CHAMPIONS *of* OPEN SOURCE

The decision to forego proprietary software isn't always easy, but those who rise to the challenge can reap the rewards

EARLY ADOPTERS OF OPEN SOURCE BLAZED THE TRAIL FOR enterprise users of this new software model, even though they didn't know where the journey might lead. Some of the territories they pioneered — such as Linux, Apache, MySQL, and Perl — are now well established. But in other areas, open source is only beginning to make inroads: CRM, portal management, content management, and reporting, for example.

For those willing to lead IT into new open source territories, the rewards await: a broad support community, greater flexibility, and more control over critical technologies. Good open source technology is supported by a broad base of developers, so the final code is well vetted and supported, just as good commercial code is, says Judith Hurwitz, president of IT research company Hurwitz

& Associates. Even better, a strong community typically continues even if individual contributors pull out, making dependence less risky than on software from a vendor that may later go out of business, change technology direction, or be acquired by a company with a different agenda.

But waging the good fight for open source in the enterprise isn't without its hazards. Making the most effective use of open source often calls for deep in-house technical knowledge. "You gain the ability to manage the software at a deep-enough level to handle the application requirements," says Don DePalma, president of Common Sense Advisory, an IT research company. The trade-off is that managing your software and platforms at this level often calls for more creativity from your IT staff — not to mention that you need the talent and time to stay abreast of developments in the open source community.

Venturing into that middle ground requires care, planning, and expertise. But for companies that rise to the challenge, such as the ones showcased in this special report, open source software has unique benefits that can't be matched by the traditional shrink-wrapped approach to software.

Change Is Good for BZ Results
Reliability and adaptability were key reasons for choosing open source

Fast-moving technology that works is what BZ Results wants in its IT tools. That's why CTO Rob Lackey's policy is to make sure there is at least one open source bid for each project. "Commercial software can't compete with the open source development effort," Lackey says. He cites the frequent, fast security updates available for Apache servers as an example of how the open source community delivers faster than traditional providers.

Although many commercial application vendors and service providers offer low-cost options, Lackey doesn't trust them. He compares the operational stability and reliability of the open source MySQL database and Sugar-CRM application to the problems he had using an earlier, proprietary CRM server, which went through seven updates before it functioned correctly.

Likewise, he's dubious about the reliability of SaaS (software as a service), a misgiving he feels the multiday outages that Salesforce.com experienced earlier this year confirmed.

BZ delivers online marketing workflow management platforms for auto dealerships to help them serve customers via the Web. As such, Lackey says it's critical for his company to have a strong technology platform. "We have service-level agreements that we must maintain," he explains.

Lackey hastens to add that not every open source technology will meet enterprise requirements. For example, BZ did not use the open source Asterisk telephony system because it couldn't provide the needed uptime guarantees.

Also, although open source advocates often cite community involvement in open source projects as their primary advantage over commercial software, Lackey takes care to evaluate each project on an individual basis. He advises companies to monitor the communities behind open source technologies in order to make sure they're vibrant before relying on them. "Make sure you have a full understanding of the community participation in the project," he says, adding that an active, well-managed community is essential to open source's success.

That's one reason BZ dropped the Apache Tomcat Java servlet engine in favor of Resin. "The Tomcat community wasn't as strong as we needed, and it was slow to release upgrades and maintenance releases," Lackey says.

The active involvement of the SugarCRM development community has proven a real advantage. "There's a strong QA subset to that community — that level of transparency is telling," Lackey says.

And using open source tools not only provided BZ with a stable platform, but also allowed it to adapt that platform to its strategy.

"When your tool is open source, the only limitation is your development staff," Lackey says. For example, a key advantage of SugarCRM was the portability of its data set. "We need to share with other tools. We're not restricted to whether the Salesforce API is up or down, and we don't have to worry about what platform we have, as we would for Microsoft SQL."

Rob Lackey

Publisher Seeks Closer Technology Relationships
Proprietary software couldn't support an entrepreneurial approach to IT

The *Christian Science Monitor* for the past nine years has been saddled with an inflexible content management system that makes it difficult to modify the newspaper's Web site or deliver content to new devices, such as smartphones. That tool is emblematic of what Curt Edge sees as a larger issue at the First Church of Christ, Scientist, which publishes the *Monitor* in newspaper and online editions.

"I need to hire inventors, and I want to be partnered with groups that want to do the same thing. We need a culture that does that," Edge says. That's why Edge has pushed the use of open source technology at the church, including adopting the Alfresco content management system for the *Monitor*. He's also made changes in his IT staff to ensure that the church's in-house IT culture fits the open source culture. In the past 18 months, he's had 60 percent turnover in his IT staff as he changes the culture to a more flexible, entrepreneurial — even creative — approach to technology development.

Although Edge is happy to use commercial software for established business practices, such as Oracle Financials for accounting, he does not want to be tied to a specific vendor's approach for an emerging, core technology like content management. "When it comes to the Web, we're still sorting out best practices," he says.

Instead, Edge wants the broader collaboration fostered in an open source community. He feels that the open source methodology allows problems and opportunities alike to be identified quickly by people who can do something about them.

"I like the open source community because anyone at any level can talk," Edge says. "I want my developers to talk with other developers, rather than with a help desk or a support organization. There's a lot of benefit from a grassroots community figuring out what's good for everyone."

Although it started its Alfresco deployment last summer, the church has already submitted two code modules to Alfresco, which Edge hopes will be improved and extended by other members of the community. Edge plans to complete the *Monitor*'s transition to Alfresco by June.

Having his developers participate actively in the open source community has helped Edge find other organizations with similar needs. He hopes this will lead to faster development of the Alfresco platform to support the needs of publishers managing content across multiple media. His initial focus is on Web content management, but Edge says he'd love to see a system that allows flexible management of the same content for both print and online. The alternative is to continue using proprietary platforms, which he says require significant modification to print content for online use.

Edge sees open source as a way to bring more resources to bear on the development of content management systems, but he also likes that the open source model allows him to decide what technology to adopt and when. "You choose your path," he says. "We want to build in a modular manner."

Curt Edge

eFashion Desires Agility, Not Do-It-Yourself
Open source allowed flexible options without starting from scratch

To deliver branded e-commerce sites for customers such as JLO by Jennifer Lopez, Members Only, and OP, eFashion Solutions wanted a platform it could easily customize and enhance, without being chained to custom, homegrown code. Open source was the answer, says Mitch Pirtle, the company's director of open source initiatives.

"It's a real fit for us to have a framework where the code is developed by the community," Pirtle says.

Open source technology is found in most of eFashion's systems, including the widely deployed LAMP (Linux, Apache, MySQL, and Perl/PHP/Python) stack.

The company's initial reliance on open source technology was largely driven by the limited resources of a startup. In those early days, eFashion was also worried about bet-

ting the farm on a particular vendor's proprietary technology, because that might require retooling systems whose vendors went out of business or were orphaned in an acquisition. "We had very few programmers and limited funding, yet we had to do a lot before our competitors did. We've been at a dead sprint since the beginning," Pirtle says.

The use of open source has allowed Pirtle's team to stay focused on technology that differentiates the business. "MySQL makes it really easy to focus on the Web development, rather than get a DBA for something like Oracle, Microsoft SQL, or Informix. It's a lot like flat-file storage, so it's really easy," he says.

In addition, choosing widely available open source technologies such as the LAMP stack also simplified staffing. "For PHP, it's easy to find talent, as opposed to Java, where it's hard to get veterans rather than students," Pirtle recalls.

Today, eFashion is in the process of migrating to newer open source technologies, such as the Joomla content management framework and the PostgreSQL database. "Now it's time to step up and look at the appli-

Mitch Pirtle

cations from a framework perspective," Pirtle says, adding that this is a marked change from the early days, when eFashion would often hand-code e-commerce sites in a hurry.

By adopting Joomla, Pirtle expects to manage the e-commerce sites in a modular fashion, making it easier to roll changes over to other sites because of the common framework. A separation of the user interface and other services such as chat from the e-commerce engine will also allow each site to be unique while allowing reuse of services through the common API.

Pirtle also expects the Joomla platform to be more stable and better tested than commercial offerings. "When a vendor ships a product, they have 20 to 50 developers look at it. When Joomla is released, you've got thousands of people looking at it, so problems are found much quicker," he says.

He also expects that broad community involvement to ensure Joomla's development fits users' needs. "It scratches the same itch for so many people, which lets it develop in the direction that users actually want," he says.

MIT Links Heterogeneous Systems
Open source lends the flexibility needed to meet disparate departmental needs

The IT staff at the Massachusetts Institute of Technology has to be prepared to work with just about anything. It manages a delicate balancing act, promoting core IT standards for security and networking while still giving each department the freedom to choose its own technology platforms and applications.

Often, the departments choose open source technology. According to Patrick Jaillet, who heads MIT's Civil & Environmental Engineering Department, the flexibility that comes when IT staff, skilled researchers, and savvy students can modify the software to their needs is a big reason why. "We don't want people to stifle their ingenuity. Open source is a big plus," he says.

Open source technology helped MIT's Distributed IT Resources Group manage the departments' far-flung technologies while maintaining basic order and service across the campus. "You can easily do new functions based on what the [users'] new needs are," says network analyst Tom Coveney.

Access to the open source software's raw data structures and code also makes it easy to integrate applications and develop new ones, Coveney says. For example, MIT is developing a common identity management system that integrates the various portals and servers in use across the campus. Open source development tools and access to source code make that possible. Likewise, MIT uses the open source Asterisk telephony system connected to a database and Web portal to make campus shuttle schedules available via both the Web and interactive voice prompts.

Coveney spends most of his time supporting departments' intranets and Web servers, ensuring they perform well and remain secure. He also helps the departments take better advantage of their portals and servers. Most departments choose open source portal tools, he notes; four use the Metadot portal development and management platform.

Some departments run Metadot on Linux, some on Win-

dows, and some on Mac OS X, but that diversity doesn't hinder Coveney's ability to manage them all. "I'm able to switch platforms and use the same software," he says. Yet Coveney can also tie platform-specific technologies into Metadot, such as using the FileMaker database system as the database engine for one department's intranet portal for scheduling. This means he can support users' individual requirements while working across a common base.

Patrick Jaillet (left) and Tom Coveney (right)

Flexibility in support options is yet another benefit. "We're not tied to any specific vendor for the maintenance," Coveney says. He recalls that when one department's proprietary portal vendor went out of business, it took a year to redo the system.

That wouldn't have been an issue for an open source portal because IT could have relied on the user community for interim support, Coveney says. Plus, it's easier to migrate from one open source portal to another because they tend to all use the LAMP stack, and access to the underlying code makes redeployment easier than working with a black-box commercial system.

Ultimately, open source brings MIT the transparency and control needed to manage a diverse IT toolbox. Although enterprises typically keep a tighter rein on their technology toolbox's contents than academia does, Coveney notes that heterogeneity is a fact of life almost everywhere, and he counts on open source to manage that diversity more easily.

Frustration Drove Owens to Open Source
Code quality encouraged flooring manufacturer to leave proprietary software behind

The IT group at Owens Forest Products went the traditional route of many smaller companies: a custom ERP system using tools such as Microsoft SQL Server, ASP.Net, and Business Objects' Crystal Reports.

But CIO Lee Hughes says the system never worked right. There were frequent, unexplained instabilities with SQL Server, and it was difficult integrating Crystal Reports with the ASP.Net apps for access via the Web.

Fortunately for Owens, Hughes says, his tendency to hire young IT developers meant his staff was familiar with open source technology, and they had already experimented with open source alternatives to SQL Server and ASP.Net.

"Originally it was a curiosity, to see what Linux could do," Hughes recalls, but the integration issues with Crystal Reports were the final straw. Hughes authorized a switch to a mix of open source and Java tools, including JasperReports as a replacement for Crystal Reports, PostgreSQL instead of SQL Server, and the Jakarta Project's Apache Tomcat servlet engine instead of Windows Server.

Lee Hughes

According to Hughes, open source has given Owens many more support options, including mailing lists and Google searches. "We have not had to turn to commercial support, but we know it's there if we need it," he says.

Today, Hughes considers the open source switch a major turning point in his IT operations. "It was a strategic move to gain control over our environment, rather than give vendors that control," he says. "Instead of making lists [of issues] for help, the developers track the problems down themselves."

Simplified license management was another unexpected benefit. "Managing Microsoft licenses has become a pretty hefty job," Hughes says. That's one reason Hughes is evaluating whether to replace users' desktops with Linux PCs equipped with the OpenOffice.org productivity suite instead of Microsoft Office. His IT staff has already switched, he says. "And a few brave users, too."

Hughes admits that the shift has required changes within his organization: "When hiring, we have to focus more on self-exploration and self-learning — the creative, entrepreneurial attitude." But the cost of retaining those employees is a price worth paying, he says. "Now we have people who can really help us strategize our IT solutions. You get more for your money."

CHAMPIONS *of*
OPEN SOURCE

HOW TO BUY
FREE SOFTWARE

As the software industry turns
toward open source, IT managers must rethink
how they evaluate and purchase assets

THERE ARE NO TWO WAYS ABOUT IT: OPEN SOURCE IS
everywhere. You'll be hard-pressed to find a single IT
shop today that doesn't take advantage of open source
software, be it Linux, MySQL, Perl, or the Snort net-
working tool. And everywhere you look, top-tier vendors such as IBM,
Novell, Oracle, and Sun are investing heavily in open source projects
and community-based development. Even Microsoft is getting in on
the game. But despite widespread and growing acceptance, making
the case for open source in mission-critical enterprise IT environ-
ments isn't always easy.

To some, the idea of a major technology vendor open sourcing its
software conjures up an image of an IT garage sale, where companies

BY NEIL McALLISTER | ILLUSTRATION BY J.T. MORROW

give away unsuccessful and poorly maintained products in the desperate hope that someone else will know what to do with them. After all, if a piece of software is good enough to use, then surely it's good enough to sell?

It's true that companies occasionally open source their software more as a way to generate buzz than as an honest attempt to garner community support, but it's a mistake to assume that motive. The business models around open source are maturing, and what began with a few early trailblazers is growing into a genuine revolution in thinking within the software industry. While it's natural and even advisable to maintain a healthy skepticism about open source today, within a few years' time the open source model may actually become the norm, rather than the exception.

This leaves IT managers in a quandary. As the old models and assumptions of software development begin to give way, so too must the traditional means by which IT shops evaluate and procure enterprise software. More and more, those decisions will require a new kind of savvy that reaches far beyond the budget sheet and into the software development ecosystem itself.

No Free Lunch

The first question that must be addressed is how a company such as IBM or Oracle can afford to give away its software for free. The answer is simple: They don't, really — at least not when you look at the larger picture.

For many reasons, the traditional shrink-wrap software distribution model is a poor fit for enterprise software. As IT infrastructures grow larger and more complex, per-seat or per-CPU licensing schemes become increasingly hard to manage. Arcane pricing formulas lead to fee structures that don't accurately reflect the actual utility of the software, not to mention inspiring a variety of creative accounting techniques on the part of bewildered CFOs.

For these reasons, some companies, such as Sun, have made the conscious decision to forsake the shrink-wrap model in favor of pure subscription pricing. The software itself is free. Customers pay for the ongoing support, maintenance, and integration assistance.

A skeptic might say this is just a different kind of Hollywood accounting. And it's true; in the long run, the omission of a specific licensing fee doesn't necessarily mean that customers will save any money. It's important to note, however, that a company that has made the leap to a subscription-based pricing structure is but one step away from the next stage of its evolution.

The subscription-support software model is the open source software model. All that remains is to open the code — and that's exactly what Sun, among others, is doing (see "Sun Signals a New Day for Open Source," page 37).

Companies, including MySQL AB and Red Hat, have built successful businesses by charging money for enterprise-level support for free software. As such ventures continue to grow and flourish, proprietary software vendors must ask themselves whether the business benefit of keeping their source code under lock and key really outweighs the other benefits offered by this new software paradigm.

Community Counts

For software vendors and customers alike, the key benefit of this new style of software development is community. The community surrounding an open source project is its life's blood. Even the best code will wither and stagnate if it's not supported by an active, thriving, and engaged developer ecosystem.

For a customer company, evaluating those communities can be one of the more difficult challenges in the software procurement process. The decision to buy a given piece of proprietary enterprise software often comes down to the reputation of the vendor in question. When evaluating an open source project, however, the factors involved can be considerably more complicated.

Before a company makes the decision to deploy any open source project, it's critical that experienced IT staff inves-

tigate the project thoroughly. How is its developer community organized? What is its model of governance? Who are its most active participants? Who is allowed to commit changes, and how often does that happen? How are internal disputes resolved? How is the code licensed?

The backing of a major software vendor can lend an open source project additional credibility with enterprise users, but it also raises additional questions. For example, commercial vendors can approach community-building in various ways. Some view it as a purely laissez-faire exercise, whereas others may harbor hopes of using their communities as sales channels for their service organizations. As a customer, it's best to seek out companies that promote open source but also clearly delineate between their open source and their commercial efforts.

Ultimately, every IT decision begins with a business problem. Solving those problems remains Job No. 1 for every IT organization; as such, open source software should be evaluated for its features, stability, scalability, security, and all the other standards to which proprietary software is held.

A natural outcome of the proliferation of open source, however, is more choices. The people in the best position to weigh those choices are the people who are closest to the projects — who know the ins and outs of the community and have a feel for where a project is going. Because of that, skilled IT personnel with deep knowledge of technology, now more than ever, remain key assets for the most successful companies. ☙

Sun Signals a New Day for Open Source

TIM BRAY, CO-CREATOR OF XML AND DIRECTOR OF WEB TECHnologies at Sun Microsystems, talks to *InfoWorld* Senior Editor Neil McAllister about Sun's efforts to open its code.

InfoWorld: What's behind Sun's recent emphasis on open source?

Tim Bray: I think the whole notion is centered around Sun's belief that, to use an old, old metaphor, the rising tide floats all boats. The notion that software is a big, expensive, closed black box — that if you want to use it, you have to write a big check and get it delivered and installed and then you find out if it's any good — is something that's increasingly becoming a barrier to entry. We think that we will actually do better in this business if we remove the barriers of entry for people to use the software.

IW: But there seem to be other ways to lower barriers of entry besides making source code available; trial versions of major enterprise databases, for example.

TB: Well yeah, but that's halfway there. You can download it and try it. In most cases you can't see the source code, so you don't really know what you're getting into. There's no community of people out there who really know the source code and how it works. And then you've always got this huge capital expense looming over your head. If you decide to pull the trigger and turn it on: Oops! You better get ready to fight something through eight levels of management to get the budget approved.

IW: So how does Sun approach managing a community? I assume there must be some reluctance from customers who say, "The energy I put into this ultimately benefits Sun."

TB: It's hard. I think one essential component is to not try and manage it. If it's a community that you sort of own and operate transparently for your own benefit, you're absolutely right; there's going to be substantial resistance from independent developers. But on the other hand, there is a lot of hunger among the developer community to be able to influence and change and direct the evolution of the software that they use. So you can guide, you can influence, you can build a business around it. But if you try and control it, that's just not going to work.

IW: As a customer, what should I look at to help me evaluate open source projects and their communities?

TB: Well, at the end of the day, you've got a business problem to solve, and you need to satisfy yourself that the product you're looking at is going to solve your business problem. So once you've actually gotten past the basic issues of features and performance — which are crucial, essential things — the next thing you're looking at is, Is this a safe long-term bet? And I would think one of the largest determinants of that decision is how healthy and dynamic and large is the community of developers who are engaged working on it.

IW: So it sounds like it's in Sun's best interests to encourage communities that are as large and healthy and engaged as possible.

TB: Absolutely. Without any question.

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Please include amounts for all locations of your organization. Consultants: please include what you recommend for your clients as well as what you buy for your own business.

01. $100 million or more
02. $50,000,000 to $99,999,999
03. $30,000,000 to $49,999,999
04. $20,000,000 to $29,999,999
05. $10,000,000 to $19,999,999
06. $5,000,000 to $9,999,999
07. $2,500,000 to $4,999,999
08. $1,000,000 to $2,499,999
09. $600,000 to $999,999
10. $400,000 to $599,999
11. $100,000 to $399,999
12. $50,000 to $99,999
13. Less than $49,999
14. None

Product category	Write code in box
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Client computers	☐
Networking / Telecom (including servers)	☐
Wireless	☐
Internet / Intranet / Extranet	☐
Security	☐
Storage	☐
Peripheral equipment	☐
Software	☐
Service / Support / Outsourcing	☐

2. What is your primary job title? (PLEASE CHECK ONE ONLY)

IT / Technology Management
❏ 01. CTO, CIO, CSO, Vice President
❏ 02. Director
❏ 03. Manager / Supervisor
❏ 04. Network Manager / Director
❏ 05. Engineer
❏ 06. Systems Analyst / Programmer / Architect
❏ 07. Other IT Management

IT / Technology Professional
❏ 08. Consultant / Integrator
❏ 09. Developer

❏ 10. IT Staff
❏ 11. Other IT Professional

Corporate / Business Management
❏ 12. CEO, COO, President, Owner, Vice President
❏ 13. CFO, Controller, Treasurer
❏ 14. Director
❏ 15. Manager / Supervisor
❏ 16. Other Business Management Title

❏ 98. Other Title

(specify)_____

3. Please indicate your job function(s)? (PLEASE CHECK ALL THAT APPLY):

IT / Technology Functions
❏ 01. Executive
❏ 02. Department Management - IT
❏ 03. Networks / Systems Management
❏ 04. Applications Development
❏ 05. Management of Enterprise Applications (CRM, ERP, SCM, etc.)
❏ 06. Research / Development Management
❏ 07. Consultant / Integrator
❏ 08. Other IT Functions

Corporate / Business Functions
❏ 09. Executive
❏ 10. Department Management - Business
❏ 11. Financial / Accounting Management
❏ 12. Research / Development Management
❏ 13. Sales / Marketing Management
❏ 14. Other Business Functions

❏ 98. Other Functions

(specify)_____

4. Are you involved in buying, specifying, recommending or approving the following IT products / services?
(PLEASE CHECK ALL THAT APPLY):

Software / Products / Technologies
❏ 01. Customer Relationship Management
❏ 02. Enterprise Resource Planning
❏ 03. Business Process Management / Outsourcing
❏ 04. Business Intelligence / Data Mining / Data Warehousing
❏ 05. Portals
❏ 06. Financials / Payroll / Billing
❏ 07. Performance / Application Management
❏ 08. .NET
❏ 09. Other Software
❏ 10. Networking
❏ 11. Web Services
❏ 12. Content Delivery Networks
❏ 13. Network and Systems Management
❏ 14. VoIP (Voice Over IP)
❏ 15. Telecommunications
❏ 16. Wireless
❏ 17. Remote Access

❏ 18. Web / Video Conferencing
❏ 19. Storage
❏ 20. Disaster Recovery
❏ 21. Security
❏ 22. Anti-Virus / Content Filtering
❏ 23. Firewall
❏ 24. VPN
❏ 25. Identity Management
❏ 26. Authentication / Authorization
❏ 27. Intrusion Detection & Prevention
❏ 28. Encryption
❏ 29. Other IT Products / Technologies

Hardware / Peripherals
❏ 30. Servers
❏ 31. Notebooks / Laptops
❏ 32. PDAs / Handhelds / Pocket PC / Wireless
❏ 33. Printers
❏ 34. Other Hardware / Peripherals

5. What is your organization's primary business activity at this location? (PLEASE CHECK ONE ONLY):

General Business Industries
❏ 01. Defense Contractor / Aerospace
❏ 02. Retail / Wholesale / Distribution (non-computer)
❏ 03. Pharmaceutical / Medical / Dental / Healthcare
❏ 04. Financial Services / Banking
❏ 05. Insurance / Real Estate / Legal
❏ 06. Transportation / Utilities
❏ 07. Media (print / electronic)
❏ 08. Communication Carriers (telecomm, data comm., TV / cable)
❏ 09. Construction / Architecture / Engineering
❏ 10. Manufacturing & Process Industries (non-computer)
❏ 11. Research / Development

Technology Providers
❏ 12. Service Provider (MSP, BSP, ISP, ASP, etc.)
❏ 13. Computer / Network Consultant
❏ 14. Systems / Network Integrator, VAR / VAD
❏ 15. Technology Manufacturer (hardware, software, peripherals, etc.)
❏ 16. Technology - Related Retailer / Wholesaler / Distributor

Government / Education
❏ 17. Government: federal (including military)
❏ 18. Government: state or local
❏ 19. Education
  ❏ 98. Other

(specify)_____

6. How many people are employed at this organization, including all of its branches, divisions and subsidiaries?
(PLEASE CHECK ONE ONLY):

❏ 1. 20,000 or more
❏ 2. 10,000 - 19,999
❏ 3. 5,000 - 9,999
❏ 4. 1,000 - 4,999

❏ 5. 500 - 999
❏ 6. 100 - 499
❏ 7. 50 - 99
❏ 8. Less than 49

7. Which of the following operating systems are in use or planned for use at this location?
(PLEASE CHECK ALL THAT APPLY):

❏ 01. Windows XP
❏ 02. Other Windows
❏ 03. Mac

❏ 04. Linux / Unix / Solaris
❏ 05. Other
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