing, you're staff may need training and you'll spend a significant amount of time installing and deploying. Some of the questions you should be asking yourself at this stage include:

- What factors should you take into consideration when you're contemplating a technology refresh?
- How often should you replace your desktop computers?
- How often should you replace laptops and PDAs? Servers? Mission-critical software?

Key Actions

- **Make refreshes a part of your technology plan.** If possible, make the technology refresh a part of your strategic planning and technology planning conversations. It can have a major impact on your budget and your services, so you want feedback from frontline staff, managers, trustees and patrons, if possible.
- **Use TechAtlas to plan a hardware refresh.** Use TechAtlas or another asset management tool to help you determine which computers need to be replaced. If you've completed an inventory of your technology with TechAtlas, you can run a report that lists all the PCs you own with less than 256 MB of RAM. Or you can run a report on the PCs that are more than four years old. Or the ones that haven't been upgraded to Windows XP. Whatever your criteria, that list is the starting point for your technology refresh project. It also helps you to make your budget requests. If you can see that 15 computers will enter their fifth year of service during 2009, you should budget for at least 15 replacement machines.
- **Use TechAtlas to plan a software refresh.** You can also use [TechAtlas](#) when you're considering a software refresh. For example, if you want to upgrade your computers to Microsoft® Office 2007 Professional, your PCs need at least 256 MB of RAM, 2 GB of free hard drive space and a 500-MHz processor. Go to the Tools and Reports tab in TechAtlas, click the Reports sub-tab and click the Report Generator. You can easily whip up a list of computers that don't meet the requirements listed. These PCs will need upgrading or replacement, or you may have to delay your rollout of the new software until you have faster machines.
- **Communicate with staff.** Let them know well in advance if you'll be replacing their computers or installing new software. If your planned changes will have a major impact, invite them to give feedback or ask them if the upgrade will have any unforeseen consequences on the way they do their work.
- **Train your staff.** Rollouts of new software and upgrades of existing software usually require some staff training.



Deciding When to Refresh

There are no hard and fast rules about when a refresh should occur. In general, desktop systems and servers are replaced every three to four years, while laptops, cell phones and PDAs are swapped every two to three years. Printers and networking equipment may last five years or more. Software and operating systems vary widely, depending on your organization's needs and vendor support. **However, these are all just guidelines, and factors unique to your organization will drive the final decision about when to refresh.**

- **What's in your budget?** Can you afford to buy new computers or new software?
- **How much are your old computers really costing you?** “Hang onto those PCs as long as possible! Squeeze every last dime out of those computers!” That sounds reasonable enough to a cost-conscious library director. However, old computers often have significant hidden costs. Your IT staff will spend much more time supporting a five-year-old computer. Frontline staff will answer more questions from frustrated patrons. Everyone will waste time waiting for software to load.
- **How long are the computers under warranty?** Some libraries purchase a three- or four-year warranty for their computers and start to look into replacement machines once the warranty runs out.
- **Does the vendor still support the technology?** Often, a vendor will no longer support a particular operating system or software. From that point on, it gets harder to keep the software secure and operational.
- **Are your old computers delaying other upgrades?** For example, are you waiting to upgrade your ILS because your servers can't handle the latest version?
- **Are old, slow computers driving away your patrons?** Obviously, this is a major consideration. If your machines struggle to play YouTube videos and your patrons have to wait several minutes for their Web-based email to load, you should consider upgrading or replacing your computers.

Selecting a Computer Refresh Strategy

- **Big bang:** In this approach, you switch out all of the computers in your library at the same time every third, fourth or fifth year. This is a risky strategy, since your funding sources could dry up just as you're about to replace everything. Furthermore, this “all at once” approach puts a big strain on your IT department, who needs to deal with a sudden influx of new equipment. On the other hand, your IT department will always have a standard hardware configuration because all the PCs were purchased at the same time. Also, you might save some money by buying in bulk.
- **Phased refresh:** A lot of libraries swap out a fraction of their computers each year. For example, if they're on a four-year replacement cycle, they'll replace 25 percent of their PCs each year. This makes their budget requests more uniform and spreads out the impact of hardware rollouts.
- **Modified big bang:** If your funding agency allows it, you can set aside a chunk of money each year for new computers. However, rather than spending it as it's allocated, you can wait and make one big purchase every third or fourth year.



Developing a Training Plan

Software upgrades and rollouts can cause a lot of frustration and lost productivity if staff haven't been trained properly beforehand.

- **How much money and effort will you invest in your training program?** "Training" might consist of a few handouts if your new software only implements minor changes. It could consist of a month-long class with multiple sessions if you're upgrading mission-critical software, such as your ILS.
- **Who conducts the training?** You can assign the training to internal staff or outside contractors. Developing an effective curriculum takes a big chunk of time, so libraries often bring someone in from the outside or send their employees to classes held at other locations.
- **When do you schedule it?** If you train your staff too far in advance of the software installation, they'll forget everything they've learned by the time they actually need it. If you wait until after the installation, staff will have to support software that they don't understand.

Stories from the Field

What we do is we maintain a database of all our computers, and we also look at the warranty. Typically, we purchase our computers with a three-year warranty. And from that database, I extract a report every fiscal year that shows which computers are either already out of warranty or will become out of warranty by the end of the fiscal year. From there, we analyze which computers need to be replaced. And some of the computers that are giving us more problems, even though they're not on the top of the list, we escalate them because we know that we've been fixing [them] X amount of times.

*Silvia Urena
San Mateo County Library, CA*

We're hoping to keep the Discover stations changed out. I am planning to put new computers in those stations every three years. I never want those to give us any trouble. I want to change out every three, no more than five years, the whole library network, which is all of our staff computers and our whole circulation system and our public access catalog. I don't want equipment to stand in our way if there's any way that I can find the money to do that. I have pretty well communicated that with all the powers that be as far as the budgeting goes.

*Phyllis Reed
Ruidoso Public Library, NM*



We try to stick to at least a three-year schedule. We try, we do our very best. Because I would say the general rule of thumb is if it's three years old, you need to throw it in the trash. You can throw it in the trash or revamp it, reimage it, do whatever you need to do, but after three years, don't look for it to work pristinely. So we try to replace everything if it's been here for three years. But, of course, we have the money, so we can do that. I know a lot of people don't. So in that situation, my best advice is to upgrade those computers as far as you can, upgrade the RAM as much as you possibly can, and just put a fresh image on it. If you have major problems, just run a new operating system on it and start from scratch, because that'll take care of anything that's wrong with it, for the most part.

*Jarvis Sims
Hall County Library System, GA*

We try to stick to about a four-year computer replacement cycle, depending on the uses of the computers. A standard staff machine or a public workstation, I try to replace them every four years. Catalog machines, machines that are just used for browsing the OPAC, single-purpose machines that don't take a lot of abuse and they're not very complicated machines to begin with, I can usually push them out to five years, if needed. I do purchase almost all of my PCs brand new. I've had people who insist on donating computers to us, and I'd rather they give them to a school or a nonprofit or some other kind of organization. But I've used those before.

*Matt Beckstrom
Lewis & Clark Public Library, MT*

It's absolutely difficult to get people to go along with change, even when it's minor, or where we think that we've discussed it and we've said, 'Well, they won't need training on that, so let's just go ahead.' We found that they absolutely thought they needed training on it. And that was the case when we switched from our old email software to Zimbra. We thought, 'You know, it's email. It's not that different from Hotmail; it's not that different from Yahoo! It's just the buttons are in different places.' But staff absolutely expected that it was a big enough change that they ought to have received training. So one of the things we try to do to mitigate that is to tell people as early and as often that something is changing, something is coming, and get whatever details out that we can. And as far as what we can actually do for training, we're very limited, because we don't have a very large training budget. So we try to just put out pieces that they can read, and we just try to do it through communicating.

*Jay Roos
Great River Regional Library, St. Cloud, MN*

And in fact, we talked to the city manager, and he suggested we only change [the computers] out every four years, [since they are] not changing that much and it's taking too long to install. So our goal will be by four years, we'll be totally changed out.

*K.G. Ouye
San Mateo Public Library, CA*



Essentially, the two of us get together and decide what machines need to be replaced. And typically, staff machines get replaced first because they're being used to make the library go. Although this last time around, we did replace public machines first because those were getting very old. And typically, it's probably between three and five years when they're replaced.

*Brian Heils
Dubuque County Library, IA*

Most of the stuff is replaced on a regular cycle, and for us, it's four years. We used to do five years, but then you run into issues where you have different operating systems because usually, in five years, you've got new operating systems to deal with. At any rate, when a computer has reached its end of life, it's either four years old or it's just so broken we can't fix it anymore.

*Michelle Foster
Boone County Library, KY*

We try to replace 10 to 12 computers a year, and that's throughout the library. We keep an inventory of the oldest, or we had a PAC [public access computer] stolen out of the teen zone and that one had to be replaced. But we try to do 10 to 12 a year; we budget for that so that in a three-year period almost everything has been replaced.

*Greta Lehnerz
Natrona County Public Library, WV*

We like to keep all of our computers in warranty for four years if it's at all possible. And we generally run one year past warranty. We figure at that point we can start cannibalizing and using the parts out of our older machines to replace things that are required and keep enough of them going to keep them available for the extra year. And we basically buy in the vicinity of 60 to 70 desktops every year. With the 400-plus we have out there, that puts us at a four-and-a-half- to five-year schedule. And sometimes we get a few more; like this year we got lucky. Dell had great buys at the end of a quarter and we were able to get 80 with our budgeted amount instead of 60. So we basically replace everything within five years.

*Michael Fettes
Alachua County Library District, FL*

We have a four-year replacement schedule. We are funding that partly through the Gates hardware upgrade. We were the beneficiaries of one of the original Gates computers and libraries grants — two of them, in fact; two of the different cycles. And, therefore, we're eligible for the latest round of grants to replace computers in libraries. So that's certainly helping us replace those PCs. We also are the huge beneficiaries of a sales tax measure in the county of Fresno that is specific to supporting libraries. So we have the money in our budget [to keep] the PCs operational and [to get] that level of staffing that allows us to have all those techs and the money for a four-year replacement plan for all of our computers.

*Deborah Janzen
Fresno County Public Library, CA*



Tools

The success of your library's technological structure depends on how well it is maintained. This, in turn, has a lot to do with if and how you are using diagnostic measures and preventative procedures to help extend the life of your computer. Your IT asset management system also plays a big part in keeping your hardware and software up-to-date and in good shape. To assist you in this area, we've assembled a variety of tools.

Library Tech Support Evaluation Sheet

ACTION	RESOURCES
1. Do you have a regular maintenance checklist for your computers?	A Cookbook for Small and Rural Libraries contains routine maintenance checklists.
2. Have you considered your IT staffing requirements and alternate staffing solutions (e.g., consultants, shared IT staff)?	See IT Hiring for further details.
3. What should you look for when you're hiring a new techie? How do you write the job description, what questions do you ask at the interview and how do you evaluate the candidates?	Check out IT Hiring for more information about screening and interviewing potential IT staff.
4. Do you need policies regarding: <ul style="list-style-type: none"> • Help request workflows? • Help-desk priorities? • Guaranteed service levels? 	See our Help-desk Policies and Procedures page.
5. Would help-desk management software improve communication and efficiency in your library?	See our Help-desk Software page.
6. Do you need remote desktop software? If you have many branches and few IT staff, the answer is probably yes.	See our Remote Desktop Software page.
7. What are the pros and cons of letting staff perform their own routine maintenance and troubleshooting? Is there a compromise between overcentralized IT and chaotic, decentralized IT?	See our IT Standardization page in the Buying and Deploying Technology and section.
8. Should you make more of an effort to standardize your IT infrastructure? Consistent, standard hardware and software are much easier to maintain.	See our IT Standardization page in the Buying and Deploying Technology and section.

Help-Desk Software Options

TYPE OF SOFTWARE	TO LEARN MORE
<p>Issue-tracking software (aka trouble ticket software) offers libraries a way to manage support requests and minor IT projects. When someone calls your help-desk, the technician creates a trouble ticket with an incident number and uses the software to record his or her efforts to fix the problem. Also, with each update to the status of the problem, the software can send out automatic messages (usually by email) to the end user. Issue-tracking software can report on certain key metrics, such as the average time it takes your technicians to respond to a request and the average time it takes them to solve a problem. Finally, the details of each incident can form the basis of a knowledge management system. Therefore, issue-tracking software and knowledge management software are usually integrated or sold as a package (see the following item).</p>	<p>Wikipedia has a good overview article on this topic, as well as a comparison of different issue-tracking programs. Slashdot has a long, useful forum discussion, where managers and techies describe their experience with different programs.</p>
<p>A knowledge management system (aka knowledge base) keeps individuals and organizations from solving the same problem more than once. Ideally, once a solution has been found, no one in the organization should have to repeat the process of research and discovery. Often, a knowledge management system is simply a different interface to your issue-tracking software (see previous item). As technicians record the details of each incident, they're actually creating the knowledge base. It's important that technicians have an intuitive, well-designed set of categories and keywords to choose from when classifying support incidents. Without that, retrieval becomes difficult. Also, you may want to give non-technical librarians access to the knowledge base so they can solve their own problems. If so, ask about what types of customer and end-user interfaces are available.</p>	<p>Should You Ditch Your KnowledgeBase and Use a Wiki Instead? describes a low-cost, informal approach to knowledge management.</p>
<p>Remote desktop applications allow you to establish a connection with a computer anywhere in the world, see what's happening on that computer and control it using your own mouse and keyboard.</p>	<p>For more information, see our Remote Desktop Software page.</p>
<p>Systems management software actually refers to a suite of IT management tools that have been integrated into a single package. The specific tools and utilities included in a systems management software suite vary from vendor to vendor, but you'll often find a single package that includes all the other utilities in this list (e.g., asset management, disk imaging, software deployment, etc.).</p>	<p>For more information, see our Installing and Patching Software page.</p>
<p>Disk-imaging software can be used to reinstall the operating system and core software after a hard drive crash or a major software problem.</p>	<p>For more information, see our Disk-Cloning in Libraries page.</p>
<p>Rather than walking from machine to machine or driving from branch to branch with an installation CD every time you purchase new software, consider acquiring a software deployment tool. A software deployment tool automates the installation of other software. More often than not, these tools are part of the systems management software suite mentioned previously.</p>	<p>For more information, see our Installing and Patching Software page.</p>



TYPE OF SOFTWARE	TO LEARN MORE
<p>Patch management software is similar to a software deployment tool. Rather than automating the installation of an entire application, patch management programs download and install security patches and other updates.</p>	<p>For more information, see our Installing and Patching Software page.</p>
<p>Asset-tracking tools let you know the exact location of each piece of hardware and software, as long as you're using it regularly and keeping it up-to-date. It can also record information about the configuration of each computer, who supports it, service agreements and other metadata. Ready access to this can save your IT department time, but it's also useful for managers and accountants.</p>	<p>For more information, see our Asset Management page.</p>

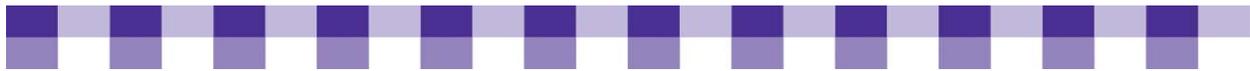


Prolonging Computer Use — Tips and Tools

WHAT	HOW
Install an open-source operating system	Many open-source, Linux-based operating systems are designed to use a minimum of system resources. In other words, they'll run just fine with an older processor and 128 MB of RAM. For example, Xubuntu is an officially supported variant of Ubuntu that needs less speed and less memory than the main distribution. Fluxbuntu is even less resource-intensive, but it's not officially supported by Canonical (the folks who develop and maintain Ubuntu). Bear in mind that making the switch to Linux often requires retraining for your systems librarians, your regular staff and your patrons. On the other hand, Linux distributions, such as the ones mentioned here, are becoming increasingly user-friendly, so the transition from Windows isn't as hard as it used to be. For more information, see our article on Open-source Software in Libraries .
Add some memory	The cheapest way to make an old machine run faster is to add some RAM. It is generally cheap these days, but you need to be careful and buy RAM that's compatible with your motherboard. How to Upgrade Your PC's RAM has some good advice on buying and installing RAM.
Clean out the junk	Computers slow down after a while due to spyware, disk fragmentation, temp files and so forth. Read Preventing Trouble on Windows Through Regular Maintenance for tips on how to keep your computers clean.
Use it for spare parts	Old computers can be a source of replacement parts — expansion cards, memory modules, hard drives, etc.
Keep it as a temporary or swap computer	When a computer crashes, it's nice to have spare machines on hand. You can roll out one of your older PCs while you're repairing the newer one. Also, if you have guests or new employees, you can set them up on one of the older machines until you've prepared their permanent computer.
Use it as an OPAC station	If you dedicate a few computers to searching your online catalog, you might as well use older machines. Searching the OPAC usually doesn't require a lot of power.
Use it as a test machine	Experimenting is a great way to learn about technology, so your staff might appreciate the opportunity to play on some of your older machines.

Computer Disposal the Safe and Easy Way — Quick Reference

THE SITUATION	THE SOLUTION	SOME SOURCES
<p>Your computer is less than five years old and it's in working condition</p>	<p>Donate or sell the computer to a qualified refurbisher. There are hundreds of nonprofit computer refurbishers in the U.S. If you have a computer that's less than five years old and still in working condition, they'll wipe the hard drive, install an operating system, upgrade some of the components if need be and then give the computer to a school, nonprofit or low-income family. If you're considering a donation to a school or nonprofit, it's often easier for everyone if you give to a nonprofit refurbisher instead. Otherwise, the school or nonprofit will waste a lot of time upgrading components and installing software. Furthermore, they'll eventually have a patchwork of mismatched hardware that they can't support.</p>	<p>To find a refurbisher near you, look at the Microsoft Authorized Refurbisher (MAR) database. MAR refurbishers donate some or all of their refurbished equipment to schools and nonprofits. If you can't find a MAR refurbisher in your area, try TechSoup's directory of refurbishers and recyclers, search My Green Electronics.</p>
<p>Your computer is more than five years old or it's damaged beyond repair</p>	<p>Find a commercial recycler. If your computers are more than five years old, or if they're no longer in working condition, you should find a qualified recycler who can dismantle the machine and dispose of the parts in an environmentally friendly fashion. You'll usually have to pay a small fee to the recycler (anywhere from \$5 to \$30).</p>	<p>Again, TechSoup has a searchable directory of recyclers as does My Green Electronics. The Basel Action Network maintains a list of electronics recyclers who have agreed to abide by a strict set of criteria regarding how they dispose of e-waste and who does the work.</p>
<p>You could really use some extra cash.</p>	<p>Sell the computer at a yard sale or auction. If your old computers are in working condition, you may be able to sell them, as long as you've reviewed the relevant regulations. Don't expect a huge windfall of cash, but you might recoup somewhere between \$25 and \$100 per machine.</p>	<p>Your local government may sell the computers for you at an auction, or you might get some money from a refurbisher, or you might sell them at your annual book sale. Again, be careful to obey the relevant regulations.</p>



Hardware and Software Inventory Worksheets

You have a few options when it comes to IT documentation. You can use [inventory worksheets and templates](#), or you can use [asset management programs](#) (aka asset tracking programs). Basically, worksheets and asset management programs are designed with the same purpose in mind -- tracking the location and configuration of your hardware, software and networking infrastructure. Which one you use depends on your personal style and the size and complexity of your IT environment. If you opt to use worksheets you don't have to install anything or learn a new interface (assuming you know how to use Word or Excel), but worksheets don't scale well in large, complex environments, and they don't have any reporting features. With asset management programs, you may need to test a few to find the one you like, and with some you'll have to install the software locally, but they have the tracking and reporting features that administrators need in mid-sized and large organizations.



Further Resources

Introduction to Managing a Library Help-desk

- [CIO.com](#) and [Information Week](#) often have articles on help-desk management and related software.
- Also, the resources listed in our [Library Tech Support Evaluation Sheet](#) can guide you to good articles and Web sites on help-desk management.

Remote Desktop Software

- Wikipedia has [an introductory article](#) and a [comparison of remote desktop programs](#).
- For more information on the two Microsoft utilities, see [Remote Desktop on Your Network](#) at PC Apprentice and [What Is Remote Assistance?](#)

Help-Desk Management Software

- [OneOrZero](#) and [osTicket](#) are two popular open-source programs. For a complete list of open-source tools, see the [Open-source Help-desk List](#). [SysAid](#) is a proprietary tool, but they offer a free version of their software. [HelpSpot](#) and [Kayako](#) are two well-known commercial programs.
- [TechAtlas](#) also includes a basic, easy-to-use help-desk form that you can make available to your staff once you've set up a account. After you've registered and logged on, click Tools and Reports tab, and then click the Event Tracker sub-tab. If you're looking for more information, the Using [Event Tracker](#) presentation might help. If you're new to [TechAtlas](#), you can find more information at WebJunction.
- Helpdesk.com has a [directory of help-desk software](#), broken into six categories. [Helpdesk2000](#) also has links to vendors and applications. Slashdot has a long, useful [forum discussion](#), where managers and techies describe their experiences with different help-desk programs.

Help-Desk Policies and Procedures

- For more information on tools to help you automate tracking and reporting, see this directory of [help-desk software](#).
- [SLA 101](#) from ComputerWorld offers some advice on service level agreements
- You can also find dozens of examples on the Web, such as [this one](#) from Earlham College.

Hiring the Right Techs

- [Finding and Hiring Great Techs](#), from Inc.com, questions the conventional wisdom about IT hiring.
- [TechEssence](#) has some advice about Hiring a Systems Librarian.

- 
- A lot of good articles focus on the hiring of programmers, and while this doesn't exactly apply to libraries, some of the underlying advice translates well. For example, look at [How to Hire the Best People](#) and [The Guerilla Guide to Interviewing](#).
 - Ohio State Library has collected some [sample library job descriptions](#) that you might use as a starting point.

IT Asset Management

IT ASSETS

- The Wikipedia articles on [asset management](#) in general and [software asset management](#) in particular have useful information.
- Systems management software suites often include tools for managing hardware and software assets. [Microsoft's System Center Configuration Manager 2007](#) is one such package and it's available to public libraries through TechSoup. In addition, help-desk management applications, network monitoring programs and other IT management tools often contain asset management functionality. So look around your library. You might already own an asset management tool.
- [TechAtlas](#) and [Spiceworks](#) are two free products with robust asset management features. TechAtlas was actually developed for use in libraries, and you can find articles on how to use it at [WebJunction](#).
- If you're looking for a standalone, proprietary asset management program, there are several to choose from including [SystemHound](#) and [Computer Admin](#).

SOFTWARE ASSETS (aka Software License Management)

- Microsoft has developed lots of material on software asset management. You might begin with [SAM Step by Step](#). They also created a free tool called the [Software Inventory Analyzer](#) that crawls your network and collects information about the installed Microsoft programs.
- [Keyfiler](#) and [LicenseKeeper](#) (Mac only) focus solely on software asset management. They appear to be fairly simple tools and might not work well in a larger library. For a discussion of other low cost techniques for managing software licenses check out this review at [Lifehacker](#) especially the comments thread.

Getting Rid of Old Computers Responsibly

- TechSoup also has [Ten Tips for Donating a Computer](#) and a [Computer Recycling and Reuse FAQ](#). The [Green Tech Initiative](#) and the [Recycling and Reuse](#) directory are also helpful.
- [Clean Your Old Hard Drives](#) and [Obliterate Hard Drive Data with Disk-Wiping Software](#) both help you ensure that your sensitive information remains private. The latter article compares a few well-known disk-wiping utilities, such as [DBAN](#) and [KillDisk](#).



Networking and Security

Whether offering Internet access to patrons or providing an online catalogue, steps must be taken to implement effective network security to protect your resources. With a proper technology plan in place, you should have already addressed many of the issues surrounding network security. Our purpose here is to provide insight for the particular issues regarding network security, including:

- Understanding Networking Concepts
- Identifying Vulnerabilities on your Network
- Creating Security Policies
- Selecting and Configuring a Firewall

We also focus on wide area networking and network management. For more information about LANs and the basics of networking, you should refer to our Further Resources section.

IN THIS SECTION

Firewalls and Network Security

[Introduction to Network Security](#)

[Identifying Vulnerabilities and Risks in Your Network](#)

[Creating Security Policies](#)

[Selecting and Configuring a Firewall](#)

Networking

[Introduction to Broadband and Wide Area Networks](#)

[Monitoring the Performance of Your Network](#)

[Internet Access and ISPs](#)

[Wide Area Networks \(Internetworking Your Library Branches\)](#)

[Bandwidth Management](#)



Introduction to Network Security

Managing security means understanding the risks and deciding how much risk is acceptable. Different levels of security are appropriate for different organizations. No network is 100% secure, so don't aim for that level of protection. If you try to stay up-to-date on every new threat and every virus, you'll soon be a quivering ball of anxiety and stress. Look for the major vulnerabilities that you can address with your existing resources.

We all know the numerous advantages of computer networks and the Internet. Connecting your network to the Internet provides access to an enormous amount of information and allows you to share information on an incredible scale. However, the communal nature of the Internet, which creates so many benefits, also offers malicious users easy access to numerous targets. The Internet is only as secure as the networks it connects, so we all have a responsibility to ensure the safety of our networks.

Why Is Network Security Important?

- **The good neighbor policy.** Your mistakes can be someone else's headaches. If your network is insecure and someone takes control of one of your computers, they can use that machine to launch denial of service attacks on innocent third parties. They can also flood the Web with spam.
- **Patron privacy.** Obviously, patron records are of paramount importance. Trust between the library and its clients can be irreparably harmed if these records are compromised.
- **Money and time.** Tracking down a virus or a worm and eliminating it from your network is frustrating and time-consuming. You often have to rebuild your machines from the ground up, reinstalling the operating system and software and restoring data from backup tapes. Lax security can lead to weeks of wasted time spent patching your network and fixing the wreckage.

Key Actions

- **Create a network diagram.** One of the most useful exercises for understanding your library's security situation is creating a network diagram. A network diagram consists of symbols representing your hardware (PCs, servers, switches, routers, printers, etc.) and the connections between them. The diagram should also include some information about the model and configuration of each piece of hardware (e.g., name, IP address, function, etc.). For network connections, list the speed and protocol of each link. For some examples, take a look at [Rate My Network Diagram](#). While you can map a small network with pencil and paper, it's hard to extend and update your diagram using this technique. Most network administrators employ software to help them map their networks. We've listed some free and low-cost options under [Further Resources](#).
- **Understand your situation.** A network diagram goes hand-in-hand with an assessment and evaluation of everything that happens on your network. Who uses your network? What types of hardware and software do they use? What kind of Internet connection does your library have? Do you host your own Web site, your own email server, your own OPAC? Do you allow patrons to connect to your network with their own computers and



peripheral devices? Is your staff network separated from the public network? What types of security policies, procedures and equipment do you already have in place?

- **Review your technology plan.** Review this document, if available, to determine the network services you're currently providing and the plans for your network's future.
- **Train your IT staff or hire a consultant.** You must make sure that either your IT staff receive appropriate training when it comes to network security or look for outside IT support that can offer the necessary knowledge to secure your network.
- **Remember the 80/20 rule.** Focus on protecting the high-impact, high-risk areas of your network. For more information, see [Identifying Risks and Vulnerabilities on Your Network](#).

Network Concepts You Should Know

Even if you plan to get security advice from an outside consultant or volunteer, understanding some basic concepts will help you evaluate your advisors and cut down on the number of calls you have to make. Basic networking topics such as TCP/IP addressing, network hardware, cabling and connectivity troubleshooting are well-covered elsewhere, so look at our [Further Resources](#). We also have information on our site about bandwidth and [Network Monitoring](#), [Internet Access and ISPs](#) and [Wide Area Networks](#).

Further Resources

We included a few [additional resources](#), which can further clarify any questions you have regarding the fundamentals of network security. ↵



Identifying Vulnerabilities and Risks on Your Network

A vulnerability is a weak spot in your network that might be exploited by a security threat. Risks are the potential consequences and impacts of unaddressed vulnerabilities. In other words, failing to do Windows Updates on your Web server is vulnerability. Some of the risks associated with that vulnerability include loss of data, hours or days of site downtime and the staff time needed to rebuild a server after it's been compromised.

Before you start searching around for weak spots in your network, we suggest you first review our [Where and How to Find Vulnerabilities](#) tool.

Key Actions

- **Understand common attacks.** Attacks on and within your network come in many different varieties. Many times the attackers do not even know who they are attacking, but there are instances of networks or organizations that are specifically targeted. Learning the different methods used to compromise computers and networks will give you the necessary perspective to proceed.
- **Inventory your vulnerabilities.** Establish a full list of potential vulnerabilities. Take special care to identify anything unknown about your network. For example, a library new to network security might think they have a “firewall” while they might just have a router provided by their ISP. For more on this topic, read [10 Steps to Creating Your Own IT Security Audit](#).
- **Use vulnerability scanning tools.** Many tools exist to check the existing security state of your network. These tools check for open ports, unpatched software and other weaknesses. Some of these programs focus on a specific machine, while others can scan your entire network. Microsoft offers one such tool, the [Microsoft Baseline Security Analyzer](#). This tool checks for updates and common configuration errors for Microsoft products. [Nmap](#) is another popular, free scanning program. For more about Nmap and other vulnerability scanning tools, see [Further Resources](#).
- **Assess the risks.** The various vulnerabilities on your network represent potential costs – time, money, and assets – to your library. These costs, along with the chance someone will exploit these vulnerabilities, help determine the level of risk involved. Risk assessment is a combination of both quantifying (the cost of the threat) and qualifying (the odds of the attack). Each library will have to determine its own tolerance for risk depending on the situation. Some examples are provided here.
 - **Patron information:** Having your patron data compromised is unacceptable for any library. You would need to design your network and implement security to minimize this risk. While you can almost never remove risk completely, you can reduce risk to very low levels.
 - **Slow Internet connection:** A library shares an Internet connection between public networks and staff networks. Since the cost of adding another Internet connection, increasing the speed of the current connection or purchasing complex network monitoring equipment might be too prohibitive, the library has a higher tolerance for a periodically slow Internet connection. Another library hosts its own Web site, online



catalogue and email server, which require a more stable Internet connection, so a much lower tolerance for this risk exists.

Stories from the Field

The issue we have is that we have the public accessing the Internet on a network that needs to be secured due to the nature of some of the county businesses. We don't know that we've had any security breaches, but the potential is there. So the manager of our county IS Department has requested that our public computers be moved off of the county network. So we are in the process of moving to a cable modem system. Both our wireless and our public computers will be operating directly through Comcast.

*Claire Stafford
Madelyn Helling Library, CA*

I can see a lot of reasons for having an Active Directory, but the chief one is authentication, and our staff is really very reluctant to do things like change passwords. For instance, our integrated library system, we would be able to have each clerk log on with a personal password. And then, when that person left our employment, you could get rid of the password. It would be a lot more secure.

*Bob Bjornson
Jefferson-Madison Regional Library, VA*

Further Resources

To learn more about network security vulnerability threats, go to [Where and How to Find Vulnerabilities](#).



Creating Security Policies

Security policies provide the road map for how to protect your network. These guidelines include the acceptable use of technical resources, the security requirements and why a particular policy exists. Without the clear guidelines from a security policy, your library runs the risk of inconsistent implementation of security. The process of creating a security policy provides a unique opportunity to understand the details of your organization's network.

Why Create Security Policies?

- **Linking network security to your library's mission.** Closing every security loophole and blocking every vector of attack would likely render your network unusable for patrons. Finding the right balance between accessibility and security requires a conversation about the library's mission and audience.
- **Consistent implementation.** A security policy minimizes the risks created by an inconsistent application of security principles.
- **Buy wisely.** A security policy can guide your technology purchases.
- **React and recover.** A security policy will outline the steps needed to respond to a breach in security or critical system failure.

Key Actions

- **Assemble the appropriate team.** Security policies impact every aspect of an organization. Network security involves rather technical subject matter. However, policy-makers, budgeting, end-users and technical experts all must be included. By involving the appropriate cross-section of the organization, the proper security team increases the transparency and understanding of the decision-making process.
- **Incorporate the overall mission and goals of the library.** The security policy must abide by existing policies, rules and regulations, as well as promote the overall mission. Any existing computer use policies should be included.
- **Utilize a policy template.** Find an existing security policy for your library, or search for a library with similar needs and ask to see a copy of their security policy. There are also many security policy templates available online.

Further Resources

For additional resources on the topic of creating security policies, check out the [Further Resources](#) section.



Selecting and Configuring a Firewall

The Internet is a dangerous place filled with a constant barrage of automated scans that scour the Internet for vulnerable targets. Once identified, these targets receive a variety of attacks. Many of the attackers have no idea who owns the target, and the ultimate goal depends on both the attacker and the type of target. Selecting an appropriate firewall helps protect your network from the Internet and the Internet from your network.

Why Do You Need a Firewall?

- **Guaranteed network resources protection from the malicious activity on the Internet**
- **Ensured safe and secure access to your internal resources to external users**
- **Maximized performance of your network resources**

Important Considerations when Selecting a Firewall

- **Network firewalls vs. desktop firewalls** – Many desktop firewalls exist to protect individual computers (e.g., ZoneAlarm); however, for overall network security you need to consider a network firewall device. This article is dedicated to network firewalls. For information about the desktop variety, see the [Home PC Firewall Guide](#).
- **Software/hardware** – With software firewalls, like Microsoft ISA Server or Smoothwall, you install the program on top of an existing Windows or Linux server, which then becomes your dedicated firewall. Hardware firewalls, manufactured by Linksys, Cisco, Netgear, Watchguard, SonicWall, and many others are devices with their own operating systems and specific hardware. In other words, with a hardware device, the manufacturer designs both the hardware and the software and sells them as a unit. With a software firewall, you provide your own hardware.
- **Extremes** – With so many firewall devices on the market, you must ensure that your firewall fits your requirements. Purchasing a high-end firewall with features your library will never utilize results in a waste of resources. At the same time, you do not want to purchase a firewall that will not support your security policy.
- **Size of network** – Does the firewall device have enough processing power to handle the number of connections for your network?
- **Network topology** – How many networks do you have that need some unique level of protection or isolation? Suppose the firewall you're evaluating has three Ethernet ports. Is that enough? Let's say you need one subnetwork for the staff machines, one for the public access machines, one for your wireless access point and one for your servers. In this case you need a firewall with four Ethernet ports, as well as a port for your Internet connection. Or you could use a second firewall or a managed switch to provide the network separation you're looking for.
- **DMZ** – Do you need a DMZ for your Internet-facing servers? A DMZ (short for demilitarized zone) is a small subnetwork for hosted Internet services, such as Web servers and email servers. The firewall protects the servers in the DMZ and checks traffic



to and from those servers, but it also isolates them from the rest of your local area network as much as possible. Your Web server can handle requests from random computers on the Internet because you've presumably hardened and secured that server. On the other hand, your average staff machine shouldn't be exposed to the Internet in that way. Also, if something goes wrong and the Web server is compromised, the damage will be partially contained. There are several ways to set up a DMZ, and your DMZ architecture may affect the type of firewall(s) you decide to buy. Wikipedia describes [two common approaches to setting up a DMZ](#).

- **VPN** – A VPN (Virtual Private Network) encrypts data between dispersed locations when that data is sent over the Internet or another public network. Libraries often set up VPNs so that staff who work from home can securely access files and programs on the library's network. Also, in many libraries the main branch and outlying branches use VPNs to transfer circulation records and sensitive patron information. If you've purchased high-speed, dedicated data lines from your service provider, you may not need VPNs for branch-to-branch communication. However, dedicated lines are expensive, so a lot of libraries use VPN instead. Some firewalls can handle VPN encryption and decryption, but you can also buy separate, standalone devices to handle this function. VPNs can be tricky to configure and maintain, so you should talk to an expert. See the following story from Cindy Murdock for one library's experience securing their data over the Internet.
- **Content filtering** – Does your security policy require some form of content filtering? Some firewall companies offer this feature. Your firewall will download a blacklist of banned sites on a regular basis, filter sites by keyword or both. However, this feature may cost extra.
- **Level of control** – Do you want to block all traffic for certain applications or do you need to implement more granular filtering so certain computers or users have more capability than others? For example, you might block ssh traffic (ssh stands for secure shell, a remote logon utility) for most of your network, but allow it for systems administrators who need to access remote servers. Does the firewall you're evaluating give you the degree of control you're looking for?
- **Bandwidth management** – Do you need to control bandwidth usage? Do you need to limit bandwidth per user or per computer? Do you need hourly or daily limits? Some firewalls have these capabilities, and you can also buy separate, standalone devices to handle these tasks. For more information, read [Bandwidth Management](#).
- **Technical expertise** – Do you have the in-house expertise to properly configure and manage the firewall, or will you need external technology support? Often your service provider will configure and maintain your firewall for a price.
- **Budget** – With firewalls ranging in price from \$50 to \$10,000, the budget represents the biggest consideration for most public libraries. While your library may want all of the features, you need to determine the most important based on your requirements and resources.

Types of Firewalls

For a quick review of the most typical firewalls for different-sized library networks, take a look at the [Firewalls at a Glance](#) tool.



Common Configuring Issues

Most security experts agree that having a poorly configured firewall is worse than not having a firewall. At least you know your network is not secure without a firewall, while you have the misconception of security with a properly configured firewall.

There are a few important steps to take when configuring your firewall.

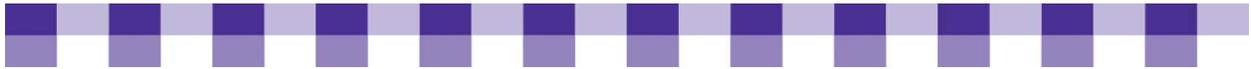
- **Username/password** – As with all computer devices, you need to modify the default password for your firewall device. Some firewalls also allow you to modify the default administrator user name.
- **Remote administration** – Most firewalls use a Web-based graphical user interface for configuration and allow for remote administration from outside your network. Disable this feature unless absolutely necessary.
- **Port forwarding** – For certain applications to work properly, such as a Web server or FTP server, you need to configure appropriate port forwarding.
- **DHCP server** – Most firewall devices act as a router and include a DHCP server. Installing a firewall on a network with an existing DHCP server will cause conflicts unless the firewall's DHCP server is disabled.
- **Logging** – In order to troubleshoot firewall issues or potential attacks, you want to make sure to enable logging and understand how to view the logs. Make sure you understand this functionality on your firewall.
- **Policies** – As discussed previously, you want to have solid security policies in place and make sure that your firewall is configured to enforce those policies.

Whether offering Internet access to patrons or providing an online catalogue, steps must be taken to implement effective network security to protect your resources. With a proper technology plan in place, you should have already addressed many of the issues surrounding network security. Our purpose here is to provide insight for the particular issues regarding network security.

Stories from the Field

We had some issues, because we're encrypting all of our traffic for security reasons on the Intranet side, the staff side. We found that it was really slow at the farthest library from the system headquarters. I had to use a hardware solution to get the encryption to speed up. Now that we've got that done, I should be able to get the other ones done pretty quickly.

We wanted to encrypt our traffic so that patron information is protected when it's being passed over the Internet. We're circulating over the Internet. We don't have our own private network or anything. It's a special router. It's running OpenBSD. There's a program called relayd to create an SSL acceleration so that any traffic that is coming in to the server on SSL, which is Port 443, it does the encryption on that computer and then it passes the traffic to the server unencrypted, so the server doesn't have to handle it. It has a special chipset on there. It's made by VIA. It's a VIA C7 that has hardware encryption capabilities. The speed difference is enormous. When we first noticed this problem, I did some benchmarks. Apache, the Web server that we're using, ours can handle about 4,000 transactions per second unencrypted. With the encryption in place, it can only handle 70-80 transactions per second. So we



had to offload the encryption onto this hardware solution to speed it up so that it was unnoticeable. Before, when you would circulate a book from the most remote library, it would take 20-30 seconds to finish the transaction, whereas now with the fast hardware encryption, it's barely noticeable. It's like using a regular Web page.

*Cindy Murdock
Meadville Public Library, PA*

Further Resources

Go to this [resource](#) if you are interested in finding out more about firewalls.



Introduction to Broadband and Wide Area Networks

Networking is the connecting of computers to share data (e.g., files and databases) or functionality (e.g., printers, scanners, Internet connections, etc).

A network can be as small as a local area network (LAN), where two computers share information using a hub or switch, or as big as a wide area network (WAN), where many libraries in different locations share an Internet connection or automated library system.

The way machines are connected has changed over the years, but at the building level, the most common technologies right now are Ethernet and 802.11b (i.e., wireless or Wi-Fi), or a combination of the two. Between buildings, at the WAN level, organizations use a wide variety of equipment and protocols (e.g., Frame Relay, T-1, Ethernet, Asynchronous Transfer Mode (ATM) and various fiber protocols).



Monitoring the Performance of Your Network

In one sense, you already have an army of network monitors in your library. Every time something goes wrong, you probably get a few spontaneous alerts from patrons and colleagues. However, if you want preventive information and in-depth analysis of what's happening on your network, you need network monitoring software.

Why Should You Monitor the Traffic on Your Network?

- **You can get information about the health of your network.** If a server stops responding, or your ILS crashes or a segment of your network goes offline, the network monitor will send you a message so you can respond right away. But these tools go beyond reactive alerts about things that are already broken. They can also provide warnings about network slowdowns, overloaded servers and other signs of trouble so you can address problems before they affect staff and patrons.
- **Better understanding of long-term trends.** Network monitoring tools also create graphs and reports about network performance over time. How fast is the demand for bandwidth growing in your library? If your library's average daily Internet use has grown 1 Mbps (megabits per second) over the past six months, you can get a rough sense of how much you'll need three years from now and budget accordingly. You can also plan better for the replacement of servers, switches and routers, because network monitors keep statistics related to performance of these devices.
- **Improved ability to check on your ISP.** Life would be much easier if we could just trust our ISPs. You're paying for a 1.5-Mbps T-1 connection, and that's what you're getting, right? No need to worry about measurements and monitoring. Just let the ISP tell you whether they're doing a good job and when it's time to upgrade. If you're a little less trusting, a network monitor can keep track of uptime and other metrics on your Internet connection, so you'll know when your ISP is failing to maintain its promised level of service.

Key Actions

- **Get permission.** Be sure you contact your network administrator before you install any network monitoring software or equipment. If misconfigured, a monitoring tool could flood the network with unnecessary traffic.
- **Ensure compatibility.** Check to see that the network monitoring tool you're interested in can communicate with your existing equipment. There are different network management protocols (e.g., Simple Network Management Protocol, or SNMP, and Cisco's Netflow), and your routers, switches and servers might not recognize the protocol used by your monitoring tool.



- **Create network diagrams.** Most network monitoring software can automatically create a diagram of your local area network and/or your wide area network. Even if you decide not to use a monitoring tool, it's a good idea to create a network diagram using software such as [Microsoft Visio](#) or [Gliffy](#), or drawing it out by hand.

Network Performance Metrics

Bandwidth, throughput and speed are three terms that most people use interchangeably when discussing networks. However, speed isn't really accurate in this context (though it is used all the time anyway), and there is a small distinction between bandwidth and throughput, as discussed below. Latency and jitter are two connected concepts that increase in importance as more people conduct real-time voice and video interactions across the Internet. Uptime is another important metric that's a little easier to understand.

For a more detailed look at metric terms and definitions review our [Network Performance Metrics Defined](#) tool.

Network Monitors and Other Utilities

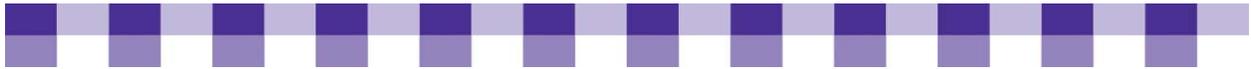
To measure network performance metrics, you need network monitoring software.

- Ping, traceroute and speedtest sites are quick, easy-to-use troubleshooting tools, but they don't provide in-depth information or analysis. For example, a speedtest site doesn't take into account the fact that you're sharing bandwidth with colleagues and patrons. If the speedtest indicates that you're on a 200-Kbps connection, even though you're paying your ISP for a 1.54-Mbps T-1 line, the slowdown is probably due to other library patrons.
- Also, even when you're the only person on the local network, your Internet connection carries a lot of administrative overhead (i.e., bits passed back and forth between computers to set up and tear down a connection). Therefore, you might see a reported throughput of 1.2 Mbps instead of the full 1.54 Mbps you were expecting.
- This is normal, but if you want a fuller picture of what's happening on the network, install one of the network monitoring programs mentioned next. Also, be sure to ask your network administrator before you install any monitoring software.
- **Ping and traceroute:** If you want a quick snapshot of the latency on your network, use ping, a command-line tool built into all Windows PCs (and most other machines as well). When you ping a remote IP address, you'll see four replies, and each one includes the "time" (measured in milliseconds) it took for your ping request to reach the remote computer and then return to your PC. In other words, you're looking at the latency on the network between your computer and the remote computer. To be more specific, you've measured the round-trip latency. If you want the one-way latency, cut the ping time in half. Traceroute (or Tracert on Windows machines) is a similar tool that provides information about latency. Also, both tools are commonly used for basic connectivity troubleshooting.
- **Speedtest.net:** Speedtest is a free site that measures latency, upstream throughput and downstream throughput with a single click. Furthermore, you can measure these between your location and several hundred servers around the world. In other words, latency between your library and the nearest city will usually be much lower than the latency



between your library and London. Throughput will also vary widely, depending on the server you try to access. [Speakeasy](#) also has a speed test, as do several other sites.

- **Network monitoring software:** The ping utility and the online speed tests have a serious drawback. You'll only get a quick, unrepresentative view of your network's performance, unless you plan to spend all day at the command prompt sending ping messages out to various computers. Network monitoring software gathers information about your network at regular intervals and grabs your attention only when there's a problem or an event that you want to know about. For example, if your main file server is almost out of hard drive space, the server sends a message to the network monitoring tool, which, in turn, sends you an email or finds another way to alert you of the problem.
 - On your networking equipment (routers, switches, firewalls, etc.), you might set alerts related to throughput, latency and dropped data packets.
 - You definitely want reports from your border router about the total amount of Internet traffic you're sending and receiving on a daily, monthly and yearly basis. Look at both the average load and the peak load, and you'll have a better sense of how quickly demand is increasing. If your average daily load is consistently above 60 percent and your peak load is consistently above 80 percent (for an hour or two per day), you've probably noticed some slowing already and heard about it from your end users. If you're approaching those numbers, you should start planning for an upgrade. Or you should invest in [bandwidth management technology](#).
 - Also, most network monitoring tools include graphing and charting components, which let you see the long-term trends in your library. How fast are the hard drives filling up on your file servers? What's the average daily throughput on your Internet connection compared to this time last year? Understanding the rate of change lets you budget accurately, and it gives you early warning so you have the right equipment on hand when it's needed.
 - Popular open-source or free monitoring tools include OpenNMS, Nagios, Cacti, Spiceworks, MRTG and PRTG (in rough order from most complicated to least complicated). Also, there are several dozen commercial vendors in this field, and you can find a [product comparison chart](#) at Wikipedia.



Stories from the Field

It's pretty obvious, I think, when you're really running out of space or out of bandwidth, and we are right now for sure. But we also have a tool called PRTG that monitors bandwidth and the network connections. You need to do that, especially if you're using your network like we are, where we're doing security cameras, Voice over IP, data and HVAC controls. We're doing a lot of stuff over the network connection. So it's critical that it work properly.

*Jim Haprian
Medina County Library, OH*

Further Resources

For more information about network performance monitoring and metrics, check out the [Further Resources](#) section.



Internet Access and ISPs

Reading a contract from the phone company or a bill from an Internet service provider (ISP) can cause experienced techies to shake their heads in confusion and frustration. Even by the standards of the technology sector, telecommunications professionals use a lot of acronyms and jargon. Moreover, the technology, terminology, services and prices all change frequently. Our intent is to introduce a few concepts that stay relatively stable and consistent. We'll also be suggesting some criteria that you can use the next time you're shopping for high-speed data lines.

The focus here is mainly on Internet access; however, in practice, you should plan your voice, video and data needs simultaneously. More and more, the same companies provide all three services and transmit them over the same wires. Phone calls, movies and Web pages can all be translated into digital form and transmitted over the same circuits. Similarly, we discuss wide area networking in the next topic, but in practice, you'll often get these WAN links from the same company that provides your Internet connection. Wide area networking refers to the connectivity between branches in a multibranch library system.

In the U.S., the major providers of Internet access are phone companies, cable companies and government entities. Minor players include satellite Internet providers and small ISPs who rent equipment and services from larger companies.

Why Should You Plan Carefully When Shopping for Internet Access?

- **Software and storage space are moving into the cloud.** “The cloud” is just another way of referring to the Internet and the massive amounts of computing power it contains. Almost all of the software and services that run on local servers and PCs are now available online in one form or another. You can write documents online, edit photos, create databases, use accounting software and project management software and on and on. And more and more of us are using the Internet as our primary or secondary storage location for files, photos, videos, etc. Think of sites like Flickr, Box.net, YouTube, Mozy and thousands more. All this creates a constantly increasing demand for bandwidth.
- **Video and audio.** The quality of online video is improving, and the file sizes are increasing. A few years ago, short, grainy YouTube videos were a novelty. Soon we'll be downloading three-hour-long, high-definition movies from Amazon or Netflix. As patrons get used to this quality at home and at work, they'll ask for it in the library as well.
- **Spending wisely.** Internet connections and wide area network links are a huge expense. A single T-1 line (1.5 Mbps) usually costs more than \$1000 per month, and many mid-sized libraries are transitioning to multiple T-1s, T-3s and other high-capacity lines. Make sure you're getting the best deal, buying what you actually need and getting your money's worth. Also, you may have more leverage than you think, even if there's only a single ISP in your town. Libraries are a high-profile, high-volume customer, but you can't get better service if you don't know what you need and you don't know what to ask for.

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- **Service to patrons and staff.** Your Internet connection has a huge impact on staff and patrons. Staff can't do their jobs without the Internet, and many patrons rely on the library for access to health information, financial institutions, schools, friends, relatives, etc.

Key Actions

- **Don't do it all yourself.** Shopping for broadband and assessing different Internet access plans is complicated and time-consuming. Paying the monthly bill is even more painful. Look for ways to share the work, share best practices and share costs.
- **Investigate local partnerships.** If you issue a Request for Proposals (RFP) for Internet access in concert with your local school district, a nearby community college or your city government, you can easily save thousands or tens of thousands of dollars. With increased size comes increased leverage and negotiating power. Furthermore, in a cooperative arrangement, the burden of understanding the different technologies and managing them are distributed across the group. You can turn to your partners for advice and share the cost of hiring network administrators.
- **Explore regional library cooperatives.** In a regional library co-op (RLC), multiple libraries and library systems in the same area pool their resources to pay for the acquisition, support and maintenance of Internet access, wide area networks, a shared ILS, server, desktop machines, software and other equipment and services as needed. In a lot of states, RLCs already exist. If there isn't an RLC you can join, the logistical and political hurdles to building one from the ground up are significant but not insurmountable. [Regional Library Cooperatives and the Future of Broadband](#) from ALA's Office of Information Technology Policy (OITP) has some advice and a discussion of the benefits.
- **Is there a statewide network?** If your state administers a statewide high-speed network for schools, colleges and libraries, you're probably aware of it already. These networks often provide amazing discounts on high-speed lines, as well as help with e-rate applications, advice about technology and other services.
- **Consider a hosted solution.** You can pay an outside company to host your Web site or your OPAC or both on servers that they own and manage. Managing your own Web server or ILS server is complicated and expensive. You have to maintain the hardware and the software. You have to back up your data on a regular basis and test those backups to make sure they work. You may have to pay extra for a more reliable, higher-bandwidth, business-quality Internet connection. You'll have security concerns and considerations that you wouldn't otherwise have. Some libraries look at all these factors and they decide to outsource to a specialist. You can buy high-quality Web hosting for a few hundred dollars a year. For an excellent overview of Web hosting options, check [A Few Good Web Hosting Solutions](#) at Idealware. Your ILS vendor might be able to host your OPAC on one of their servers (for a fee, of course). If you go this route, you still need to pay attention to the concerns mentioned (security, reliability, etc.), but you don't need the same degree of expertise.
- **Find a consultant.** WAN networking is a complex, advanced topic, requiring years of study and practice to fully understand. You'll be more comfortable with your choices in the long run if you get good advice up front.
 - Look to the city and county IT departments, as well as the network administrators for your local schools, colleges and universities.



- Also, the other library systems in your area might have expertise in this area, or they might know of a reputable consultant. Regional library consortia and state libraries are also potential resources.
- If you're looking for consultants who specialize in working with social benefit organizations, check out [TechFinder](#). The Independent Computer Consultants Association ([ICCA](#)) and the National Association of Computer Consultant Businesses ([NACCB](#)) also provide searchable databases with member contact information.
- **Ask questions at WebJunction or TechSoup.** If you need advice about particular ISPs or general networking topics, post a question in [TechSoup's Networks forum](#) or [WebJunction's Networking Forum](#).

How Much Bandwidth Do You Need?

The following are a few tips on how to assess your current bandwidth usage and plan for your future needs.

- **Know your end users.** Think carefully about the applications and Web sites your staff and clients use today. What sorts of functionality do you think they'll be asking for in three years or five years? This information has an impact on the amount of bandwidth you'll need.
- **Look at your technology plan.** If you have a tech plan or a strategic plan, it probably has useful information about upcoming changes that will impact your bandwidth requirements. Are you planning to hire more staff? Are you rolling out new bandwidth-intensive technologies? Do you plan to implement public access computers? These strategic changes will determine greatly the type of connection you need.
- **Monitor your network traffic.** How fast is demand for bandwidth growing in your organization? How much bandwidth did you use six months ago and how much are you using today? Bandwidth monitoring tools can help you track this information. If you're hosting a Web site or other online services, Web analytics software can also help you forecast future bandwidth needs in your organization. For more information, see [A Few Good Web Analytics Tools](#) at Idealware.

Before You Select a Telecom Provider

Before you go looking for a Telecom provider, we recommend that you take a minute or so to read our [Ten Factors to Consider When Shopping for a Telecom Provider tool](#).



Stories from the Field

Q: This is the first time I've heard of an ISP who is providing the technical service but donating part of it and also donating the Internet connection, because that's a pretty big chunk of dough, right?

It is very big, and they've been doing it for ten years. [More than] ten years. Maybe closer to 15. We started out in a partnership. They used our electrical closet for their routers and the T-1 line that was coming in, and it's just kind of grown from there. One hundred percent of the cost of the Internet they pick up and give us great bandwidth service. They don't have their equipment here anymore. They've moved up to DS3, but they still provide the service to the library. And our wireless service as well. So it's been a big boon for the library.

*Bridgett Johnson
Lewiston Public Library, MT*

Traditionally, over the years, the library had always had its own Internet provider. So I started looking at how much we were spending. I think that the more you get together with other people, the more you increase your bargaining power. So we went in together with our main county IT, and we said, 'How about we join together and try to go out to bid and see what we can get?' And surprisingly we saved a lot of money because we put our resources together and our bargaining power then became bigger. Everybody was trying to get our business and so they offered us bandwidth that nobody had ever heard of. They were able to come up with certain combinations for us just so they could get our business. You will be amazed at what they can do when you show them the money and they see that they are about to lose a customer — especially one that is going to be a long-term customer. They come up with all kinds of combinations and all kinds of things. We ended up with a 45-Mbps pipe that was split between the two of us. We were paying \$3,000 a month for 6 Mbps and now I'm paying \$3,000 a month for 22 Mbps. That's how you save money. You just have to find other people and just try to leverage your bargaining power, and people will come running.

*Monique Sendze
Johnson County Library, KS*

We combined the Bill and Melinda Gates program grant with the city capital improvement project, so we went from 11 to 30 computers, and the bandwidth was sufficient but it was starting to choke a bit because of the new usage. And then we expanded to 38 PCs, and it really started to slow down considerably. And IT at the time, told us, 'Well, you could have up to 50 computers on this network and it shouldn't slow down, [but] that was not the case. So, because we got the e-rate funding, we decided to upgrade the bandwidth to as far as we could put it at the time. We went from 1.5 Mbps to 6 Mbps and it's a huge difference — a huge difference — because we have wireless Internet access and we have 38 public access computers. With all of them working at the same time, it was grinding to a halt. Now, with everything set up it's really, really fast, which is nice.

*Jeff Scott
Casa Grande Public Library, AZ*

The city had gone through a process to upgrade their bandwidth at the same time we were looking at upgrading the library's bandwidth, and the problem they ran into was



that there are a lot of politics involved as far as who should get the contract. So instead of doing a bid, they're like, 'Oh, we should use a local company' and then it should be just this person, and then it sort of all fell apart. Because of e-rate, we're forced to pick a vendor on that list, which we don't have any control over. We just have to pick one of the three or four people that can provide that in the area, so we ended up picking Qwest. It led us to get around that little problem by saying, 'Oh, we can't do anything about it. We have e-rate. We have to follow the guidelines.' We were able to pick a company and upgrade our bandwidth, and the city is still struggling with theirs, so it's kind of funny.

Jeff Scott
Casa Grande Public Library, AZ

I mean, the bottom line for me is you could never put enough money and resources into the backbone, because often it's not the machines on the front that are causing you the problem. It is that you don't have enough bandwidth to do what your customers want to be able to do on those machines.

Helene Blowers
Columbus Library, OH

We are experiencing some bandwidth issues. We've got kids in after school playing games. And what we discovered is that our ISP has a list of game sites, and when they see those coming through as traffic, they clamp down the bandwidth. So when we've got kids in here playing the games, our bandwidth actually gets smaller because it's shared by the whole community. And I sort of found that out by accident. I had read about it somewhere and called the ISP and asked, and he said, 'Yeah, that's it.' Because we thought it was sort of odd that even if we only had one kid playing, it seemed to really slow it down. So we're sort of negotiating on that.

Darla Wegener
Lincoln Public Library, CA

E-rate is a pain. It's time-consuming but for libraries like us, it's what allows us to do what we do and that's the biggest motivator right there. We would not be offering the high-speed DSL and the higher-speed bandwidth that we have and the wireless network that we have here in this library if it wasn't for the reimbursements from e-rate. Our budget simply wouldn't allow us to do that, and that's been the case all through the years. E-rate was what allowed us to go from dial-up to Frame Relay because we knew that we were going to get back 80 percent of what we spent, and we tried to do it right from the very beginning as far as kind of following the rules and just plodding along with it, and it's served us well. I honestly don't know what we would do if they discontinue it.

Sherry Millington
Suwannee River System, FL



A number of years ago, when we replaced our network with DSL, we went from Frame Relay to DSL, we had to replace some equipment and we bought Cisco PIX boxes. We really didn't feel that we wanted to delve into setting up virtual private networks (VPNs) for our library automation system. So we hired someone to set it up and show us how they did it. I called around to some of the other libraries in the area in Florida. We have a pretty good network. I think that I'm pretty well networked with most of the people around, and I got opinions from them. And then I would contact the person and see how I felt about them and how we meshed as far as time and money and so on, and we've been fortunate so far.

*Sherry Millington
Suwannee River System, FL*



Wide Area Networks (Internetworking Your Library Branches)

Wide area networking refers to the interconnection of geographically dispersed offices separated by public rights-of-way. The Internet is actually a huge wide area network (WAN), and if your branches are all online, they're technically already part of the same WAN. However, the Internet lacks the reliability, security and bandwidth that companies need for certain sensitive data and critical applications. In a library context, circulation records, cataloging records and financial records shouldn't be sent over the public Internet unless they're encrypted. Moreover, since they're critical to the work your staff does, you don't want your colleagues twiddling their thumbs while a batch of cataloging records fights its way upstream against all the YouTube videos and file downloads. So most multibranch library systems eventually create a private WAN. These WANs often do carry Internet traffic for staff and patrons at the branches, but you can control that traffic, keep it separate from staff data and assign it a lower priority than your cataloging and circulation records.

Why Is Your Wide Area Network Important?

- **Better service.** The faster you can transfer circulation and cataloging records between branches, the better your service to patrons. If a patron sees a book in the catalog that seems to be available and places a hold on it, she'll be disappointed to find out an hour later that the book was actually checked out.
- **Improved staff productivity.** Obviously, the more time staff has to wait for cataloging records and other files, the less productive they'll be.
- **IT savings.** One of the biggest drains on your IT budget and your tech support staff is the need to drive back and forth between the main library and the branch libraries. Once you add up the gas, the maintenance of the cars and the time your staff spends on the road, you're often looking at thousands of dollars a week to troubleshoot routine software problems. Therefore, IT departments are doing as much work as they can over the library's WAN, and they rely on high-bandwidth, low-latency connections. For example, IT staff often use remote desktop software to troubleshoot computers at the branches. Where the bandwidth is sufficient, IT departments are using enterprise software such as Norton Ghost and Active Directory to send software updates and disk images over the WAN. If the operating system on a remote PC gets corrupted, they can reimage the entire computer from the main branch.
- **Centralization and consolidation savings.** We usually talk about WANs when we're discussing the transfer of data back and forth between colleagues at remote locations or between software applications working on their behalf. However, WANs can also carry phone calls and ordinary Internet traffic. It depends a lot on local variables, but in many areas, it's cheaper to send all your traffic (voice, Internet, cataloging records, etc.) over a single line headed towards the main branch. The routers at the main branch then separate the traffic streams and send them all to their appropriate destination. Obviously, the central location will need a higher-bandwidth Internet connection to handle the traffic coming from the branches, and you may need to upgrade the WAN connection at each branch location. However, the alternative often turns out to be more expensive. When



each branch has multiple lines (one for phone service, one for Internet traffic and one for catalog records), the costs add up quickly.

- **Managing and prioritizing traffic.** You have much more control over the data on your WAN than you have over standard Internet traffic. You can give high priority to circulation and cataloging records, voice traffic and other staff communication. It's also easier to monitor and troubleshoot a private WAN.

Key Actions

- **Establish partnerships.** Refer back to [Internet Access and ISPs](#) for information on ways to join (or create) local, regional and statewide cooperative networks. These cooperative purchasing and administrative agreements can save you thousands each month. We also discuss ways to find consultants and advisors.
- **Choose one provider.** If possible, choose a single service provider for your entire WAN. This might be impossible, depending on the network coverage in your area, but whenever service providers have to exchange traffic, delays get introduced and it's harder to guarantee levels of service.
- **Think about the kinds of traffic your WAN will carry.** As we mentioned previously, if the links going out to the branches are wide enough, they can also carry Internet traffic and voice traffic. In other words, instead of purchasing a high-speed Internet connection for each branch, you buy a really big pipe at your central location, and that pipe handles all the Internet traffic for your entire library system. Of course, all the branch traffic has to go across the WAN before it gets to the Internet, but as long as those WAN connections are wide enough and fast enough, they won't add a significant delay. Also, you'll have to buy a larger Internet connection at the main branch, but that's often cheaper than maintaining a separate connection for each branch. Of course, this creates a single point of failure for your whole system, so you should have a backup Internet connection at the main branch.
- **Talk to staff, patrons and IT.** Think carefully about the applications you're using now and the ones you'll be introducing over the next few years. Ask staff what kinds of data they transfer between branches and whether they're satisfied with the perceived speed of these transactions. If you're considering the implementation of the remote administrative programs mentioned previously (e.g., Norton Ghost or Microsoft's System Center Configuration Manager), talk to the vendors and your IT staff to see how much bandwidth you'll need between branches.
- **Use a centralized phone system.** If you don't already have a centralized phone system, you can decrease your overall costs and increase your service and functionality by centralizing, but there's a whole lot of planning and expertise and up-front costs that go into that sort of a switch, so you'll need to talk to an expert.

Shared Lines vs. Leased Lines

- A **shared line or "best effort" connection** refers to a data link between two locations over shared circuits and shared equipment. In other words, the service providers who create the connection will do their best to forward your traffic to its final destination, but they won't make any guarantees regarding how long it will take to get there and how



much bandwidth gets allocated to your data. Most residential Internet service plans fall into this category.

- With a **leased line**, on the other hand, the network service providers manage the connection between the sender and the receiver to ensure a certain level of service in terms of latency and bandwidth. Leased lines are sometimes referred to as private lines, dedicated lines or point-to-point lines. Also, service providers often refer to the underlying network protocol. In other words, T-1 lines, Frame Relay circuits and Ethernet connections are all leased lines, though they vary quite a bit in terms of their cost, availability and performance.

Other WAN Considerations

- **WAN topology:** This refers to the layout and interconnection of the end units (or nodes) in a network. Most library systems use a hub-and-spoke topology for their wide area networks. In other words, the branches all link to the central library, but they don't link directly to one another. They can still communicate, but all that data goes through the networking equipment at the main branch first. Some businesses use a mesh topology where every branch office is connected to every other branch office, but this type of WAN is usually more expensive and more complicated to administer, and there's not much need for it in the library environment.
- **WAN management:** If you have skilled network administrators on staff, you might be able to handle the configuration of routers, switches, firewalls and other devices. However, each WAN protocol has its own equipment, its own set of concepts, its own terminology and its own rules, so it's often easier and cheaper in the long run to pay your service provider and let them manage your WAN.
- **WAN protocols:** There are dozens if not hundreds of networking protocols that play a role in wide area networking, but you can usually ignore the details of how each one is implemented. Also, you often use several of these protocols in combination over the same wide area link. Furthermore, the best protocol in a given situation depends mostly on the local ISPs and the extent to which they've invested in the necessary circuits, equipment and expertise.
 - Ethernet, SONET/SDH, FTTx, ATM and MPLS have good reputations with regard to bandwidth, reliability and the ability to handle time-sensitive traffic, but they're expensive and they're not available in a lot of places.
 - Ethernet Frame Relay has been around for a long time; therefore, it's sometimes the only available option, but it wasn't designed to handle real-time voice and video traffic.
 - Ethernet ISDN has also been around for quite awhile, but it's being replaced by faster, cheaper protocols. Setup, configuration and management of an ISDN connection can also be very complicated.
 - Ethernet T-1 lines (and variations such as T-3 lines) are a standard, widely available option, and they can carry both voice and data.
- **VPNs:** Increasingly libraries are building their WANs across the public Internet. In other words, they don't buy expensive point-to-point connections, but instead they purchase a standard high-speed Internet connection at each branch. They then use VPN (Virtual Private Network) devices to encrypt their sensitive cataloging and circulation records. In



effect, they're creating a private, encrypted tunnel within the wide-open, chaotic Internet. Although this option is cheaper than leasing point-to-point connections in some areas, you may have less control over the performance and prioritization of your traffic. Also, you might find that there's a high learning curve associated with configuring and maintaining VPN devices.

- **Reliability and Service Level Agreements (SLAs):** Most leased lines include assurances with regard to “uptime” and other metrics. In other words, your ISP might guarantee that 99.9 percent of the time your connection will work and they promise to refund some of your money if they fail to meet that target. Also, they often make promises with regard to throughput, latency, dropped packets and other measures. These promises are usually captured in a Service Level Agreement (SLA). Bear in mind that your ISP only makes these promises with regard to service between your building and the edge of the ISP's network (where it connects to the Internet backbone). Beyond that they have no control. Also, if you have several connections from the same provider, your ISP may make assurances about average, across-the-board metrics. For instance, if they promise a monthly average of 99.8 percent uptime across ten high-speed connections, that leaves them a lot of leeway. Your main Internet connection could be down for roughly 14 hours a month and they'd still be within the terms of the SLA. Pay close attention to this type of detail. An example of an [SLA](#) can be found at [Speakeasy.net](#).

Stories from the Field

The other technology that we've implemented here at one of our branch libraries, and are starting to phase it in here at central library, is Voice over IP telephones, and that provides us [with] a cost savings. We are able to put the telephones on the same network as our data — as our computer network — so that is saving us an infrastructure cost. And from what I have been told, the Voice over IP technology could cut down on the costs of long-distance phone calls also. It's sharing the same bandwidth as the computer network, so you need to make sure you have sufficient bandwidth for everything that you're doing there. You do not want everything to go down when somebody starts a streaming video broadcast on one of their computers.

*Thomas Edelblute
Anaheim Public Library, CA*

Our branches are on the same wide area network and different subnets, but we're going away from that model. We are going to put individual connections in different libraries because the more you send traffic through a central location, the slower things get. Right now, the smaller libraries have 256-Kbps connections, and the first of July they're going to go to T-1s. And then we are going to put in a fiber connection with two T-1s here at the main branch.

Our ISP actually owns our routers, so they do all the router maintenance for us. And we go through Merit, which is an ISP for nonprofits in Michigan. They are really easy to work with, and we have never had a problem. This will be our tenth year with them. Actually, the cost of bandwidth went down for us when we went from the 256-Kbps lines to the T-1s this year. It will actually cost less for them to have the T-1 than it was to have the 256. As a consortium, we buy Internet access, and our libraries can buy into that if they want to. But we don't have all 20 of the libraries that we support doing that.



We have five libraries that don't come back through the main branch – they have their own firewalls. And we have about ten that actually come through our firewall first before they go out to the Internet.

Jean Montgomery
Upper Peninsula Region of Library Cooperation, MI



Bandwidth Management

Every afternoon after 3 P.M., it takes 40 seconds to pull up Google or CNN. Your staff has to wait until the next morning to send cataloging records to a remote branch. Video or audio downloads are out of the question. Your first response might be, “Buy more bandwidth!”, and that’s not a bad idea at all, but you might not have enough money to buy more bandwidth. Moreover, some libraries are finding that patrons will fill up everything they’re given. Double your bandwidth, and a month later it’s slow again after 3 p.m. Patrons can use file-sharing applications, such as BearShare, LimeWire and UTorrent, to download several large files simultaneously. Online games, streaming video and streaming audio can also take up large amounts of bandwidth.

There are a few related approaches to managing and controlling bandwidth:

- You can slow down the greedy, bandwidth-hungry programs and/or the patrons who use them.
- You can prioritize the important, high-priority traffic on your network (e.g., catalog records or phone calls).
- Finally, you can optimize the traffic on your network to increase efficiency and avoid redundant transmissions.

We’ll explore all three approaches.

Why Should You Manage Your Bandwidth?

Bandwidth equals \$\$\$\$. Bandwidth costs thousands of dollars a month, and anything you can do to lower your bandwidth consumption will save you money in the long run.

Improved Internet experience. Bandwidth management can make the difference between a network that’s perceived as sluggish and unresponsive and one that seems fast and reliable. For delay-sensitive applications, such as Voice over IP, bandwidth management might make the difference between a device that works and one that’s unusable.

Fairness through compromise. Someone accessing a low-bandwidth, text-based site shouldn’t have to put up with a slow connection because someone else is downloading 5-GB movies onto their laptop. Going to the opposite extreme and blocking all video traffic or all file-sharing traffic is also unfair because it penalizes the moderate, occasional downloader as much as it hurts the patron downloading 50 albums every afternoon. Students often use BitTorrent or streaming video to access lectures and other files related to their classes. In other words, it’s not always the particular protocol or application that’s a problem; it’s the few folks who use more than their share. Bandwidth management strikes a compromise. You can limit bandwidth usage on a per-user basis, a per-protocol basis or both. No single user or type of traffic can hog everything, but they won’t be completely blocked either.

Improved traffic prioritization. Although it’s hard to give one stream of patron traffic priority over another based on your own judgments regarding the appropriateness of the content, libraries often have valid reasons for giving some bandwidth preferential



treatment. Certain voice and video applications simply won't function if they don't have reliable bandwidth and low latency. Also, you may decide that traffic from staff machines should have priority over patron traffic since your library depends on the effective, reliable transmission of catalog records and other files.

Opportunities for remote and rural libraries. Unfortunately, some parts of the country still don't have access to high-speed data lines, or the prices are prohibitive. In these cases, bandwidth management can make a big difference. Even if you don't have money to spend on a high-end commercial device, you can put some open-source software on a desktop computer with two network cards and use that as your Web caching server or your traffic-shaping server.

Bandwidth Management Techniques

Our [Bandwidth Management Techniques — Tips and Actions](#) tool covers four bandwidth management techniques and suggestions, hardware solutions and software solutions. As with most tools, the specialized hardware devices are usually more powerful and more expensive. If you choose a software solution, you'll need to install it somewhere. Depending on how much work you expect the software to do, you might make do with running it alongside other programs on an existing server, or you might be able to run it on an old desktop PC.

Bear in mind:

- These four bandwidth management techniques come in a variety of combinations and packages.
- You might find them all in a single hardware device or a single piece of software.
- On the other hand, you might decide to buy one device that specializes in packet shaping and another that focuses on optimization.

Bandwidth management tools usually reside on the edge of your network and filter all the traffic leaving and entering your network. However, you can also shape the traffic on a particular server or a particular segment of your network. Choosing the right bandwidth management strategy depends on the type of traffic your network typically carries. Therefore, it helps to monitor your bandwidth and pay attention to patterns (e.g., which protocols are taking up the most space).

Even after you've looked at the traffic patterns on your network, you should take your graphs to a network administrator or a networking consultant.

Stories from the Field

Right now, we have a packet shaper from Symphonics, but we're gonna have to do away with that, because at the time we purchased it, we were expecting that we'd have 3 Mbps of connectivity. Now because [of] our access to the municipal fiber, we're up to a 100-Mbps connection, and it's not able to handle that much traffic. So we're gonna have to do away with that. But we did recently upgrade all of our locations to SonicWALL appliances and that does have some bandwidth management built into it. I don't think it's as good as the Symphonics box, but it has some capability. Basically, a traffic shaper is just a traffic cop and you tell it what's most important in terms of traffic. Is it the library catalog traffic that's going out to the branches? Is it the people sitting at home trying to connect to your OPAC server or



your Web site? Is it the staff browsing the Internet? And you give it a set of priorities and rules, and it just says, 'Okay, well, there's too much video-streaming bandwidth being used. You need to wait, and I'm gonna let this library catalog traffic go through.' And then, once library catalog traffic goes through and there's a little bandwidth freed up, then the Internet computer users can start seeing their streaming traffic again. But we've kind of put [a] priority on the actual business of operating the region as the number one priority for who gets the bandwidth.

When I look at our package shaper, the number one source of traffic is HTTP traffic. But HTTP traffic has been used for so many different things. For instance, you can stream video over HTTP. So it's hard to determine exactly where that's all going, but that's the number one use of bandwidth. When you start going beyond just looking at the protocol information, you almost start getting to the point where you're doing content filtering or content prioritization. And the device we have does not do that. It's my understanding that there are devices that can go beyond just the protocol level and actually look inside the packet and see, 'Well, it says it's HTTP but I can tell that it's really video traffic, so they can throttle it back.'

Jay Roos

Great River Regional Library, MN

The only problem with bandwidth is you put it in and it's going to get filled up, especially if they're doing YouTube and some of the higher-bandwidth types of things. Now there are some devices that will throttle bandwidth for you. We're part of the CleveNet Consortium. They handle all of our network connectivity for us. I know they're working with Cisco to get an appliance that will do some bandwidth throttling and do a little throttling with our wireless networks, because honestly, one of the biggest hogs is the public wireless network — people coming in with their own laptops. Because they have LimeWire and BearShare and all the file sharing and BitTorrent types of things on their laptops, and they're able to do that over HTTP, because it doesn't use some other weird port. So there's no good way to stop that. Some of the stuff you don't want to stop. I mean, you don't really want to block YouTube. We don't really want to block a whole lot of anything generally. But how do you throttle that bandwidth and keep those people from completely killing all your bandwidth? So I know they're working on some appliances that are going to help with that.

Jim Haprian

Medina County Library District, OH

One thing I notice is that the more bandwidth you give, the more it's going to be used. I have a lot of my remote sites that are running two, three T-1s and they're still maxed out. A year ago, they were on just a T-1 connection and they were fine. But guess what? It started running slow and I said okay, I'll bump it up. So I took them up to three T-1s and they're still slow today because I give more bandwidth, and the more bandwidth you give, the more it is being used because I'm not doing any bandwidth shaping, [which is] something now that I'm looking at getting into. I know that with the budget shrinking, it's going to be hard for me to go and say okay, a couple of years ago I was at 6 Mbps and today I have a 23 Mbps pipe, and I want actually more money to upgrade it. They're probably going to look at me and say no way, with budgets shrinking. So what I'm trying to do now is I'm looking really closely at my bandwidth and the kinds of traffic, and I'm going to try to start doing bandwidth



prioritization and things like that so that I can give more bandwidth to things that we consider core library services.

*Monique Sendze
Johnson County Library, KS*

One of the things that we looked at — we just went to 6 Mbps here at the main library, and they have this MetroNet, I think it's called MetroNet or something BellSouth has, and it's supposed to be like 10 Mbps for each branch and then it's burstable to 100 Mbps based on your usage. That way, if all of a sudden you have a lot of usage, it can go up if it needs to, but it won't unless it has to. We have experienced some bandwidth issues at some of our branches, and when you've got a T-1 at each one, you would think you'd be okay, but I'm telling you, with the downloads and the bandwidth it eats up, you have to go back and think, 'Well, do I need to manage this?' Should you buy the device to manage the bandwidth to say I'm only going to give 5 percent here and 5 percent there? Or do we increase the bandwidth, which is going to cost the library system more?

*Delbert Terry
Bossier Parish Libraries, LA*

Further Resources

Looking for more information about bandwidth management for your library? If so, check out the [Further Resources](#) section.



Tools

Vulnerabilities and threats to your library's technological infrastructure can be prevented through proper computer, communications and physical security.

Check out the following list of tools. They have been included to help create a library plan that addresses network security issues.

Where and How to Find Vulnerabilities

POSSIBLE VULNERABILITIES	WHAT TO CONSIDER
Patrons can access the staff network	Use your networking equipment (e.g., router, switch, firewall) to create separate sub-networks for patron computing and staff computing. Network administrators often use Virtual LANs (VLANs) and firewalls to accomplish this. This step is especially important if you have a wireless network for patrons. Some of those laptops will be riddled with viruses and malware. Also, while most patrons have no interest in hacking your network, there's no point in tempting them. For more information on wireless security, see Chapter One of Recipes for a 5-Star Library .
You don't have control of critical data	Where do you keep your patron data, circulation records, financial documents, staff documents and critical databases? Make sure you have a list of all the mission-critical data collections in your library, where they're stored, how they're backed up, and who has access to them.
You haven't secured your servers	Devices that connect directly to the Internet must be secured. Do you have servers (e.g., Web servers or email servers) exposed to the Internet or your public network? Have the servers been "hardened" by removing all unnecessary applications, services, and user accounts? You should not have a Web server that has additional services running beyond what it needs to complete its primary function. The exact steps for hardening a server depend on your configuration, but you should look for advice and see if there are any software tools that might help (e.g., the Microsoft Baseline Security Analyzer).
You aren't taking basic precautions	All PCs should have the latest operating system updates, the latest software patches and up-to-date virus definitions. As much as possible, try to automate these updates so they aren't forgotten. For more information, see Chapter Two of A Cookbook for Small and Rural Libraries .
You haven't paid attention to physical security	Who has the keys to your building? Are there locks on your server room? Who has keys to that room? Do you have any computers in far-off corners of the library where your staff has a hard time seeing them? If you check out laptops and other equipment to the public, have you thought about theft-prevention?
You aren't backing up critical data on a regular basis	For more information on backup tools and strategies, see Backing Up Your Data at TechSoup.
You aren't testing your backups	We've heard a few horror stories about libraries who thought they had backups, only to find that the backup tapes were blank or unusable. For more information, see Worst Practices: Don't Test Your Backups at TechRepublic.
You're using weak passwords	For advice on choosing good passwords, read Strong Passwords and Password Security at Microsoft.com.
Your staff doesn't understand the risks of social engineering	Social engineering is a technique that hackers use to trick people into divulging private, secure information. It's still one of the leading causes of security breaches. For example, an employee might receive a phone call from someone who claims to work for your Internet service provider or other

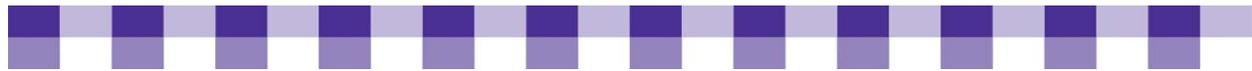


POSSIBLE VULNERABILITIES	WHAT TO CONSIDER
	technical support. The caller says that he's fixing a problem and needs the user's password to test a possible solution. The employee hands over the information without verifying the caller's identity.

Firewalls at a Glance

With so many firewall products on the market, trying to fit each into a specific category would be nearly impossible. The following categories provide generalized descriptions of the most typical firewalls for different-sized library networks. The manufacturers listed do not represent recommendations nor are they restricted to any particular category; they are meant to provide common names for each category.

TYPE	PRICE RANGE	DESCRIPTION	COMMON MANUFACTURERS
Basic – Firewall commonly found in homes, small offices and small libraries.	From \$50-\$150	These firewalls provide basic port forwarding, packet filtering and logging. Although the specification may claim to support more connections, these are generally designed to support networks with 5-10 computers.	D-Link, Linksys and Netgear
Mid-range – These firewalls, made by Watchguard, Symantec and Sonicwall, are found in medium-sized libraries with more specific needs and with 10-50 computers.	From \$300-\$700	These firewalls provide more advanced, stateful packet inspection, and technologies such as VPN, user authentication and content filtering.	Watchguard, Symantec and Sonicwall
Advanced – For larger library systems, advanced firewalls offer very high capacity and feature-rich devices.	From \$2,000 to well into five figures	You will not find these in most small to medium libraries.	Cisco, Checkpoint and Juniper



Network Performance Metrics Defined

Latency:

- Refers to the amount of time (usually measured in milliseconds) it takes for data to travel from one location to another across a network (or across the Internet, which is a network itself).
- Is sometimes referred to as delay, because your software is often waiting to execute some function while data travels back and forth across the network. For example, Internet Explorer can't display a story from CNN.com until CNN's Web servers respond to your request for that page.
- Is often less than 100 milliseconds on today's high-speed network, which has very little impact on Web surfing.

If you'd like a more thorough explanation, see [It's the Latency, Stupid](#) and [It's Still the Latency, Stupid](#).

Bandwidth and throughput

These two terms are sometimes used interchangeably, and though they are related, they're not quite the same. They both refer to the amount of data transferred between two points on a network in a given period of time. In other words, how many bits per second can you send across your network or over your Internet connection?

Bandwidth vs latency

If you're still having trouble grasping the difference between latency and bandwidth (or throughput), this analogy from the [Gentoo Linux wiki](#) might help:

"Latency is a measure of the time a packet needs to get from point A to point B. Bandwidth measures the amount of data that got from A to B in a certain time. So, if you were to take a dictionary to your friend on the other side of town, your bandwidth would be good, but the latency would be bad (the time spent driving, to be exact). However, if you were to phone your friend and start reading the dictionary to him, the latency would be lower, but the bandwidth would be substantially less than in the first example."

How It Applies to You

Generally, you only need to be concerned about latency in two situations:

- When your staff and patrons complain about a slow connection, high latency could be part of the problem, though you might not be able to do anything about it other than contact your ISP and ask them to address the issue.
- Second, if you're planning to install Voice over IP (VoIP) or any other application that relies on live, real-time transmission of video or audio, you need to ask your service provider about their latency. Real-time voice and video applications are sensitive to network delays. For instance, with VoIP, you'll notice that the audio is choppy, with lots of pauses and dropped syllables. **Jitter** refers to variation in the amount of latency, and it has a similar negative impact on real-time communication.

How It Applies to You

- On a day-to-day basis, you'll usually see them measured in Kbps (kilobits per second), Mbps (megabits per second) or Gbps (gigabits per second). Bandwidth generally refers to a theoretical maximum, while throughput is a real-world, practical measurement. The distinction is relevant because ISPs will usually advertise their bandwidth, which is often higher than the throughput that you'll actually receive. In other contexts, you'll see the terms bandwidth, throughput and speed used interchangeably.



Uptime or responsiveness

Uptime, sometimes referred to as availability or responsiveness, refers to the amount of time that a computer or a network connection is functioning and usable.

Hardware and software

Your network relies on switches, servers, routers and firewalls, so network monitors can usually track metrics such as CPU utilization, remaining hard drive space and memory use. Also, by sending messages to your Web site, your OPAC and other key applications, your network monitor can track the responsiveness of mission-critical services and software.

Etc.

There are hundreds of data points you could track on your network, so you'll have to spend some time talking to your vendor or wading through the documentation.

How It Applies to You

- If you're buying a leased line, the ISPs guarantee with regard to uptime should be written into the Service Level Agreement. You also want to measure the uptime of your own equipment to see if a device has a recurring problem.



Ten Factors to Consider When Shopping for a Telecom Provider

- 1. Business vs. residential:** ISPs usually distinguish between the services they market to businesses and the services they market to home users. Residential customers can usually choose between dial-up, cable Internet, DSL and, in some areas, Fiber to the Home (FTTH). Business customers often have several additional options to choose from, such as Frame Relay, Metro Ethernet, SONET and SDSL. The underlying technologies and protocols shouldn't be your first concern, and the exact menu of choices varies a lot from city to city. What's important here is that business-class connections provide more reliability, greater upload speeds and other advantages important to some nonprofits. On the downside, business-class connections usually cost a lot more. If your needs are limited, you might not need a business-grade connection. On the other hand, ISPs don't always offer residential broadband service to office buildings and organizational customers.
- 2. Reliability and Service Level Agreements:** Most business-class Internet connections come with assurances regarding "uptime" and other metrics. In other words, your ISP might guarantee that 99.9 percent of the time your connection will work, and they promise to refund some of your money if they fail to meet that target. Also, they often make promises with regard to throughput, latency, dropped packets and other measures. These promises are usually captured in a Service Level Agreement (SLA). Bear in mind that your ISP only makes these promises with regard to service between your building and the edge of the ISPs network (where it connects to the Internet backbone). Beyond that they have no control. Also, if you have several connections from the same provider, your ISP may make assurances about average, across-the-board metrics. For instance, if they promise a monthly average of 99.8 percent uptime across ten high-speed connections, that leaves them a lot of leeway. Your main Internet connection could be down for roughly 14 hours a month and they'd still be within the terms of the SLA. Pay close attention to this type of detail. An example of an [SLA](#) can be found at [Speakeasy.net](#).
- 3. How long does the contract last?** ISPs will sometimes offer reduced rates in exchange for a long-term contract. Be cautious about any contract that lasts for more than two years. The services, prices, providers and technologies are changing all the time in the Internet access market. When a cheaper, faster service shows up in your community a year from now, you don't want to be locked into a four-year contract.
- 4. Equipment and installation costs:** Residential plans usually have very low setup costs. You pay \$50 to \$75 for a modem and a \$25 to \$50 installation fee. On the other hand, for some business-class Internet connections, the equipment can cost thousands. For example, if you buy a T-1 connection, you need a CSU/DSU and a router, both of which can cost a thousand or more. Also, the installation and setup fees are usually much higher. You can roll some of these initial costs into your monthly bill by renting equipment from your ISP. In other words, you'll trade lower up-front costs for higher ongoing costs.
- 5. Uploading vs. downloading:** Uploading, or upstream, refers to the transfer of data from within your local area network to machines outside your network, and downloading is the reverse. We spend most of our time on the Internet downloading Web pages, files, audio streams, etc., as do our patrons. However, since libraries host Web sites, email servers, Web-accessible online catalogs and other services, your ability to send data upstream over your Internet connection is nearly as important as your download speed. In fact, with more and more patrons uploading videos, photos and other large files to sites such as YouTube and Flickr, you should think about upload speeds even if you aren't hosting a Web site or an OPAC in your building. Most



broadband connections marketed to home users (e.g., DSL and cable) are asymmetric. In other words, the upload speed is much lower than the download bandwidth. With DSL, for example, your download rate might be 1 Mbps, while your bandwidth for uploading is only 150 Kbps. In fact, residential service contracts from some ISPs expressly forbid the hosting of Web sites and other online services. On the other hand, business-class broadband connections usually provide more bandwidth for uploading. If you have a leased line (e.g., a T-1 line), your upload and download speeds are usually the same. [SDSL](#) is another synchronous technology that's often used for business-grade Internet access.

6. **Scalability:** If you need more bandwidth a year from now, will your existing networking equipment and data lines handle the extra traffic? How much will your ISP charge you to upgrade the connection?
7. **Integrated voice and data service:** Ten years ago, most companies sent their phone traffic over one connection and their data over another, and these lines were often purchased from different providers. It's more and more common to get both services from the same vendor, over the same lines, sharing much of the same equipment. For example, you can lease a T-1 line from your phone company and use half of it for Internet traffic and half for phone traffic, and a single device can handle routing and security for both services. Also, bear in mind that some networking technologies can allocate bandwidth dynamically while others can't. In other words, if the voice section of your high-speed line is empty because nobody's making a call, can staff and patrons use that bandwidth to surf the Web?
8. **Managed services:** If you have the required expertise, you can manage your own routers and the other networking equipment you need for Internet access. However, most ISPs offer a managed option where they handle all the configuration and troubleshooting. Sometimes the managed equipment still resides in your building, but in other cases, it's hosted by your ISP. When it's time to dispose of the router or the firewall, the service provider takes care of it. Obviously, you pay more for this type of service.
9. **How does this impact e-rate?** If you plan to buy new equipment or upgrade your Internet connection, how will it impact your e-rate application? If you plan to change service providers and you apply for discounts under Priority 1, make sure your new provider is an eligible telecommunications carrier. Also, the cost of on-premises telecommunications equipment is often eligible for e-rate discounts under Priority 1 if the equipment is integral to the provision of the high-speed connection. For a short explanation of what's eligible under e-rate and what isn't, download [Appendix G](#) of Recipes for a 5-Star Library. For the long explanation, see [the 2008 eligible services list](#).
10. **Redundancy:** Do you have more than one way to get to the Internet? Sooner or later a construction crew will cut a line somewhere in your town, or a transformer will blow up. Some ISPs can provide redundancy by selling you two data lines that connect to the ISPs network at two different locations. In other words, you can lease two T-1 lines that terminate at two different Points of Presence (or POP, which just refers to a phone company facility near your building). If that's too expensive, you could lease a single T-1 from the phone company and buy cable Internet service or dial-up service as a backup solution in case your primary line goes down. Of course, you should only consider this if 24x7 Internet access is critical to the operation of your library. For anything besides dial-up access, you'll pay a lot of money for a redundant connection that you might need only once or twice a year.



Bandwidth Management Techniques — Tips and Actions

BANDWIDTH MANAGEMENT TECHNIQUE	DESCRIPTION	TIPS AND ACTIONS
<p>Traffic shapers limit the speed and bandwidth available to certain data streams.</p>	<p>You can limit a particular type of application (e.g., specify that traffic from file-sharing software can never exceed 200 Kbps), or you can specify how much bandwidth is available to each user. This technique is sometimes known as packet shaping or bandwidth limiting.</p>	<ul style="list-style-type: none">• Limiting by type of application (or port number) is occasionally difficult because software can be designed to use random port numbers to communicate in order to evade traffic shapers.• Also, port 80 (the HTTP port for standard Web traffic) handles a wide variety of different data, and you don't want to throttle it all indiscriminately.• Most traffic shapers can handle these routine evasive maneuvers by inspecting each packet of data carefully.• Investigate your packet-shaping tool to see what kinds of distinctions it can make. For example, can it tell the difference between Web audio and Web video? Can it recognize BitTorrent traffic, regardless of the port it's traveling across?



BANDWIDTH MANAGEMENT TECHNIQUE	DESCRIPTION	TIPS AND ACTIONS
<p>Quality of Service (QoS) complements packet shaping, and it often requires packet shaping to work effectively.</p>	<p>Packet shaping delays and limits low-priority Internet traffic, which makes room for higher-priority traffic. QoS, in turn, prioritizes the important or delay-sensitive network traffic, making sure it gets sent out before other traffic streams and guaranteeing that it arrives at its destination within a specified time frame (e.g., under 100 milliseconds). Real-time media, such as voice, video and online gaming, react badly to latency and jitter, so they often need QoS. For instance, latency above 145 milliseconds makes Voice over IP calls unlistenable. On the other hand, most of us can surf the Web at much higher latencies without noticing a serious delay, so there's no point in applying QoS to ordinary Web traffic.</p>	<ul style="list-style-type: none"> • To obtain true QoS, with guaranteed latency and bit rates, you need to have some control over the entire network connection, including the equipment at both ends and all the circuits and routers in between. Usually, this means you have to pay your service provider for higher-quality point-to-point connections (aka leased lines), because you can't guarantee QoS over the public Internet. • On the flip side, you can implement packet shaping on one end of a network connection, so it's often cheaper and less difficult to set up. Packet shapers can usually prioritize certain traffic streams, but they can't guarantee delivery the way an end-to-end QoS connection can.
<p>WAN optimization doesn't discriminate between traffic streams the way packet shapers and QoS devices do. Instead, optimizers use a variety of techniques to strip out the inefficiencies and redundancies from network traffic. In other words, an optimizer speeds up all the traffic that passes through it.</p>	<p>Compression and caching are two basic techniques that optimizers use, but there are a variety of advanced algorithms that we won't get into here. As with the other devices that we've discussed, WAN optimizers usually reside at the edge of your network, behind your router or firewall.</p>	<ul style="list-style-type: none"> • With certain types of WAN optimizers, you need a device at both ends of the network connection. For example, to take advantage of compression, you need a device at the far end of the connection that's capable of decompressing.



BANDWIDTH MANAGEMENT TECHNIQUE	DESCRIPTION	TIPS AND ACTIONS
<p>Web caching is a piece of software or hardware that saves copies of recently accessed pages in memory or on a hard drive in order to speed up retrieval.</p>	<p>If you have 200 patrons surfing the Web on any given day, chances are that they're accessing the same sites over and over again. Some of these sites are saved, or cached, in the Web browser on each individual desktop computer. If you return to a story you were reading half an hour ago, you don't have to wait while your browser pulls down a fresh copy from a remote Web site. Instead, your browser shows you the version contained in the browser's local cache. However, this only helps your personal connection. If the patron next to you wants access to the same article, they can't get it from your local cache. They have to send another request to the remote Web server and download the same article that you downloaded half an hour ago. A Web-caching server acts like a big shared cache for the entire network. All the PCs on the network can be configured to check the server first to see if a copy of the desired page has already been retrieved for someone else.</p>	<ul style="list-style-type: none">• Some Web pages are constantly updated (e.g., weather information or stock quotes), and other sites are fairly static.• Obviously, your caching server shouldn't hold and redistribute a page of stock quotes that someone retrieved two hours ago.• Any request for time-sensitive information should bypass the caching server. Fortunately, most Web pages contain this information. A field in the page header will tell your caching server how long the page should be held.



Network Inventory

As with anything IT related, you have the option to automate all or part of your network inventory. Many different types of software (e.g., asset management programs, network management programs, network inventory tools) have the ability to scan your network and collect information about your existing equipment. However, it takes time to find the right tool, learn it, and integrate it with your networking equipment. If you don't have a large network, or don't have the time to investigate network inventory software, use the worksheets provided here.

At the end of each inventory sheet, we've included space below for you to record administrative logon information. As always, be careful about how you handle sensitive usernames and passwords. It's often a good idea to record usernames and passwords in a separate, encrypted file. Also, regardless of how you record logon information, be sure to protect these worksheets and any IT documentation. Even without passwords, a hacker could use the information below to compromise your network.



Switch

MAKE/MODEL		LOCATION	IP ADDRESS		VLAN INFO (IF ANY)
			IP		
			Subnet Mask		
			Gateway		
ADMIN LOGON		CONNECTED TO	SPEED		SERIAL #/ASSET TAG #
PORTS		DATE PURCHASED	PURCHASE ORDER #	TECH SUPPORT PHONE NUMBER	
TOTAL	FREE				
Notes					



Wireless Access Point

MAKE/MODEL	LOCATION	IP ADDRESS (WIRELESS SIDE)		IP ADDRESS (WIRED SIDE)	
		IP		IP	
		Subnet Mask		Subnet Mask	
		Gateway		Gateway	
SSID (I.E., THE NAME OF YOUR WIRELESS NETWORK)	ADMIN USERNAME AND PASSWORD	WIRELESS SECURITY KEY (IF ANY)		SERIAL #/ASSET TAG #	
DHCP INFO	DATE PURCHASED	PURCHASE ORDER #		TECH SUPPORT PHONE NUMBER	
Notes					



Router

MAKE/MODEL		LOCATION	INTERNAL ADDRESS		EXTERNAL ADDRESS	
			Static?		Static?	
			Router IP		Router IP	
			Subnet Mask		Subnet Mask	
			Gateway		Gateway	
ADMIN LOGON		REMOTE ACCESS	WHERE IS THE CONFIGURATION FILE BACKUP?		SERIAL #/ASSET TAG #	
PORTS		DATE PURCHASED	PURCHASE ORDER #	TECH SUPPORT PHONE NUMBER		
TOTAL	FREE					
Notes						



Firewall

MAKE/MODEL		LOCATION	INTERNAL ADDRESS		EXTERNAL ADDRESS	
			Static?		Static?	
			Firewall IP		Firewall IP	
			Subnet Mask		Subnet Mask	
			Gateway		Gateway	
ADMIN LOGON		REMOTE ACCESS INFO	WHERE IS THE CONFIGURATION FILE BACKUP?		SERIAL #/ASSET TAG #	
PORTS		DATE PURCHASED	PURCHASE ORDER #	TECH SUPPORT PHONE NUMBER		
TOTAL	FREE					
Notes						



Internet Connection Hardware

EQUIPMENT TYPE (E.G., CABLE MODEM)	MAKE/MODEL	INTERNAL ADDRESS		EXTERNAL ADDRESS	
		Static?		Static?	
		Hardware IP		IP	
		Subnet Mask		Subnet Mask	
		Gateway		Gateway	
ADMIN LOGON	REMOTE ACCESS INFO	LOCATION		SERIAL #/ASSET TAG #	
CONNECTION SPEED (E.G., 1.54 MBPS)	DATE PURCHASED	PURCHASE ORDER #		TECH SUPPORT PHONE NUMBER	
Notes					



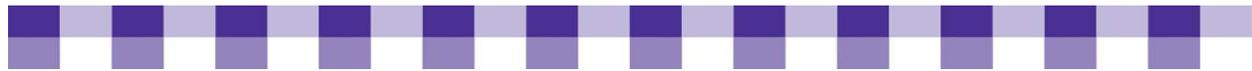
Other Network Information

DHCP Server

Server Name	
IP Address	
Subnet Mask	
Gateway	
Physical Location	
Range 1	
Exceptions	
Range 2	
Exceptions	
Range 3	
Exceptions	
Notes	

DNS Information

Primary DNS Server	
IP Address	
Who hosts it?	
Notes	
Secondary DNS Server	
IP Address	
Who hosts it?	
Notes	



Web Site

Web Site URL	
Web Server Software	
Root File Directory	
FTP Server Name	
FTP logon Info	
Web Server Software	
(if hosted internally)	
Server Name	
Physical location	
IP Address	
Subnet Mask	
Gateway	
(if hosted by a third party)	
Web hosting company	
Web host contact info	
Account management URL	
Account management logon info	
Monthly bandwidth/storage limits	
Cost	
Notes	

Domain Registration

Domain Name	
Registrar Name	
Registered Admin Contact	
Registered Technical Contact	
Registration Login Information	
Contact E-Mail	
Expiration Date	
Last Renewed	



Further Resources

Basic Networking Resources

- Novices to the network world should check out the educational animated movie at the [Warriors of the Net site](#). The [Computer Networking](#) section of WebJunction has many resources dedicated to understanding computer networks in libraries.
- Along with TCP/IP, Ethernet is the dominant technology in wired local area networks (LANs). Lantronix has a good [Ethernet Tutorial](#) though the third part of it includes too many sales pitches. This tutorial has some information about the different types of cables commonly used in local area networks, but for more in-depth information see [Ethernet Cable Identification](#) and this [FAQ](#) on CAT-5, CAT-6 and other cabling standards.
- If you're interested in TCP/IP, the [Learn Networking](#) site has an introduction [], and they also have a tutorial about subnetting. You can calculate subnets by hand, but a lot of administrators just use a [calculator](#). Microsoft also has some information about [IP addressing](#). If you need to do some basic connection troubleshooting, [TCP/IP Troubleshooting](#) at the Microsoft site will teach you to use some basic tools such as ping and ipconfig.
- For definitions of basic networking equipment, see [Network Gear](#) at About.com or search for individual terms (e.g., switch, router, firewall) at [Webopedia](#) and [Wikipedia](#).
- For more information about wireless networking, see [Recipes for a 5-Star Library](#).
- The FCC's article, [What is Broadband?](#) defines broadband and discusses its importance and the different types. Our article on Internet Access and ISPs also has information on this subject.

Basic Security Information

The SANS Institute creates an annual list of the [Top 20 Security Risks](#). While this list may go beyond the scope of the small to medium-sized library, it represents the most accurate compilation of malicious activity on the Internet. [Microsoft's Security Guide for Small Business](#) provides an excellent overview of establishing a secure network.

Network Diagramming Software

[Microsoft Visio](#) is often used for network diagrams, and libraries can buy it at a discount from TechSoup. [Gliffy](#) is an easy-to-use online program with a free and a paid version. [Dia](#) and [Networknotepad](#) are two free, open-source diagramming programs. Also, most network monitoring programs [Network Monitoring] can automatically create a map of your local area network and/or your wide area network.

Identifying Vulnerabilities and Risks in Your Network

- **Common threats:** Infopeople describes [Common Security Threats and Vulnerabilities](#) Microsoft has similar information on pages 5 to 9 of their [Security Guide for Small Business](#). While written a few years ago, [Why You Need a Firewall](#) by Cisco also identifies the different types of attacks that are prevalent on the Internet.

- 
- **Vulnerability scanning tools:** [Nmap](#) is another popular, free tool which scans your network and looks for vulnerabilities. By default it runs from the command line, but you can also find several free graphical interfaces (e.g., [Zenmap](#) for Linux and [NmapView](#) for Windows). For a short beginner's guide, see [Nmap for Beginners](#). For a thorough run-down, see [Secrets of Network Cartography](#). Also check out this list of [Top 10 Vulnerability Scanners](#) as voted on by security experts. Most of the tools on this list are commercial, and some are quite expensive.
 - **Risk Assessment:** InfoPeople has an article on [Library Security Principals](#) that includes a section on [Risk Assessment and Creating Security Policies](#).

Security Policies

- WebJunction's article on [Security Policies](#) has advice about the process of developing a policy, and TechAtlas provides an excellent [template](#) to get you started.
- [Security Policies 101](#) highlights several reasons for implementing security policies and also illustrates the difference between technical and administrative policies.
- [Non-technical Hurdles to Implementing Effective Security Policies](#) by Gary Kessler provides an important non-technical perspective on security policies.

Network Performance Metrics

[Connectivity Troubleshooting](#) from WebJunction and [How to Troubleshoot TCP/IP in Windows XP](#) both explain ping, traceroute and other basic troubleshooting tools. [A Survey of Network Monitoring Tools](#) from WebJunction and [ABC: An Introduction to Network Monitoring](#) from CIO.com both explain the different functions performed by this type of tool. [Stanford Linear Accelerator Center](#) has an exhaustive list of free and commercial solutions.

Bandwidth Management

- For advice from the library community, see this thread on [Bandwidth Limiting](#) (aka traffic shaping) at WebJunction.
- The [QoS article](#) on the Gentoo Wiki server tells you how to build your own packet shaper using open-source software, but it also explains the concepts that underlie packet shaping and Quality of Service.
- [What Is Web Caching?](#) on the WebJunction site offers a good introduction to this topic. For a more detailed explanation, check out the [Caching Tutorial for Web Authors and Web Masters](#).
- [The Options for Network Optimization](#) gives a quick overview of the various techniques used to speed up a WAN link or an Internet connection. [WAN Optimization Appliances](#) at the Network Computing site offers a review of four popular optimization tools.



Innovation

The Internet was first based on the “Web 1.0” paradigm of Web sites, email, search engines and surfing. Web 2.0 is about conversations, interpersonal networking, personalization and individualism, a much higher level of interactivity and deeper user experiences. It is vital that libraries be at the center of these new community conversations. Libraries are traditionally a trusted resource, a community institution that offers universal access and that can now be a point of practical information technology innovation — the third place in the physical and online community (beyond the workplace and home).

IN THIS SECTION

[Free and Open-Source Software in Libraries](#)

[Gaming in Libraries](#)

[Collaborative Tools](#)



Free and Open-Source Software in Libraries

Different experts have different ideas about what exactly qualifies as “open-source” software. In general, the term refers to any program with a licensing agreement that allows you to view and modify the source code, which is a series of high-level, human-readable instructions that defines a particular program and tells the computer what to do. Under an open-source license, if you choose to distribute your modifications of someone else’s software, you have to do so under the same terms. Simply put, other developers can view and modify your source code, just as you could view the original code. An open-source license doesn’t require that the software be available free of charge, though that’s usually the case.

For most people, the Linux operating system is the archetypal open-source application, and it’s the platform for which most open-source software was designed. There are hundreds of Linux variants (called distros) that differ from one another in look, feel and bundled applications, but that all share the same underlying structure (embodied in the Linux kernel). For more information on Linux and Linux distros, see [Further Resources](#).

Skeptics and Windows fans like to say that open-source software is “free like a puppy.” In other words, they argue that the ongoing support and training costs of open-source software will outweigh your initial cost savings. Open-source advocates respond that all technology has support and maintenance costs. The real total cost of ownership (TCO) for open-source depends on which program you’re considering and your staff’s expertise.

- Some open-source programs run from the command line and intimidate non-techies.
- Others are supported by a few part-time programmers so it’s hard to get bugs fixed and questions answered.
- On the other hand, well-known programs, such as the ones at [Open-Source for Windows](#) and the major Linux distributions, are highly polished, reliable, and easy to use. In these cases, you can almost always get free, informal support from volunteers or formal, paid support from the software developer or a third party company.

Why Use Open-Source Software in Your Library?

- **It’s free.** If your library is on a tight budget, a no-cost solution has to be tempting. However, nothing in life is entirely free. As we’ll discuss in more detail, all software, as well as all hardware, has a [Total Cost of Ownership](#). You and your staff will spend time learning the open-source software, installing it, customizing it and maintaining it.
- **It’s customizable.** There are no restrictions about what you can do with open-source software. If you need some functionality that isn’t currently part of the program, you can hire someone to develop that function or write the code yourself. You have to release your improvements to the wider community, but that’s not a problem for libraries, since we’re not in the business of selling software. Moreover, the open-source community might latch on to one of your improvements and develop it further.
- **You are vendor-independent.** With proprietary software, you’re usually dependent on a single software vendor. If you need some specific, added functionality for a core piece of



software, such as your ILS, you have to ask the vendor and pay their prices. If the vendor is too busy to address your request, all you can do is wait. With open-source software, you can often choose from thousands of developers for well-known programs. For more obscure products, you may have fewer choices, but you're never completely trapped. Moreover, with open-source software, you're less likely to face the "we no longer support this product" scenario. When proprietary software vendors upgrade a program, change strategy or go out of business, they often abandon older software, forcing their customers to migrate and/or choose another vendor. This is less likely to happen with open-source software. If one open-source company stops developing certain software, customers can take over maintenance of the software themselves or hire a new company to do it.

- **There's security and reliability.** Windows advocates and open-source advocates can argue for days about this topic, but Linux/Unix lovers suggest that their favorite tools are lower-priority targets for hackers. They also point out that "with a million eyeballs, all bugs are shallow." In other words, bugs and security holes are found and patched quickly because so many developers have access to open-source code.

Key Actions

- **Start slow with OpenOffice and Firefox.** If you haven't used them before, install [OpenOffice](#) and [Firefox](#) on a test machine. These two programs are by far the best-known, most popular open-source applications.
 - **OpenOffice** is an office productivity suite, with word processing, spreadsheet and presentation software. In style and functionality, it's similar to Microsoft Office.
 - **Firefox** is an open-source Web browser that competes with Internet Explorer.
- They're both well-designed, easy-to-use applications, perfect if you're still intimidated by the idea of open-source software. Also, both run on Windows, and they don't conflict with Internet Explorer, Microsoft Office or other common applications.
- **Think "free" when you shop for software.** For almost any commercial application, you can find one or more free, open-source alternatives. Even if you narrow your choices down to software that runs on Windows, there are several open-source programs in almost every major category. The [Open-source Alternative](#) site lets you search for well-known commercial programs and then offers open-source alternatives. The [open-source for Windows](#) page suggests two or three popular programs for most major categories.
- **Try Ubuntu by running it from a "LiveCD."** [Ubuntu](#), a relatively new Linux distribution, has taken off quickly and boasts a huge, active user community as well as great documentation. It's intuitive, user-friendly and resembles Windows enough that Linux-newbies won't be overwhelmed. When you boot to a [LiveCD](#) the operating system runs from the CD itself and main memory (i.e., RAM), but doesn't install itself on your hard drive or overwrite any files there. Of course, changes you make to your settings won't stick by default, and reading files from a CD is slower than reading them from a hard drive. Using a LiveCD is a good way to experiment with an operating system without committing to it.
- **Join the open-source for libraries movement.** Check out a few of the sites under [Further Resources](#) for descriptions of open-source software specifically designed for libraries.



- **Consider the total cost of ownership.** As we mentioned previously, before you install any program, look at the documentation and the support community. Who will you turn to if you run into trouble? Will your staff adapt quickly to the new software, or will they need retraining?

Stories from the Field

I think if there's one thing that makes people gasp and flinch even more than mentioning Macintosh, when they're used to dealing with PCs, is mentioning open-source. But like you say, once you get it going and you say, 'Go ahead, touch it, it won't bite,' I think it gets really exciting after that because it's like, oh, hey, this does work. I think people are still kind of spooked into thinking they're going to have to sit there and do all kinds of coding or something.

*Lisa Shaw
Turner Memorial Library, ME*

We are actually using, and I talked about this once before, MONOwall, and we use it for our wireless. It creates what you call captive portals so that way, a page will come up that the user has to accept. And, along with that now, we use Kiwi, so we can get statistics on how many people are using the wireless in certain libraries. Another product I just played with was Cybera, which is actually Internet café tracking software, so if a person wants to use a machine, [the software] will time them, and it will kind of keep statistics on them, and that's open-source. I'm trying to think of some others. MRTG — that's from an open-source product. Our listserv is open-source; it's just called List Serve Lite. I'm big on open-source because other stuff costs so much money. And, you know, when you are a small library, you don't have a lot of money, so those are the kinds of things that we're looking at.

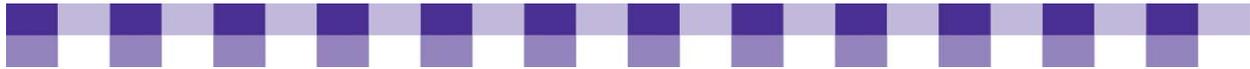
*Jean Montgomery
Upper Peninsula Region of Library Cooperation, MI*

Linux Thin Client Terminal Project

The thin client project was my first major open-source project that we implemented here, the first one that I was responsible for. And it's gotten a lot easier since those early days, because, for example, Ubuntu has the Edubuntu distribution that already has the thin client server installed on it. You could just potentially do an installation of that and be up and running.

We tend to buy a pretty powerful server. I think the one we have now has two dual-core processors on it. I don't remember their exact specs. Right now, we only have 2 GB of RAM on this one. I've been meaning to upgrade it, but the speed is pretty good, so it's been all right. I also upgraded our internal network to gigabit, so we're using all gigabit switches. That helps the traffic flow through the network. We have a little [more than] 30 thin clients on the same server. We're also using 64-bit. The server uses a 64-bit kernel, but I think it serves up 32-bit software.

The Linux terminal server project has a Web site. It's www.ltsp.org. They have a wiki on there that has a lot of information on how to set it up. Ubuntu also has a lot of documentation on their Web site about setting up a Linux Terminal Server Project (LTSP) server. Those are good places to start. I think Edubuntu has a handbook, too, that includes LTSP information.



On our public computers, I use K Desktop Environment (KDE) as the default desktop, because I tried initially locking down Gnome and I used to use IceWM, but KDE is really easy to lock down. You can create different profiles. All the configuration files are text-based, so you can edit those and create a profile for your various user types — like I have one for the online public access catalog (OPAC), one for the [circulation] computers, one for the public Internet computers. Also, we have another one, because we have an on-staff software developer. He just wrote a kiosk management system called LIBKEY. If anybody wants it, it's on SourceForge. We created a profile just for LIBKEY so that instead of the desktop, a patron first sees a login screen, and they have to log in with their user name and password, and they get half an hour to use the Internet. Then it kicks them off. We're using that for patron time management to avoid arguments about "I have five more minutes" and the librarian says, "No, you don't" and that kind of thing. It's tied into our [circulation] system. We're using Koha. It grabs the patron database from Koha every night and that's what it uses for the user name and password.

*Cindy Murdock, Open-source Guru
Meadville Public Library, PA*

Using An Open-source ILS (Koha)

You don't need to have an on-staff developer. We wanted to change quite a bit of it. We made our own interface for the [circulation] system to suit ourselves. It's nice to have a developer on staff if you want to change a lot of things or tweak things. But you can get support from various vendors, like LibLime. There are vendors that do hosted solutions. So if you don't want to muck around in the database innards or anything like that, you can do that as an option. Since it's open-source, you can also download it and install it yourself if you want to see how it works. That's a nice thing, because most vendors don't give you that option to play with it without paying for it in some way. We've been using it since mid-May. We just finished migrating our third library to it just this past weekend. We have nine libraries in the county. I think we'll be able to get the next few up pretty quickly. We had some issues because we're encrypting all of our traffic for security reasons on the intranet side, the staff side. We found that it was really slow at the farthest library from the system headquarters. I had to use a hardware solution to get the encryption to speed up. Now that we've got that done, I should be able to get the other ones done pretty quickly.

*Cindy Murdock
Meadville Public Library, PA*

Further Resources

We've included several additional resources on the topic of [open-source](#) software.



Gaming in Libraries

Board and card games have a long history in libraries. Most librarians have no problem with a quiet game of chess or gin rummy, and many libraries make these and similar games available for checkout. Video games, on the other hand, haven't always had the best reputation, so libraries have tended to steer clear of them until recently. The idea that video games cause violent behavior has been strongly disputed, but some librarians still feel that they're a waste of time with no relevance to our profession. However, there's more and more evidence that games in general and video games in particular develop a wide range of useful skills. Furthermore, gaming events in libraries can generate great publicity and they create a strong, lasting connection between teens and the one institution in town that actually supports and encourages the activity that they love so much.

Our purpose here is to describe the logistics and details you should think about before you host a gaming program. We will not be covering the steps you need to take to build a collection of video games for checkout, but the following resources will lead you to information on that subject.

Why You Should Care About Gaming in Libraries

- **Gaming events can:**
 - **Draw teens and their parents to the library.** For years librarians have worried that they're "losing a generation." Teens have been visiting the library less often and checking out fewer books as their information and entertainment options increased. There's [increasing evidence](#) that gaming events in the library will increase circulation and reading among young adults.
 - **Create a connection between young adults and library staff.** Teens (and adults) are more likely to ask for help from someone they know.
 - **Help teens develop teamwork and organizational skills.** A lot of libraries involve teens in planning and monitoring their game nights. Teens help select the games, market the events, set up equipment, enforce time limits and so on. Furthermore, the games themselves often require teamwork and cooperative problem solving.
- **Video games can be beneficial.** There's no universal consensus on this controversial issue, but there's a lot of evidence suggesting that well-designed games improve fluid intelligence and one's ability to solve complicated, multifaceted problems. For a book-length discussion of this topic, see [Everything Bad Is Good for You](#) by Steven Johnson. Animeted.org has more [arguments in favor of gaming in libraries](#), and you can find similar information in the resources on this page.

Key Actions

- **Talk to your target audience which is typically made up of teens.** Ask them which gaming platforms they prefer, and which games will draw the biggest audience. Teens can also help you with the setup and takedown of the equipment. Finally, peer marketing will get the word out and make your gaming nights successful.



- **Create partnerships.** If you have a GameSpot or a similar store in your area, drop by and see if they can offer any advice or assistance. They know the gamers in your town and can recommend age-appropriate games. Also, they might donate games or gaming equipment to your library, or at least offer you a discount. The local YMCA, the Boys and Girls Club or any other kids program might be looking for someone to partner with. They can provide space, money or help with marketing and outreach. Get creative with your partnerships. A library in West Virginia recently partnered with the State Health Department. It makes sense. When teens play Dance Dance Revolution or Wii Fit, they burn thousands of calories. And seniors love Wii Bowling for some reason (Wii Bowling is part of Wii Sports, the game that comes with your console). Talk to local senior groups and elder care facilities and see if you can collaborate on a Wii Sports night.
- **If possible, borrow the games and the game consoles from local teens or a local gaming store.** You might be able to borrow TVs as well, but these are harder to transport. Of course, some equipment is less durable, so be careful about what you borrow and how you take care of it. Furthermore, only borrow from patrons you can count on. Gaming events where the equipment doesn't show up are generally unsuccessful. Finally, if you plan to put on regular gaming events, you should get your own equipment.

Other Ideas and Possible Actions

- **Think about making formal competition a part of your gaming events.** Setting up a tournament with rules and scorekeeping takes a lot more work, but it's been wildly successful for Ann Arbor Public and other libraries. Ann Arbor Public also keeps a running leaderboard.
- **Plan your purchases carefully.**
 - **Which consoles will you buy?** You can focus on the latest and most expensive consoles (the Wii, the Xbox 360 and the Playstation 3). But older consoles (i.e., the Gamecube, the Xbox and the Playstation 2) are still popular and considerably less expensive. Some libraries have also had success with events that focus on PC games, handheld devices such as the Nintendo DS and the PSP (Playstation Portable), and multiplayer online games. ConsumerSearch has [buying advice](#) on the latest generation of consoles. Wikipedia has [an overview of the previous generation](#).
 - **Should you buy wireless controllers?** Probably not, as they tend to wander and get lost.
 - **How many controllers will you need?** Most game consoles only come with one, but you'll need more than one for your events and tournaments. You can buy the extra controllers (usually about \$50 apiece) or ask participants to bring their own. Again, if you're asking someone to help you with equipment, make sure they're reliable.
 - **Do you need to buy extra TVs?** If so, some TVs work better with video games than others. Most new TVs work well with video games, but if you're looking at older models, try to find one with a response time under 12 ms. Also, if your console and your TV both support it, you can often get a better-quality image by purchasing an HDMI cable.
 - **Do you want to buy a projector?** They're usually more expensive and harder to set up than a TV, but projectors can add an epic feel to your gaming events and they



offer teens an experience they can't get at home. Library Success Wiki has some [tips about projectors](#) and their compatibility with various consoles.

- **Assess your game needs.** Not all popular games will work well at gaming events. Some games are designed for one player, and others focus on long, involved quests and puzzles. Look for games with good match play, multiplayer or cooperative modes. Also, it should be possible to complete a round of play in a half an hour or less so players can cycle through quickly and everyone gets a turn.
- **Be prepared for questions from parents and other concerned citizens.** Parents may want information and reassurances before they let their children participate. Library board members, journalists and others may have a bad impression of video games due to news reports about Grand Theft Auto and other games designed for adults. ALA has a list of [Talking Points about Gaming in Libraries](#) that may address some of the questions you'll get, and most of the following resources talk about advocacy in one way or another. [A Parent's Guide to Video and Computer Games](#) speaks directly to parents of young children, and a simple Google search will pull up similar pages. The [Parent's Guide to Game Ratings](#) explains the major game categories.
- **Shape your message proactively.** Most of the press surrounding library gaming events has been overwhelmingly positive, so don't be afraid to promote and publicize your events. In doing so, you can also address community concerns about supervision and appropriateness of content.

Stories from the Field

And so we have a little teen area. It has this little moveable wall that's four feet high around this table and that's the teen area. One of our staff members, Natalia, donated a television, and we had a community member donate a video game system, and I just literally dropped it. I didn't even hook it up. I just dropped the bag of donated stuff in the middle of the teen area and walked away, and the kids had it set up and playing within minutes; I don't use a lot of staff time on that. I made a sign and it says if you're really loud we're going to kick you out. If you're consistently loud, we take away the video game system. This is yours. Use it. Please use it, but just know that it's got to be quiet. It's got to be respectful, and I don't keep track of who's playing what or anything. The kids maintain it themselves and they regulate themselves. Usually whoever wins gets to keep the controller and the next kid plays and they don't really need clipboards. It's more like sandlot baseball. Pick your teams.

*Kieran Hixon
John C. Fremont Public Library, CO*

We have a projector that hooks up to laptops for PowerPoints and I thought, 'We have to get a video game system and hold a tournament.' What could be better than playing on a screen that's six feet tall? Let's get everybody here. The first thing I did was ask people in the community to donate stuff, and I got more Xboxes than you can shake a stick at because the community does want to be asked and does want to help.

So we did our first tournament. We had two TVs in two different corners. One was a Dance Dance Revolution. One was a driving game, Burnout I think. We close on Saturdays at 2:00 and so we scheduled the tournament at 2:30, and at 2:15 there



was this kid knocking on the back door. Well, we were still setting up and the parking lot's full of kids! It's like a riot and we looked outside, and sure enough there were 50 kids standing in line and we were 'Oh, my.' We expected maybe 12, 13 kids. It was crazy the tournament we had — it went really well.

We made a rule that you had to have a library card without any fines on it; then you could play the video games. The amount of kids we had sign up for cards was outstanding, and the kids that came in that didn't have library cards said, 'Oh, I haven't been in here. This place is really cool.' It's really brought a lot of kids into the library, and now we have probably 80, 90 video games and it's the second highest circulating collection in our library. We have a video game tournament every month. The last video game tournament 60 kids showed up. Think about it, because our district's only 5,000 people.

*Kieran Hixon
John C. Fremont Public Library, CO*

One of the head librarians gave me a heads-up with Best Buy, and we filled out a form to get some equipment donated to us. And there were two choices — the Wii and the Xbox 360. If we do the Wii, everyone from different generations can more or less adapt to it, and it seems like we can more or less use that for singular tournaments and for gaming tournaments for seniors and stuff like that. But the Xbox 360 has more games. I think either way, whatever one they decide to donate, we'll probably do good either way. And then we asked for the Guitar Hero bundled package.

*Tanya Finney
Cheltenham Township Library, PA*

One of the things we do every Friday afternoon with the laptop lab is we actually invite teens to come in and do online gaming for about an hour and a half before we close.

In 2005 we bought a PS2 and we put that on the children's floor in the teen area and we let them play games on that. Then late last year we started doing once-a-month teen gaming after hours for two hours and we'd get pizza in and stuff like that. We were getting about 10 to 12 kids to come in for that. We bought a Nintendo Wii. We had an Xbox donated to us, so we've now got three gaming systems for them to use every day when they come in. And then the weekly gaming started about September, a couple months ago, so it was just a case of we had the laptops. Let's take them upstairs. That way we can put the gaming upstairs and get them out of the Internet room so they can make a little bit more noise up there, and it frees up some of the computers downstairs for other people who want to use them. We've got about seven or eight regulars and then we have the odd two or three that sort of drop in.

*Terry Caudle
Madisonville Public Library, KY*

Martha Fuhrman is our teen librarian and she got us Guitar Hero II and DDR [Dance Dance Revolution] and she was just telling somebody today that they did a Guitar Hero event at one of our branch libraries and got just a monster turnout of boys coming into the library so, yeah, that's parting the Red Sea.

*Stef Johnson
Flathead County Library, MT*



Further Resources

To learn more about gaming programs, materials and resources for your library, check out the [Further Resources](#) section.



Collaborative Tools

The term Web 2.0 has been around since the end of 2004. Wikipedia, the free user-created Web encyclopedia, defines it as “the trend in the use of World Wide Web technology and Web design that aims to enhance creativity, information sharing and, most notably, collaboration among users.” Web 2.0 is as transformational as the arrival of the Internet itself. It isn’t about technology, but about community, sharing and openness.

Specifically, Web 2.0 can enhance your library’s ability to:

- **Fulfill the library’s mission and vision.** Libraries need to look at emerging social technologies as valuable tools for communicating with and serving their current patrons, as well as attracting new library patrons.
- **Tell and share stories.** When the library takes a role in showcasing and collecting the stories of its community members, it becomes an agent for expression and community development. Engage your community in a new and different way.
- **Harness the collective intelligence of our profession and our communities.** We know more together than we do as individuals.
- **Understand and meet your online library users.** This involves finding out how they are communicating, what content they are developing and what is most important to them. People are doing library things online. For fun! Go where our users are (or will be) and strengthen community ties with social software. Also, get feedback on your library services.
- **Network and build online community.** Web 2.0 technologies can give the library an online face by profiling the library space, the staff and the services they offer and by participating in ongoing online conversations. Enhance your library’s Web presence with a more personal and personalized online experience.
- **Attract and serve teens.** This can be accomplished through online gaming, a magnet that attracts library users of all types and, beyond its entertainment value, has proven to be a powerful tool for literacy and learning. More than half (55 percent) of all online American youths ages 12 to 17 use online social networking sites.
- **Become part of the participatory culture.** A participatory culture is a culture with relatively low barriers to artistic expression and civic engagement, strong support for creating and sharing one’s creations and some type of informal mentorship in which what is known by the most experienced is passed along to novices. A participatory culture is also one in which all contributions matter and there is some degree of social connection. Participatory culture is about community involvement. There are opportunities for peer-to-peer learning, changed attitudes regarding intellectual property, diversification of cultural expression, the development of skills valued in the modern workplace and a more empowered conception of citizenship.
- **Provide digital collections.** Libraries can expand traditional collection development practices by incorporating collections of online videos, photos and Web sites.



What Collaboration Tools Can Be Useful to Libraries?

There are varieties of online participatory culture, including:

- **Affiliations** — These can include memberships, formal and informal, in online communities centered on various forms of media, such as Flickr, Facebook, Friendfeed, Twitter, message boards, gaming or MySpace.
- **Production of new creative forms** — This involves producing new creative forms, such as digital sampling, programming, videos, mash-ups, podcasting, widgets and writing via blogs, zines or other technologies.
- **Collaborative problem-solving** (whether formally or informally) to complete tasks and develop new knowledge (for example, through wikis, alternative reality gaming or spoiling).

Web 2.0 is about sharing, about making information available where people are — whether it is photos, videos, news, bookmarks, knowledge or shared lives. A key component of Web 2.0 is social software that lets people connect, collaborate and communicate over the Internet. The collaboration may occur in real time (called synchronous collaboration) or at different times (called asynchronous collaboration), while the locations may be across the world or across an office. Most of these tools are free, enabling anyone with access to the technology to be a publisher. The common goal is building communities in which participants constantly give and receive valuable information. The [Collaboration Tools Chart](#) outlines some of the broad categories of tools available.



What to Consider When Evaluating and Implementing Web 2.0 Tools in Your Library

- **Be adept at exploring new technologies.** One of the most important things to remember when it comes to Web 2.0 is that there will always be new tools. Libraries must consider the training needs both for their staff and their users. Staff must be given time to learn and participate in the online world.
 - Build staff training programs for late-bloomers.
 - Let staff communicate and share what they are learning weekly using 1.0 methods, such as emerging technology committees or newsletters.
 - Encourage staff to share and work together.
- **Creative Commons (CC) is another topic for library staff to consider.** This allows content owners to specify a level of copyright protection that works for their needs. CC often relaxes copyright restrictions to promote creative freedom and remix, balancing end users' desire to freely use Web information with authors' intellectual property rights. CC replaces "all rights reserved" with "some rights reserved," usually that the work be attributed, not sold and, if remixed, then reshared under CC.
- **It's important to be aware of the tools the public is using.** If the vast majority of one of the library's user populations use instant messaging, it is important to offer virtual reference services via IM. If your patrons are avid blog readers, your library might want to start a blog to disseminate information about programs, services or resources.

Libraries should not only examine how social software can improve services to their patrons, but they should also consider how these tools can improve internal communication and collaboration. While social software tools can improve the ways in which libraries communicate with patrons, they can also improve internal communication and knowledge sharing. Blogs, wikis and social bookmarking each can play a role. A library wiki knowledge base can decrease people's dependence on their colleagues' in-person expertise. Blogs are a great way to disseminate news about broken printers or new databases. Social bookmarking can help colleagues share useful Web links.



Stories from the Field

Libraries can play a greater role in their communities by building dynamic, interactive Web sites, reaching out to users via instant messaging, feeding out content such as library holdings and library news to other community-based Web sites and offering mechanisms for users to create or mash up library content. Before there will be success, however, there must be a commitment by the librarians to sustain successful services and participate in the ongoing conversation. A library's online presence should never be an afterthought or an aside with just one or two librarians contributing. There should be a collective voice made up of the individuals of the library staff.

Michael Stephens
[Spring 2006 SirsiDynix UpStream](#), p. 14

Allen County Public Library has used Flickr for three years in a row to do A Day in the Life of Allen County. They've encouraged their community to, on one specific day, take pictures in the community, upload them to their own Flickr account, tag it a specific way or if they want to email it to the library they can, and then Allen County showcases it on their Web site. And the nice thing about that is they're not sustaining a whole year of capturing pictures about whatever. They're doing it in a really small timeframe.

Helene Blowers
Columbus Public Library, OH

Further Resources

We have included a large number of [resource links](#) related to Web 2.0 reference information and tools.



Tools

Web 2.0 services and concepts make it easier to facilitate group use of information and allow for the creation of new data and value for library members. We hope you'll find the following tools greatly beneficial as you select and apply Web 2.0 to drive and implement innovation in your library.



What You Need to Stay Future-Focused

By creating an environment of continuous learning, by finding ways to stay aware of changing trends and needs, and by staying committed to thoughtful planning, it is possible to achieve that future-focused service vision in your rural library.

How can your library achieve goals and prepare for an unknown future? When doing strategic technology planning, here are seven key areas to consider:

- 1. Staff technology skills (and volunteers and trustees) as a continuous priority.** Make learning an expected part of everyone's work routine. Find ways to teach one another and to help keep each other apprised of changes and ideas. This culture of learning will help alleviate some of the stress around not feeling "caught up". The reality is, there will always be more to learn. Try to embrace this thought and even make it fun!
- 2. The continued development of patron skills.** Some people come to the library with strong technology skills and high expectations. Find ways to stay aware of popular tools and "gadgets". Are you noticing a lot of people carrying iPods or other MP3 players? Ask questions and pay attention to the uses. There is also a need, however, to always look at the gaps. Who does not know about technologies that could potentially benefit them? What role can the library play in closing that gap?
- 3. A means for continued awareness and planning need to be in place.** Some ideas to be discussed in more depth later in this section include the development of a new technology advisory group, a guest speakers series, and/or panel discussions on technological topics.
- 4. A larger library world connection to glean new ideas/create partnerships for learning, purchasing, and more.** Use online resources like [WebJunction](#) to connect with librarians from many places. Consider organizing face-to-face meetings or partnerships with libraries in your geographic area, too.
- 5. Community outreach and communication to develop relationships.** The goal here is for the library to be seen as a center of technology in the community. Are there other.
- 6. [The Pew Internet Reports](#) site offers an overview of the changing ways in which people use technology.** You may also find it useful to view census data (<http://www.census.gov>) for your community – past, present, and future predictions – and to think about the implications they may have for library services, including public computers.
- 7. Advocating for the library! Make sure that you get the word out about all of the great services you offer.** Do not take for granted that people know about the technology that is available in today's libraries. Many do not. When you begin offering a new service, make sure to highlight it prominently with publicity efforts. Develop relationships with your local legislators. When a library technology issue is being discussed in the legislature, make sure your local legislators know how the issue affects your library and community.



Collaboration Tools Chart

CATEGORY	EXAMPLE OF TOOLS
<p>Blogs and microblogs — Short for “Weblog,” a blog is an easily updated Web site, generally in reverse-chronological order by date. These Web sites range from personal diaries to professional tools, and you can often subscribe to them via RSS using an aggregator. Often, they contain links to and comments on other online information. Microblogging involves sending brief posts to a personal Web space or a microblog site (such as Twitter). Microblog posts are short (Twitter limits them to 140 characters). Blogs represent the fastest-growing medium of personal publishing and the newest method of individual expression and opinion on the Internet.</p>	<p>Blogger Blogging software owned and powered by Google.</p> <p>Movable Type Blogging platform for organizations.</p> <p>Twitter: A microblogging service that allows users to immediately share short (140 characters) snippets of content via text messaging, the Web and other interfaces. <i>The New York Times</i> called Twitter “one of the fastest-growing phenomena on the Internet.” <i>TIME Magazine</i> said, “Twitter is on its way to becoming the next killer app.”</p> <p>WordPress Personal publishing platform with a focus on aesthetics, Web standards and usability.</p>
<p>Social bookmarks and tags — This involves online services that allow you to store your bookmarks online, categorize them and share them with other site visitors interested in similar topics. Tags are descriptive terms to categorize online content. Tagging content allows it to be shared with others interested in similar topics; multiple tags can be given to the same content. Also referred to as “folksonomies,” created by folks.</p>	<p>Delicious: A “social bookmarking” site. Users can store URLs, personal comments and descriptive tags to organize Web pages. It is like a Favorites folder that is located on the Internet, and it can be accessed from any computer.</p> <p>Digg is a user-driven social content Web site, where news and online content are submitted and rated through online votes and displayed in order of most votes.</p> <p>Squidoo is an easy-to-build Web page that can point to blogs, favorite links, RSS feeds, Flickr photos, Google maps and/or eBay auctions.</p> <p>SuprGlu helps you gather your content from all over the Web and publish it in one place.</p>



CATEGORY	EXAMPLE OF TOOLS
<p>Multimedia sharing (including audio, photo and video) — Podcasting involves putting audio content on the Internet, and may be delivered via RSS feeds so that subscribers receive new content automatically. Podcasts can be downloaded to iPods or other players, or listened to on a computer. Screencasting is the capture of a video of computer screen activity (for example, to show people in real time where to click, what to type or to capture video for tutorials, presentations, etc.).</p>	<p>Audacity is free, open-source software for recording and editing sounds. It is available for Mac OS X, Microsoft Windows, GNU/Linux and other operating systems. Many libraries offer podcasts of book talks, library news items and book reviews.</p> <p>Camtasia and CamStudio are common screencasting tools.</p> <p>Flickr is an online photo management and sharing application that includes the use of tagging. You can share your favorite photos with the world or securely and privately show photos to only your friends and family.</p> <p>Live Plasma allows users to map music and movie interests.</p> <p>Pandora makes a streaming “radio station” just for you, based on your ratings of favorite music.</p> <p>Picasa is a free software download from Google that helps you find, organize and share your photos.</p> <p>SlideShare provides a place to share and discover slideshows and presentations.</p> <p>YouTube has been called the “million-channel people's network” and allows for the viewing and uploading of videos.</p>
<p>Collaboration, projects and productivity — The collaboration and community evident in Web 2.0 even led <i>TIME Magazine</i> to name the Person of the Year in 2006 as “You.” The magazine designated Web 2.0 as a revolution and a massive social experiment. “The new Web is...a tool for bringing together the small contributions of millions of people and making them matter . . . it's about the many wresting power from the few and helping one another for nothing and how that will not only change the world, but also change the way the world changes.”</p>	<p>Furl allows you to save a copy of your favorite Web sites with 5 GB of free storage space.</p> <p>Google Docs and Spreadsheets provide an online tool for individual or group document creation and editing.</p> <p>SurveyMonkey.com is a tool to create and publish custom online surveys in minutes and then view results graphically and in real time.</p> <p>Ta-da Lists creates simple, sharable to-do lists.</p> <p>Writeboard creates sharable, Web-based text documents that let you save every edit, roll back to any version and easily compare changes.</p> <p>Zoho offers a suite of online Web applications geared towards increasing productivity and collaboration. Includes a word processor, spreadsheet application, presentation tool, hosted wiki, notebook, Customer Relationship Management (CRM) tool, etc.</p>



CATEGORY	EXAMPLE OF TOOLS
<p>Gaming — This is not just for fun! Libraries find that offering gaming attracts teens and young adults to other library services and is a good marketing technique.</p>	<p>eGames Generator allows you to create your own custom learning games. Since eGames Generator is online software, there are no downloads or installations necessary: You can create a game in just a few minutes.</p> <p>Neopets involves keeping a pet alive in this online community; great for children.</p> <p>Second Life is a 3-D virtual world entirely built and owned by its residents. Not just a game, there are opportunities for communicating with the public, including in the library on “Info Island.”</p>
<p>Instant messaging and communication — Differs from email in that conversations are able to happen in real time. Most services offer an indication of whether people on one’s list of contacts are currently online and available to chat. This may be called a “Buddy List.” In contrast to emails or phone, the parties know whether the peer is available. Examples include AIM (AOL Instant Messenger), Yahoo! and MSN, also embedded in gmail.com, Facebook, etc.</p>	<p>Meebo is a Web-based instant-messaging application that combines all the major IM services into one.</p> <p>Skype is an Internet call software and service.</p> <p>Trillian is a software application for instant messaging. Compatible with all the major IM applications.</p>
<p>Library and book-related tools — People are doing library-related things online for fun! Social software can provide ways to communicate, collaborate, educate and market services to patrons and other community members. Libraries can be the online hub of their communities just as they have traditionally been the physical community center. Often, a library is the only place where someone can get free connectivity, free training and free assistance and access to technological information.</p>	<p>Goodreads and Shelfari. Like Facebook and MySpace, users sign up for an account, post a profile, add friends, create personalized online bookshelves, find reading recommendations based on friends’ shelves and reviews, connect with authors and the literary community, read about book signings and view excerpts.</p> <p>Library Elf is a personal reminder service for library users that will send library notifications, such as overdue reminders with email alerts and text message alerts for holds.</p> <p>LibraryThing catalogs your books online, easily, quickly and for free.</p> <p>Scriblio (formerly WPopac) is a free, open-source CMS and OPAC with faceted searching and browsing features based on WordPress.</p>
<p>Mashups and widgets — Mashups involve combining multiple tools and Web sites to create a new interface, product or tool, such as a Web site. Widgets are small, specific applications that can reside on a desktop or Web site, such as displaying a weather forecast, playing a game or a list of activities. Widgets are simple to develop and easy to install on a Web page. Most require a few images and expertise with JavaScript and XML to create.</p>	<p>Mashup Dashboard lists hundreds of mashups, with new updates daily.</p> <p>Web 2.0 Mashup Matrix is a programmable Web 2.0 mashup.</p> <p>Yahoo! Widgets allows you to create, find and rate widgets.</p>



CATEGORY	EXAMPLE OF TOOLS
<p>“Real Simple Syndication” or “Rich Site Summary” (RSS) and aggregators — You can subscribe to RSS-enabled blogs, newspapers, journals and other online content so that updates automatically come to you, rather than having to return to the original site to see if new material has been posted. It’s a way of packaging Web items such as blog entries in a stripped-down, XML-based format so that they can be imported into other Web pages. Most blog-hosting services automatically create RSS versions of blog posts. That means bloggers can “syndicate” their content across the entire Web, while readers can subscribe to RSS feeds. An aggregator, news reader or feed reader is a usually free service that allows you to subscribe to and read blogs, news or any type of feeds in one customized Web page. It is client software that uses a Web feed to retrieve syndicated Web content. Subscriptions can also be created for podcasts, photos, searches or other media. Web sites publish updates — called “feeds” — that indicate when new content has been posted. Aggregators automatically update and keep track of what you’ve read!</p>	<p>Bloglines is a Web-based RSS reader, which includes blogging capabilities.</p> <p>FeedBurner is a provider of media distribution and services for blogs and RSS feeds. It offers tools to assist bloggers, podcasters and commercial publishers promote, deliver and profit from their content on the Web.</p> <p>Google Reader is Google’s RSS reader in its “lab.”</p> <p>NewsGator Online is a free, Web-based RSS aggregator.</p>
<p>Search engines — Search technologies today have moved beyond traditional content retrieves. They are now designed to combine existing Internet search engines with new and improved models that allow for stronger connections to user preferences, collaboration, collective intelligence and a richer user experience.</p>	<p>BlogPulse is an automated trend discovery system for blogs. BlogPulse applies machine-learning and natural-language processing techniques to discover trends in the dynamic world of blogs.</p> <p>Google Blog Search allows you to find blogs on your favorite topics.</p> <p>LibWorm: Librarianship RSS Search and Current Awareness is intended to be a search engine, a professional development tool and a current awareness tool for people who work in libraries or care about libraries.</p> <p>Podscope lets you search the spoken word for audio and video that interests you.</p> <p>Podzinger is an audio and video search engine.</p> <p>Technorati searches and organizes blogs and other forms of user-generated content (photos, videos, voting, etc.).</p> <p>Top 25 Web 2.0 Search Engines Online Education Database’s Top 25 Web 2.0 Search Engines.</p>



CATEGORY	EXAMPLE OF TOOLS
<p>Social and collaborative networks — Researchers are discovering that beyond the original digital divide, separating those who owned technology from those who didn't, there is now an increasing social divide, termed technocultural isolation. Social technologies are connecting people and providing communication structures in more ways than ever before. Even teens are conversing and networking across countries and cultures. Those who do not have continual access to these tools will be isolated and at a societal disadvantage, particularly in the workforce.</p>	<p>Classmates.com allows you to connect with school friends.</p> <p>Facebook is a social utility that connects you with the people around you.</p> <p>FriendFeed enables you to keep up-to-date and discuss the Web pages, photos, videos and music that your friends and family are sharing.</p> <p>Friendster is a social network emphasizing friendships and the discovery of new people through friends. Search for old friends and classmates, stay in better touch with friends and share photos and videos.</p> <p>LinkedIn strengthens and extends your existing network of professional contacts.</p> <p>MySpace is an online community that lets you meet your friends' friends and share day-to-day events.</p> <p>Ning allows creation of public or private social networks, including groups, forums and sharing.</p> <p>WebJunction is an online library community, created by librarians for librarians, and includes articles, forums, etc.</p>
<p>Wikis — Collaborative Web sites where anyone can create new content or edit existing content. Share staff knowledge through wikis, communicate regarding policies and brainstorm on projects.</p>	<p>Library Success: A Best Practices Wiki This wiki was created to be a one-stop shop for great ideas and information for all types of librarians.</p> <p>LISWiki The Library and Information Science Wiki, a free encyclopedia that anyone can edit.</p> <p>PBwiki lets you quickly set up your own free, hosted, password-protected wiki to edit and share information. It's as easy as a peanut butter sandwich.</p> <p>Wikipedia is a free online encyclopedia that allows anyone to add or edit the entries. With over 10 million articles written in 253 languages, it is the world's most comprehensive (though not most reliable) reference work. It may be the largest collaborative literary work in history. Wikipedia proclaims it is a project that attempts to summarize all human knowledge.</p>



Fifteen Ways to Effectively Use Web 2.0 Tools

It's all about sharing information, just using new tools. Instead of pencils, card catalogs or even databases, it's blogs, wikis and del.icio.us. There are millions of blogs and online resources. The library cannot track and keep up with everything. Create teams and pilot Web 2.0 projects. Some key ideas include:

1. Web 2.0 lunch discussions
2. Learning partners or mentors
3. Fifteen-minute demos for staff and patrons
4. Fifteen minutes of personal learning
5. Online marketing projects
6. Workshops on emerging technology updates
7. Personal development time for online exploration
8. Promote staff use of WebJunction.org
9. Show and tell technology topics
10. Attend state and national conferences (Internet Librarian and Computers in Libraries are great)
11. Host blogs; read and comment on blogs
12. Subscribe to journals that address Web 2.0 technologies
13. Participate in Webinars and Web casts
14. Attend local workshops
15. Create an emerging tech committee, wiki and/or blog

Instant messaging is important, and [Meebo](#) in particular seems to be a library favorite, as it is easy to use and to add to an existing library Web site. Meebo adds value to a static Web site without requiring big changes. Instant messaging with Meebo “pushes” your reference service where it's needed the most — side by side with other instantaneous services. But the true value point is the human being — moderating and interacting with the community.



Further Resources

Open-Source Software

- **Open-source licensing:**
For a longer definition of open-source licensing and how it differs from commercial, proprietary licensing, see [Open-source for Beginners](#) at OSSwatch.
- **Linux for Beginners:**
Wikipedia has a good [definition of Linux](#) and links to other resources. If you want to know more about the different flavors of Linux out there, see the [top ten list](#) on [DistroWatch](#), which compares the most popular Linux distributions. [A larger matrix is available on Wikipedia](#).
- **Ubuntu for Beginners:**
For Ubuntu, the [official documentation](#) and the [User wiki](#) are great resources. In particular, you might want to look at [Switching to Ubuntu from Windows](#) and documentation about using the [LiveCD](#). If you're a visual learner, watch some of the "[how to](#)" [screencasts](#). Once you've decided want to install it permanently, check out [Installing Ubuntu](#) or [Dual Boot Ubuntu and Windows](#) course, you should back up important data and get permission from your IT department before you try this.
- **Open-source Software for Libraries:**
[Koha](#) and [Evergreen](#) are the open-source projects with the highest profile among libraries and librarians. Koha is an Integrated Library System (ILS) for small and medium-sized library systems. Evergreen is an ILS for large systems and consortia. However, there are dozens of library-centric programs, designed to handle everything from patron management to interlibrary loan. The lists on [OSS4Lib](#), [Library Success Wiki](#) and [Sourceforge](#) are all good starting places.

In other cases, the library community is extending and adapting software that already exists rather than writing new programs from the ground up. For example, a lot of libraries use Drupal, Joomla, Plone or WordPress to manage their Web presence. [Drupal for Libraries](#), [Joomla for Libraries](#), [Plinkit](#) (based on Plone) and [Scriblio](#) (based on WordPress) are four sites with more information on the ways that open-source software is being adapted for use in libraries. Also, the [Library Success Wiki](#) directs you to numerous sites that help you integrate your Firefox Web browser with your library's digital resources.



- **Open-Source Software for Windows:**

If you're not ready to switch your entire library to Ubuntu or another Linux-based operating system, take a look at the [Open-source for Windows](#) page. Rather than overwhelm you with a thousand choices, this site lists roughly 60 popular programs that run on Windows and breaks them down into categories. For a more comprehensive list, see the [OSSwin Project](#). If you're just looking for all the free software you can download, check out these popular [freeware sites](#). But bear in mind that freeware is not the same as open-source, because you usually can't view or modify the source code of a freeware program.

Gaming in Libraries

- **Introductory Material:** If you're having trouble with the gaming terminology, InfoPeople has a [handy glossary](#). [Animeted.org](#) has a great discussion of the practical details involved in setting up a gaming event (though some of the technical details are a bit out-of-date). You'll also find excellent advice on the [Library Success Wiki](#) including [tips and suggestions](#) from libraries with successful gaming programs. And if you want to talk to a colleague about his or her experience with gaming events, the Wiki provides [contact information](#) for libraries of all sizes. [Gaming the Way to Literacy](#) tells the story of a poor, rural library in South Carolina using gaming to engage youth and promote reading.
- **Intermediate Resources:** ALA now has a [Games and Gaming Wiki](#) with a strong bibliography, good advice on [advocating for your gaming program](#) and lots more. Finally, the [library gaming listserv](#) is a great place to ask specific questions.
- **Advanced Resources:** If you're looking for a longer, more detailed discussion of gaming in libraries, ALA devoted two [recent issues](#) of Library Technology Reports to this subject (both edited by Jenny Levine). Also, Eli Neiburger, who manages the highly successful gaming program at Ann Arbor Public Library, has written [a book](#) about gaming tournaments. If you're really excited about the intersection of games and libraries, you might attend the second annual Gaming, [Learning and Libraries Conference](#) this November or read up on the latest academic research being conducted at [the Library Game Lab](#).
- **Gaming Blogs:** There are too many blogs covering this topic to mention them all, but [Game On](#) and [The Shifted Librarian](#) are especially strong on library gaming. ALA also has some great postings at their [Gaming News](#) site



Web 2.0 References and Tools

- [Everything You Need to Know About Web 2.0](#) TechSoup explains ways nonprofits can benefit from the use of emerging technologies.
- [Five Weeks to a Social Library](#) The first free, grassroots, completely online course devoted to teaching librarians about social software and how to use it in their libraries. It was developed to provide a free, comprehensive and social online learning opportunity for librarians who do not otherwise have access to conferences or continuing education and who would benefit greatly from learning about social software.
- [Library 2.0: A Guide to Participatory Library Service](#), by Michael E. Casey and Laura Savastinuk. Medford, NJ: Information Today, Inc. 2007.
- [Library 2.0 and “Library 2.0”](#) This [Cites and Insights](#) article by Walt Crawford is a thorough look at the phenomenon of Library 2.0 and examines whether it is hype or an actual movement.
- [Library 2.0 Theory: Web 2.0 and Its Implications for Libraries](#) This article by Jack M. Maness of the University of Colorado at Boulder Libraries addresses the application of Web 2.0 social software in libraries.
- “[Library 2.0: Service for the Next-Generation Library](#),” by Michael E. Casey and Laura C. Savastinuk, *Library Journal*, 2006. This article brought the concepts of Web 2.0 into the library arena, dubbing them Library 2.0. Explains “long tail,” collaboration, social networking, tools and services for today’s users.
- [OPAL: Online Programming for All Libraries](#) is a collaborative effort by libraries of all types to provide free Web-based programs and training for library users and library staff members. You can find free courses, such as the Ten Top Technologies for Librarians, Day of the Digital Audio Book, Wikis and How to Google: An Introduction to Searching the Web.
- [SirsiDynix Institute](#) includes free Webinars on blogs and libraries, Library 2.0, gaming, etc.
- [Techcrunch](#) profiles and reviews Internet products and companies.
- [The Future of Libraries: Beginning the Great Transformation](#), Thomas Frey, Executive Director of the DaVinci Institute.
- [The Machine Is Us/ing Us](#) is a YouTube video that explains the dynamic Web.
- [Web 2.0](#) This Wikipedia article does a good job of explaining the various services that make up Web 2.0 and the technologies behind it.
- [Web 2.0 and Libraries: Best Practices for Social Software](#) This article from [ALA's TechSource](#) by Michael Stephens of Tame the Web, discusses how Web 2.0 social software can be put to use in libraries.
- [Web 2.0: Building the New Library](#) This article, by Dr Paul Miller in the online journal [Ariadne](#), examines the characteristics of Web 2.0 and how they can and/or should be employed in libraries.

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- [WebJunction's Online Courses](#) Everything from basic computing skills to training on advocacy and outreach.
 - [WebJunction Webinars](#) Live and archived free Webinars on topics including technology, training and outreach.

Library Technology-Related Blogs to Read

- [ALA TechSource Blog](#) is published by the American Library Association with authors Michelle Boule, Michael Casey, Michael Golrick, Teresa Koltzenburg, Jenny Levine, Tom Peters, Karen G. Schneider and Michael Stephens.
- [BlogJunction](#) is WebJunction's blog authored by WJ staff and will keep you up-to-date on WJ events, programs and staff observations.
- [Information Wants to Be Free](#) by Meredith Farkas, Distance Learning Librarian at Norwich University, includes posts regarding the library profession and technology.
- [It's All Good](#) is maintained by five Online Computer Library Center (OCLC) staff members, with posts about "all things present and future that impact libraries and library users."
- [MCLC Library Tech Talk](#) Blog of a technology interest group in Maricopa Country, AZ. Profiles a different Web 2.0 tool every Friday.
- [LibrarianInBlack](#) is by Sarah Houghton-Jan, Information and Web Services Manager for the San Mateo County Library, who writes "resources and discussions for the 'tech-librarians-by-default' among us."
- [LibraryCrunch: Service for the Next-Generation Library -- A Library 2.0 Perspective](#) by Michael Casey.
- [Stephen's Lighthouse](#) by Stephen Abram, SirsiDynix's Vice President of Innovation, includes his thoughts on library technology issues and notes from his national presentations.
- [Tame the Web: Libraries and Technology](#) by Michael Stephens, Instructor in the Graduate School of Library and Information Science at Dominican University, focuses on Web 2.0 and Library 2.0, technology-related articles and presentations and technology trends.
- [The Shifted Librarian](#) by Jennie Levine, Internet Development Specialist and Strategy Guide, American Library Association, contains posts on technology gadgets, gaming and social technologies.

Podcasts: These are audio-only broadcasts that can be downloaded for free online.

- [CNET Networks](#): Includes podcasts such as Buzz Out Loud, Gadgettes and MP3 Insider.
- [Talking with Talis](#): Listen to conversations about the interface between Web 2.0, libraries, and the Semantic Web.
- [TWiT: This Week in Tech](#): Free podcasts on technology topics.
- [Homer Township Public Library's audio book reviews](#)
- Fairfax County Public Library's audio [author interviews](#).



Examples of successful Web 2.0 projects happening in libraries

- [PLCMC's Learning 2.0 project](#), an online self-discovery program that encourages the exploration of Web 2.0 tools and new technologies, specifically, 23 Things.
- [Princeton Public Library's wiki](#) for a summer reading club.
- [Infodoodads](#) Librarians review online info tools.
- [Superpatron](#) Edward Vielmetti is a patron of the Ann Arbor District Library and a member of its Technology Advisory Board.
- [Hennepin County Library](#) offers RSS feeds, comments within library catalog and Amazon links from the catalog.
- [St. Joseph County Public Library - Subject Guides](#) SJ CPL has created subject guides using wiki software, updates a [SJ CPL GameBlog](#) and posts photos on [Flickr](#).
- [Lansing Public Library Home Page](#) The Lansing Public Library in Illinois offers RSS feeds and podcasting.
- [Wadsworth Public Library](#) in Ohio is using MySpace for teen programming.
- [Western Springs History](#) This is a joint project of the Thomas Ford Memorial Library and Western Springs Historical Society. It uses blog software to share photographs and collect comments from the public.
- [Westerville Public Library -- Celebrate Westerville's 150th Anniversary](#). This is a great example of the power of Flickr, used to create a timeline and show images of the town's history.
- [The Coastal Resource Sharing Network \(CRSN\)](#) is a consortium of public and academic libraries serving Tillamook and Lincoln counties in Oregon. Their staff intranet includes email contacts for all library staff, documentation, policy documents, reports, events, current and historical collection and circulation statistics, and a Staff Toolkit of special tools for staff use, including the Weed-O-Maker, to generate shelf lists for weeding, reporting or other purposes.
- [Ann Arbor District Library](#) Michigan, has an innovative online presence created through the use of an open-source content management system, several blog mechanisms that allow easily updated content to display on the front page and a dedication to interaction with library patrons. AADL has created a thriving community with an online branch. In the teen area and gaming blogs, it is not unusual to see discussions with more than 200 comments.
- [Public classes at ImaginOn](#), a collaborative venture of the [Public Library of Charlotte and Mecklenburg County](#) and the Children's Theatre of Charlotte include:
 - **YouTube Video Contest:** Film and edit on site with free help from staff and interns.
 - **Take Photos for Your Webpage:** Got a MySpace, Facebook or other online account? Need cool pics for it? The Loft can help! Just drop by The Loft on Thursdays from 5-7 p.m., and we'll snap your picture for you.



- **Teen Second Life:** Get one! Explore the virtual world of Second Life. Learn from other teens how to build in 3-D, script objects and interact with other avatars. Your world. Your imagination.
- **Make Your Own Computer Games:** Use Game Maker to create many different types of games. For ages 9-11. Participant should be familiar with using a mouse, dragging and dropping objects and online game play. Creating games builds visual literacy, strategy and symbolic recognition skills.
- **Gaming for Parents:** Learn why video and computer games are so popular and how they can benefit tweens and teens. This workshop will look at research, suggested games that are brain-power builders and then we will also play a few games.
- [Princeton Public Library](#) offers an amazing array of [technology classes](#) for the public, including “Fantastic Freebies for Everyone,” which focuses on free Web 2.0 tools. Here’s the class description: “Contrary to popular belief, there is such a thing as a ‘free lunch,’ and you can find it on the Web. The number of free services, sites and downloads is multiplying monthly at an astonishing rate in a new era of Internet innovation. This class will take you on a tour of some of the hottest freebies currently available. Everything from system tools to image editors to word processors and much more can all be found online for no cost. This session will ensure you know where to find the newest and most useful tools to keep you on the cutting edge of technology.”