

An Assessment of User Satisfaction with UNIX Technical Documentation

EXECUTIVE SUMMARY

This is the Internet age and, in the majority of cases, the web is the most popular means of accessing technical information. The web is quick, easy and up to date. Even so, this survey of UNIX professionals found an interesting range of preferences depending on the technical issue under consideration. For example, in startup situations, IT managers prefer hard copy. Overall, 58% were at least “somewhat satisfied” with user manuals that came in both hard copy and electronic versions. But, for troubleshooting – especially with a mature system where the operating system may be working with a later release – the web and online service were preferred. DVD and multimedia did not fare well, however. IT managers reported that they had relatively limited experience with them and they eat up large quantities of memory. Does this mean that the web might replace hard copy? There were mixed opinions on the use of a single-source information base (i.e., a web-based application) to replace hard copy documentation even though the data showed that hard copy was consistently the least preferred.

Accessing technical data takes up a considerable amount of time. IT managers reported frequent access to technical information; 35% reported daily references. On average, IT executives spend two and a half hours per week looking for lost technical documents alone. With all of this experience, there were many useful suggestions for improvement. Many suggestions focused on search engines and improving the use of online and web-based technical information.

This survey was conducted at the request of Hewlett-Packard because the most current technical information is critical to successful UNIX operation. Technical manuals – often relegated to the dusty shelves of the corporate library – are only one form of cataloging and sharing information on operating systems, applications, patches, training programs, configuration guides, compatibility of third-party solutions, and system administration. In the survey, fifty-four IT executives in companies with a minimum of 10,000 PCs on site responded. (Please see Appendix A: “How the Study Was Conducted” for more details.)

The survey covered not only the means in which data are made available – hard copy, website, online, DVD, and multimedia – but also how IT managers’ preferences change in particular scenarios. These scenarios range from purchase, initial startup, and booting to troubleshooting, continual operation, upgrading, and obsolescence. All lifecycle steps of a UNIX system were reviewed. The

UNIX professionals were asked to evaluate all technical information for its usefulness, accuracy, ease of access, and granularity.

For IT managers and vendors alike, this survey verifies the critical nature of having current technical information available and, as the reader will see in the body of the report, greater accessibility and more comprehensive technical information. Manuals on older equipment, troubleshooting guides, and technical white papers carry considerable weight in maintaining a vendor's reputation with those who operate massive UNIX systems. Analyzing information needs with the intention of developing a comprehensive information-management system requires the understanding of how content is used, not merely where it is stored and warehoused.

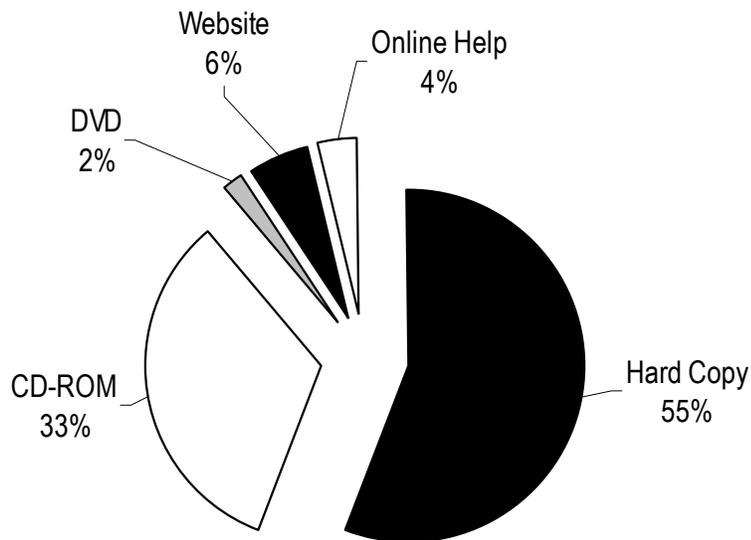
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IT DOCUMENTATION – AN OVERVIEW

FIGURE 1:
 UNIX Professionals
 Information Preferences –
 Initial Installation/
 Configuration



Even in the Internet age, product documentation starts with an assumption that hard copy is the proper form of detailed specifications on the operating system, hardware, applications, and a range of IT issues. As shown in the chart above, 55% prefer hard copy for initial installation and configuration. Most UNIX systems provide technical manuals, training guides, upgrade manuals, patch information, configuration guides, and system administration guides. But as shown in the succeeding parts of this report, preferences change depending on the task.

In DHBA's interviews with IT managers, fourteen distinct areas of documentation were mentioned. In order of the frequency with which they were mentioned, these areas are shown in Table 1 below.

TABLE 1:
 Documentation Topics
 by Significance

Documentation Subject (In Order of Significance)	No. of Times Mentioned
Operating System	48
Reference Guides	45
Systems Administration	45
Technical Documentation	44
Installing/Updating	42
System Diagnostics/Monitoring Tools	42
Network/Systems Management	39
Networking/Communication	38
Systems Hardware	35
Systems Integration	30
Development Tools/Libraries/Computing	29
Fault/Resource Management	29
Application Solutions	17
Internet/Security Solutions	17

The survey also found that hard copy is only the starting point. Most agreed that at most one hard copy is crucial for certain operating procedures but that after the initial use, hard copy is of no added value, as all changes and upgrades can be accessed online or by placing a call to technical support. Eighty-three per cent said they were aware that their vendor makes hard copy available after products are ordered.

If given the option, and if money were not an issue, forty-one participants of the fifty-four who responded would like to purchase hard copy at a later day online. Thirty-one chose e-mail as the means of notification for updates and three respondents preferred mail or phone. Eight-five percent felt that updated information should be forwarded by e-mail. Fifty percent felt that updated information should be forwarded immediately while seventeen and ten participants respectively wanted notifications on a quarterly and monthly basis. Most felt inundated with the constant barrage of e-mails that are of no immediate relevance.

So, while hard copy is the initial preference, more modern forms of publication are rising rapidly in acceptance level. In part, the purpose of this study (more detail on methodology can be found in Appendix A) is to determine exactly how IT managers view such far-ranging alternatives as e-mail, online services, DVD, e-book, CD-ROM, website including PDF, technical services representatives, multimedia, and, of course, hard copy. Since hard copy manuals are generally taken for granted and included in the purchase price, the study also looked at the willingness of IT managers to pay for these services

PRODUCT INFORMATION PREFERENCES

The study first considered two broad questions: Where do IT managers access information first? and, What are their preferences by medium?

WHERE DO UNIX PROFESSIONALS ACCESS INFORMATION FIRST?

For immediate access to information, 43% of IT managers go to the web first to access information, followed by 20% for hard copy and 20% for online help. Hard copy is still highly regarded as a valuable information source, especially in the initial stages of systems installation and administration. (This point will be further illustrated in later sections of this study.)

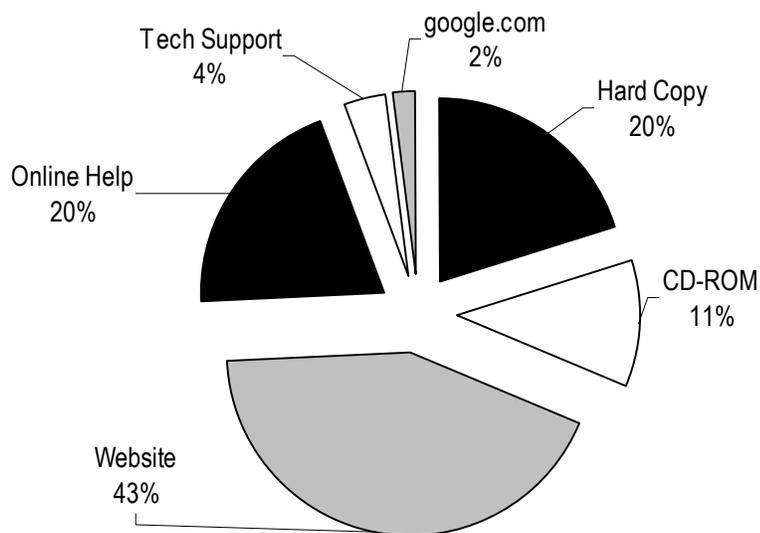


FIGURE 2:
Where Do UNIX Professionals Go First for Information?

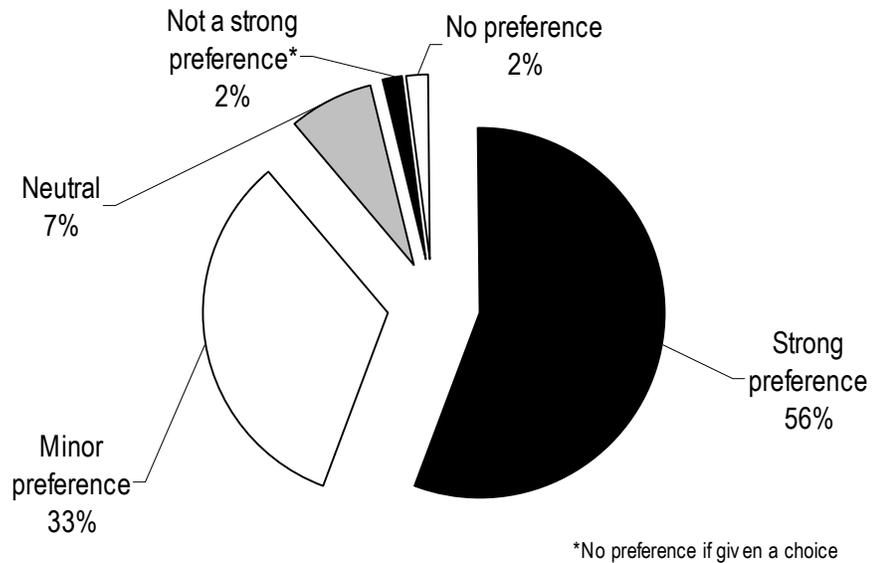
Many IT professionals ask about paying for documentation. In the survey, only nineteen of those interviewed were willing to buy hard copy documentation at some additional cost while fifteen felt that it depended on the circumstances. Nineteen were willing to pay up to \$50 if it were considered critical information and twelve were willing to spend over \$100. Roughly half of the respondents wanted multiple copies of hard copy and 65% wanted the option of zero copies.

INFORMATION PREFERENCES BY MEDIUM

While hard copy does well as a first access, it falls sharply as a preferred medium after the early stages of use. Hard copy was only 24% strongly preferred with a 27% minor preference. Overall, the immediacy of online help and CD-ROM are the most popular means for accessing information. Fifty-six per cent of those interviewed had a strong preference for online help, with CD-ROM a close second at 53%. One UNIX IT manager complained that since he pays close to half a million dollars annually on maintenance, he demands that all technical

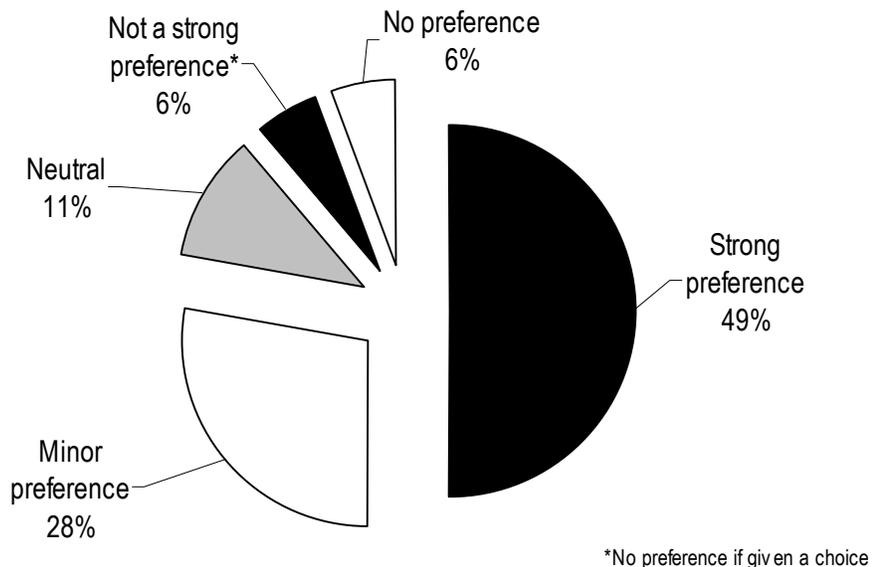
information be put on CD-ROM (at no cost to his organization). Others in favor of CD-ROMs mentioned the added values of convenience and transportability.

FIGURE 3:
UNIX Professionals
Preferences for Online Help



Internet access was the third choice with web-PDF and web-HTML obtaining 49% and 48% strong preferences, respectively. Although quantitatively, there were no major differences between the use of web PDF and HTML files, many IT managers commented that PDF files are far easier to manipulate. Ironically, hard copy was only 24% strongly preferred with a 27% minor preference.

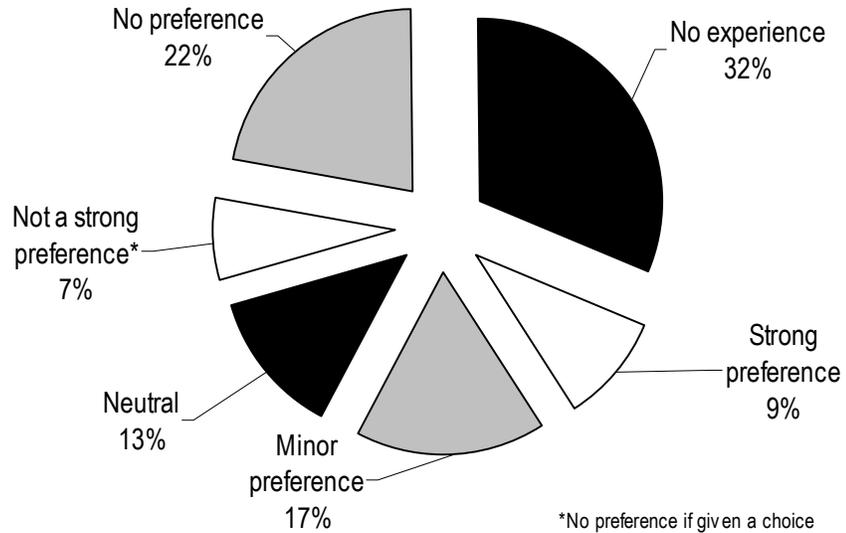
FIGURE 4:
UNIX Professionals
Preferences for Web-PDF Files



The more contemporary alternatives did not fare well in the survey. Results for DVD were mixed with 28% neutral, 22% minor, and 19% strong preferences. Thirty-two percent of those ranking e-book had no experience with the medium and 22% did not want it at all. The main complaint with e-book is that it takes up

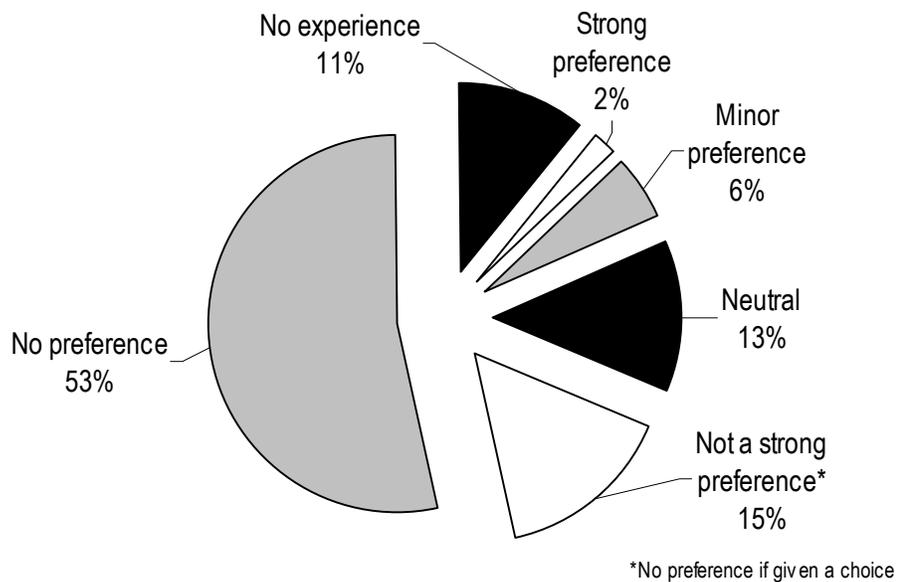
excessive amounts of disk storage. These results suggest that the IT managers have little experience with the newest sources and that there is a perception that they are unwieldy.

FIGURE 5:
 UNIX Professionals
 Preferences for e-Book



Similarly, there was a low preference for multimedia, as 53% had no preference for audio at all, although 11% had no experience with the medium. One UNIX manager explained that multimedia is cumbersome and its storage is a problem. Audio/video fared better with only 17% not in favor and 24% with minor preferences. Most felt that it would be a while before this medium is regarded as an acceptable information source especially due to the facts that it is not mobile or easily accessible.

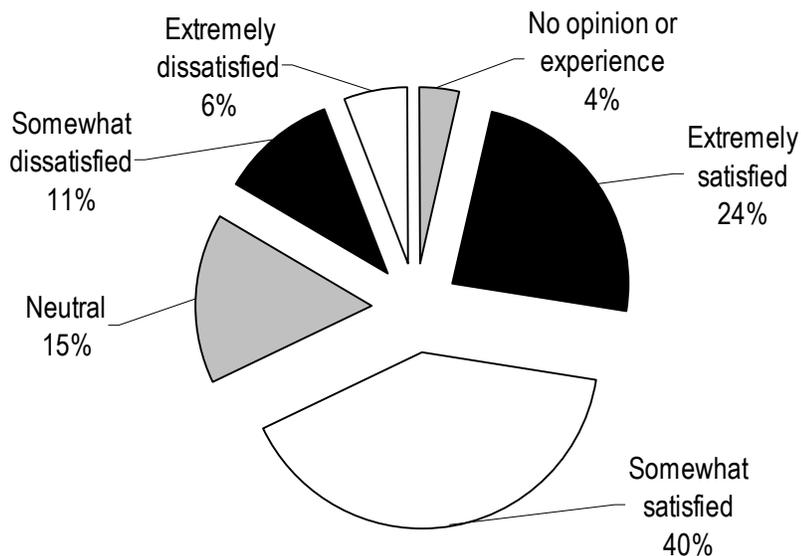
FIGURE 6:
 UNIX Professionals
 Preferences for Audio Only



RATINGS OF EXISTING INFORMATION SOURCES

In addition to the medium, the survey asked how satisfied IT managers were with the product manuals and other documentation provided by the vendors of their UNIX systems.

FIGURE 7:
*UNIX Professionals
Ratings of Product
Information from
Current Vendors*



RATINGS OF CURRENT VENDORS

The User Manual, Configuration Guide, and Release Notes were determined by HP to be the three central manuals in a vendor's library of product information. The enthusiasm for vendor product information is lackluster – acceptable at best. Only 24% of UNIX respondents were extremely satisfied with the company's product information while 40% were only somewhat satisfied. These three critical manuals were then analyzed for information preferences and had similar middle-of-the-road results.

Despite the significance of these manuals, it may be that these IT managers have found that current problems cannot be solved by a manual that was written to support an older version or release. Preferences were also analyzed for manuals in hard copy and electronic formats as well as manuals that had both versions. (Note that the sample sizes for users of both hard copy and electronic versions were, for the most part, double those of the users of hard copy or electronic-only versions. In addition, data in a few instances did not total 100% due to multiple responses or "No Response" given.)

USER MANUAL RATINGS

The User Manual is the best known piece of technical documentation in the IT library. In the survey, user manuals got mixed reviews with 34% somewhat satisfied and 24% very satisfied with the hard copy version. An overwhelming 87% were neutral on the electronic version. Overall, 58% were somewhat satisfied and 23% were extremely satisfied with user manuals that came in both versions. This high percentage of extremely satisfied users was driven by those who preferred the hard copy version.

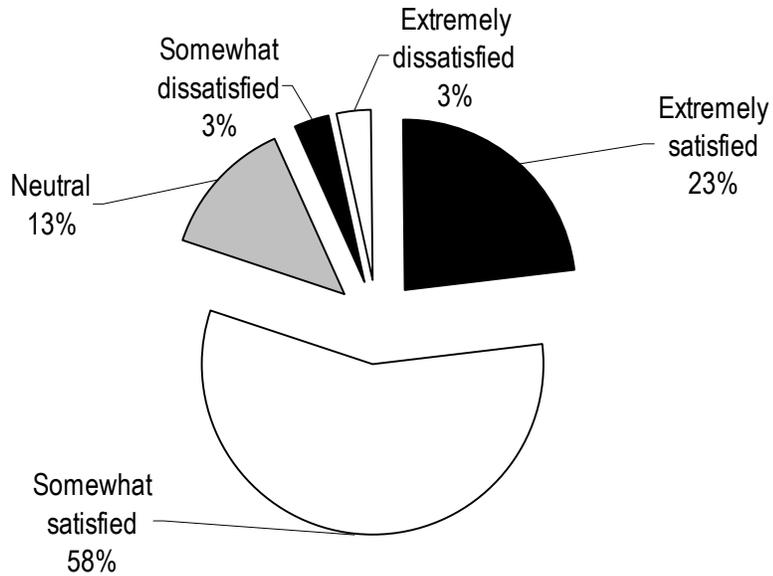


FIGURE 8:
UNIX Professionals Ratings
of User Manual – Hard Copy
and Electronic Versions

CONFIGURATION GUIDE RATINGS

Twenty-six percent were extremely satisfied with the hard copy version while 37% were neutral on the hard copy version. Only 8% were extremely satisfied with the electronic version while 59% were somewhat satisfied with it. Twenty-nine

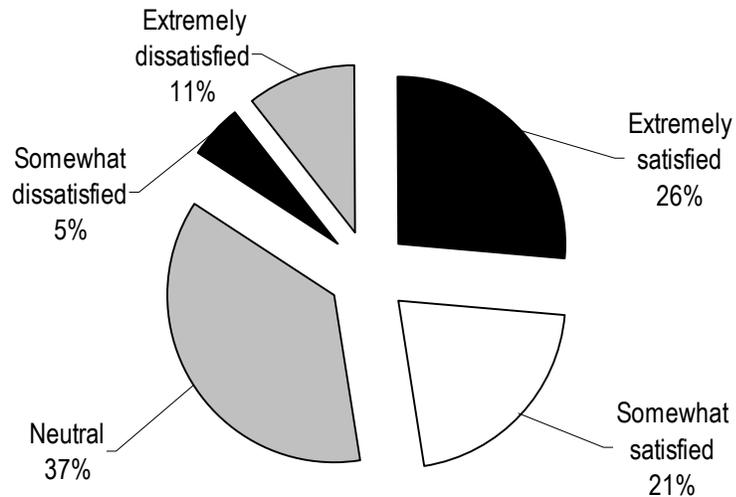


FIGURE 9:
UNIX Professionals Ratings
of Configuration Guide –
Hard Copy Version

percent were extremely satisfied with the configuration guides that came in both versions and, similar to the user guide, 59% were somewhat satisfied. Again, those who favored hard copy drove the ratings higher for manuals with both hard copy and electronic versions.

RELEASE NOTES RATINGS

Only 27% were extremely satisfied with the hard copy version of Release Notes while 34% were somewhat satisfied. The electronic version was clearly more favored this time with 38% extremely satisfied. Overall, 58% were somewhat satisfied and 24% were extremely satisfied with release notes in both hard copy and electronic versions.

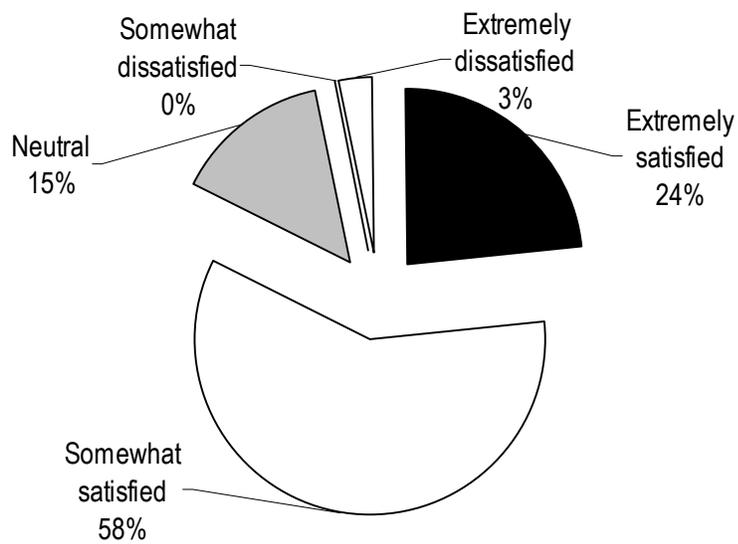


FIGURE 10:
*UNIX Professionals Ratings
of Release Notes – Hard
Copy and Electronic Version*

INFORMATION PREFERENCES – PRODUCT LIFECYCLE STAGES

For the most up-to-date information on the latest technology, it was no surprise that the web was the most popular choice for accessing information on purchase decisions. Close to 70% of those interviewed choose the web for purchase information while 19% preferred hard copy. However, for initial installation and configuration, 55% chose hard copy as the preferred medium followed by 33% for CD-ROM. (See Figure 1, page 5).

Hard copy has frequently been mentioned as the preferred medium for the initial stages of system administration, after which the web or e-mail are the preferred options for updates and upgrade information. For ongoing maintenance, 42% choose the web and 22% CD-ROM.

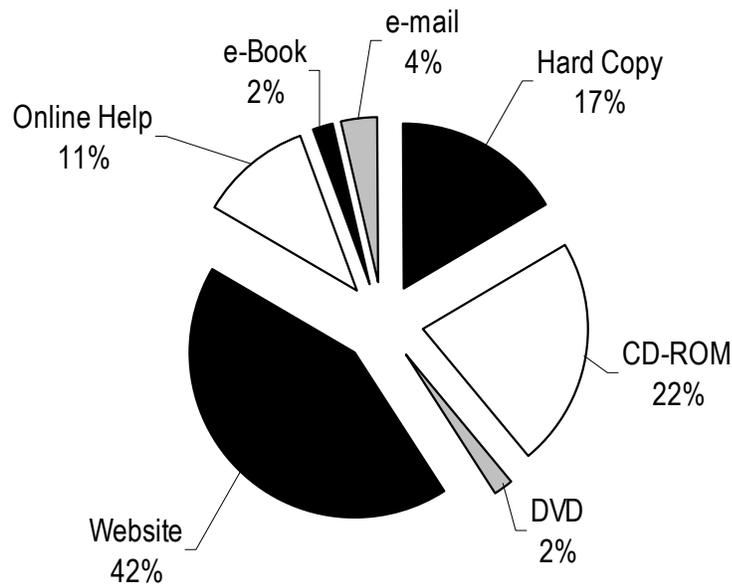
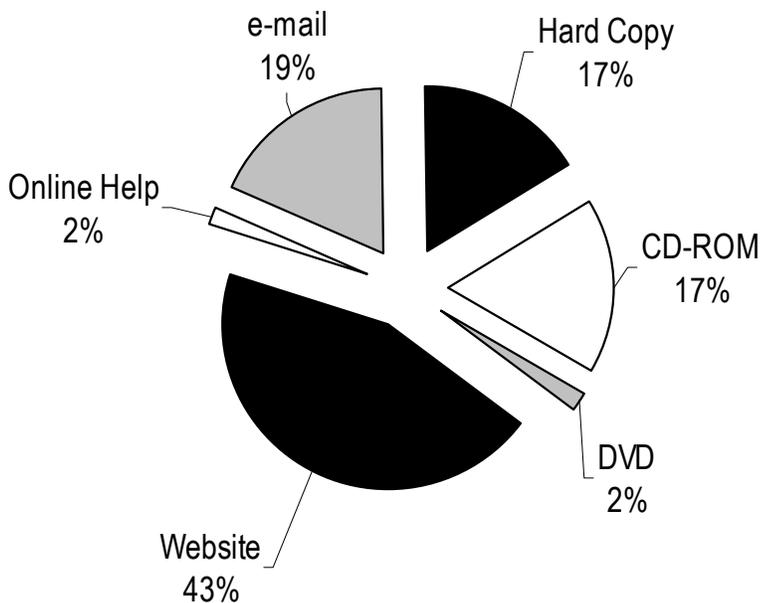


FIGURE 11:
*UNIX Professionals
Information Preference –
Ongoing Maintenance*

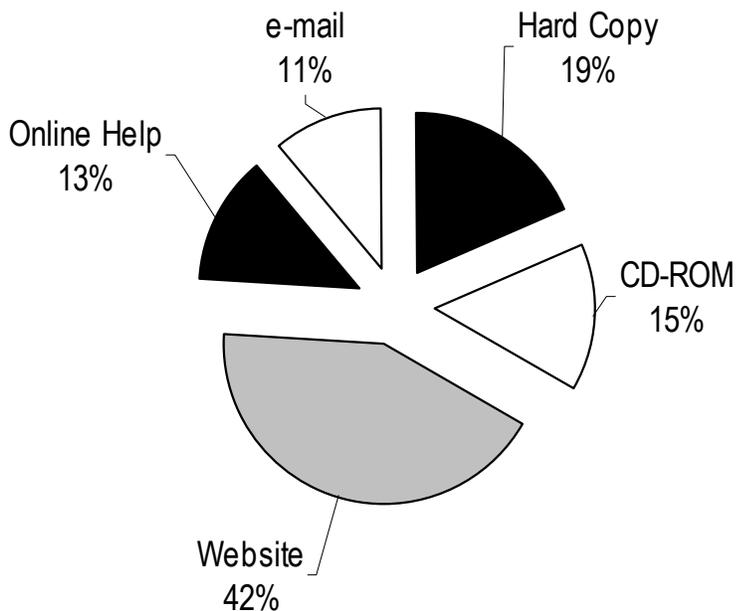
Information on upgrades is continually changing and therefore the web was the popular choice among 42% of IT managers, followed by 28% for hard copy. Immediate access is also crucial for the obsolescence stage and similarly, 43% choose the web, followed by 19%, for e-mail for this stage of the product lifecycle.

FIGURE 12:
*UNIX Professionals
Information Preferences –
Obsolescence*



Forty-two percent preferred the web for error handling, as immediate access is once again imperative, followed by 19% for hard copy and 15% for CD-ROM.

FIGURE 13:
*UNIX Professionals
Information Preferences –
Error Handling*



PRESENT PRACTICES

All respondents had Internet access, a CD-ROM, and a printer in the location where their systems are located. Fifty percent (twenty-seven UNIX professionals) preferred Netscape for their browser of choice while 23% preferred Internet Explorer. Forty-two percent of respondents print information by the section while 28% print information on a specific task.

The survey found that in most cases, there were no organized systems in place for storing hard-copy documentation. Except for a few instances where bookshelves or filing cabinets were in place, there were also no systems for managing information and no organized security checks to track hard copy when it is off company premises. Thirteen of those interviewed maintain the management of hard copy and in thirty cases, no one manages it at all. Half of those interviewed, for example, take hard copy off the company premises but in twenty-seven cases, there were no security measures in place to track it. This was, however, not viewed as a high-priority problem among IT staff members, since most information can be found online.

Forty-four percent of UNIX users felt there would be some financial benefit if hard copy were replaced with a single information source, but forty users were unable to quantify the cost savings. Across the board, all respondents felt that having a single-source information base would enable a more efficient use of their time and resources.

INFORMATION PREFERENCES BY SCENARIO

Technical information may be needed in a range of situations from start up to troubleshooting. There were originally eighteen different scenarios analyzed in the survey. Out of these, six scenarios were selected to provide the most meaningful overview of information preferences. In the majority of cases, the web and CD-ROM were the preferred ways to receive information. Online help was a strong contender while hard copy was the leader in site preparation, booting, initial installation, and hardware. E-mail and technical support were the preferred means for error handling and obsolescence, as immediate access was once again considered vital for these stages.

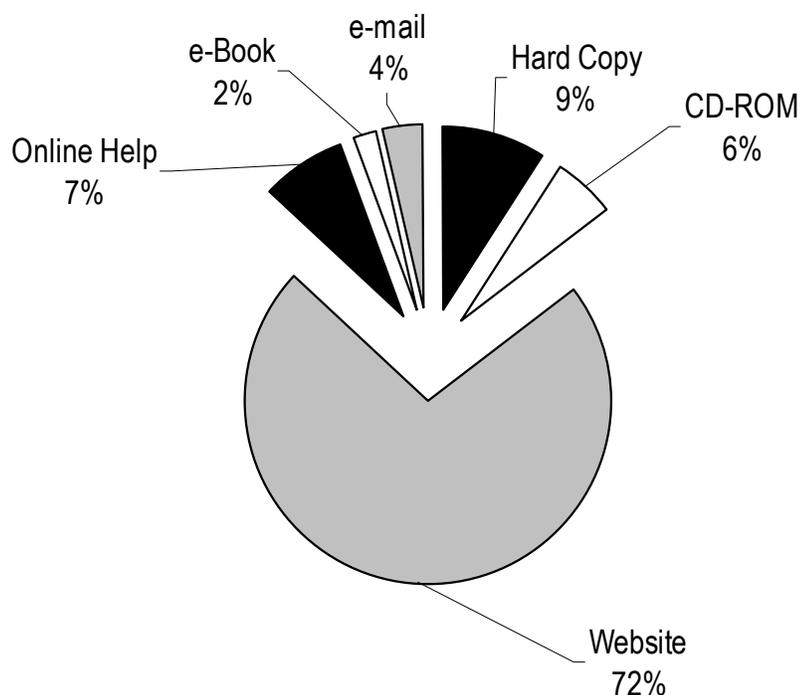
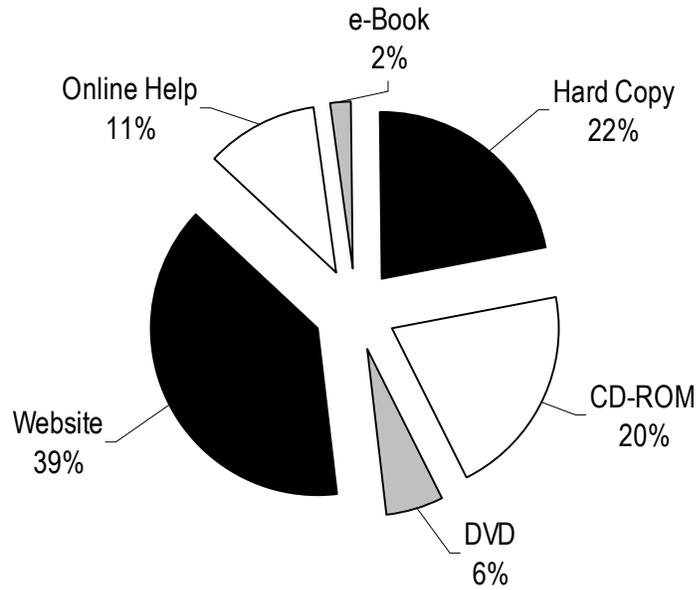


FIGURE 14:
*UNIX User Information
Preferences Compatibility –
of Third-Party Solutions*

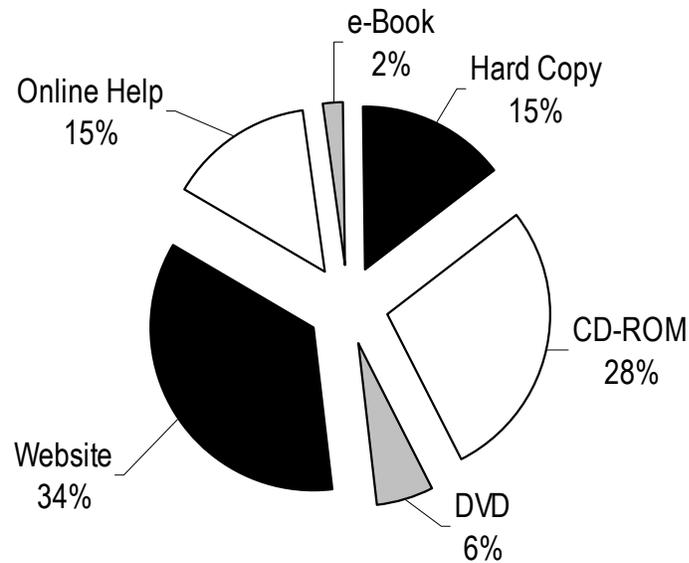
For compatibility of third-party solutions, the first of the six scenarios, 72% of those interviewed preferred the web with a small majority of 9% preferring hard copy. Compatibility issues are among the most dynamic reasons for using technical data, and, as a result, the web is vital.

FIGURE 15:
*UNIX User Information
Preferences –
Performance Tuning*



For performance tuning, 39% preferred the web, while 22% chose hard copy and 20% CD-ROM. The ongoing nature of this task demands currency of information. For operating systems, the preferred options were almost evenly split among the web (28%), hard copy (27%) and CD-ROM (26%).

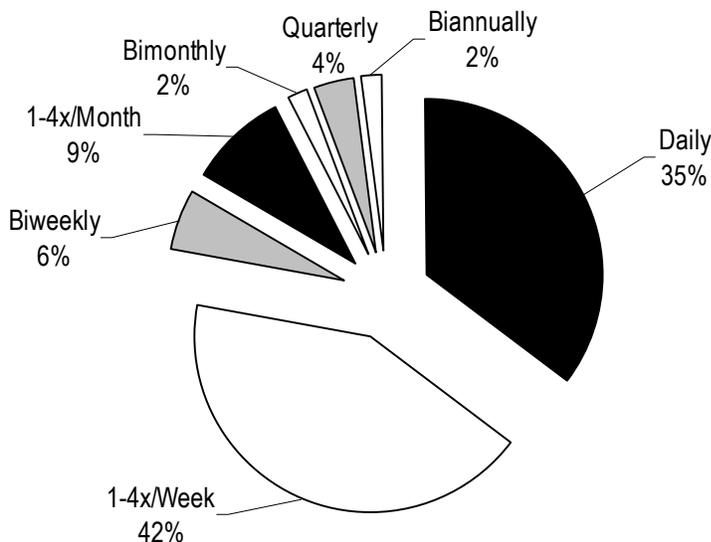
FIGURE 16:
*UNIX User Information
Preferences – Applications*



The last three scenarios – applications, performance tuning, update firmware – require the most up-to-the-minute information. In these areas, accessing information on the web dominated. Thirty-four percent preferred the web for accessing information on applications, followed by 28% for CD-ROM. For updating firmware, 46% preferred the web, followed by 20% for hard copy.

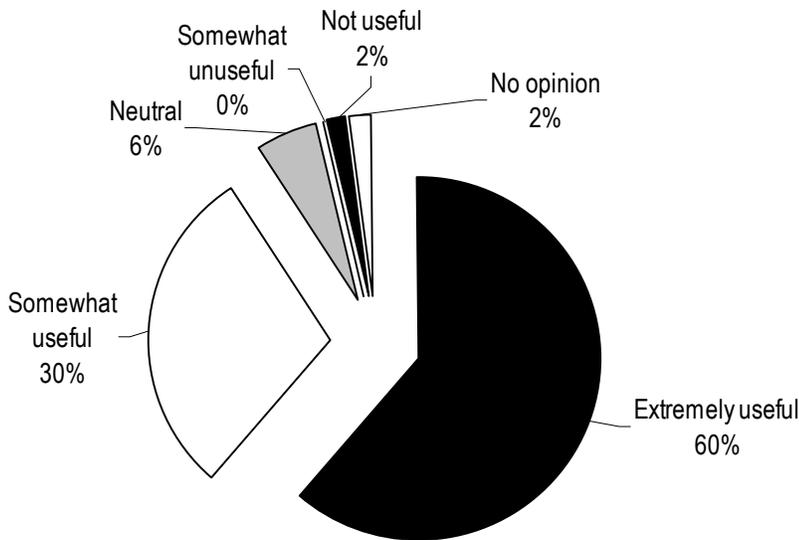
VENDOR WEBSITE AND OTHER INFORMATION SOURCES

FIGURE 17:
*Frequency of
Accessing Information
from Vendor Website*



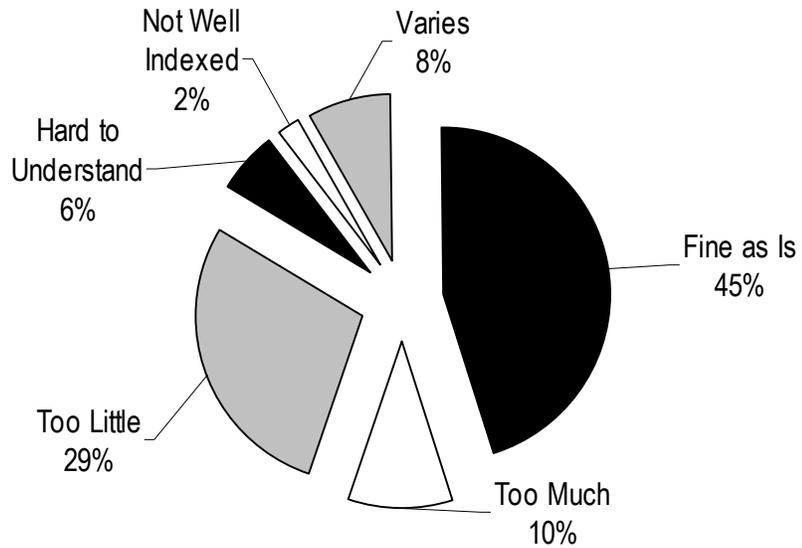
Now that we know IT managers like to access vendor websites, how valuable is the information available? In 35% of the cases, UNIX professionals access the vendor website on a daily basis.

FIGURE 18:
*Usefulness of Information
from Vendor Website*



Sixty percent found the vendor's information extremely useful and 59% said it took them only five to ten minutes to get what they needed. When asked if they found it easy to find what they needed, only 24% found it extremely easy and 54% felt it was somewhat easy. When asked to evaluate vendor's website content, 45% were satisfied with the way it was presently but close to a third felt there was too little content. This may account for the high number of users who felt it was only somewhat easy to find information.

FIGURE 19:
*How Well Does Vendor
Website Content
Work for You?*



On the whole, these survey data may serve as a wakeup call to vendors. IT managers rely on the website, so vendors need to be alert to keep the content up to date and must keep working on user friendliness.

Beyond vendor-supplied technical material, thirty-four respondents use outside hard copy sources, with O'Reilly texts as the most popular choice. Other outside sources included Interex references, industry publications, other websites, chat rooms, and leading industry textbooks published by Prentice Hall.

INFORMATION REQUIREMENTS

Based on the significance of technical documentation and their frequent experience in tapping into technical resources, the IT managers surveyed offered practical advice. Several suggestions were made to improve the accessibility of technical product information. Most focused on the search engine's functionality, while other suggestions centered on improving the organization of the website's architecture, written content, resolution and the availability of information in electronic format (in case of system failures).

Here is a brief summary of suggested improvements:

- more precise search engine;
- updated search engine;
- better relational databases;
- more relevant topics;
- faster downloads;
- better accessibility, maneuverability;
- more material online;
- better FAQ's;
- dynamic information updates; and
- more problem solving.

Other comments included,

- There should be a better "marriage" between errors and technical help.
- If content could be written for "one level down," that would be great.
- Fifteen percent of the information gives you 85% of what you need.
- I need detailed information that is quick and accessible online, otherwise, I call tech support.

Most felt that they could access any information they needed. However, there were topics they consistently had no access to:

- specifications on older product models ;
- technical White Papers;
- integration with third-party hardware/software;
- in-house tools;
- problem solving and applications;
- source code;
- intelligent storage systems;
- systems-management software;
- "How To" documents;

- hardware errors;
- hardware diagnostics;
- contact information for sales and tech support; and
- contract information.

GENERAL SATISFACTION ACHIEVED

Most of those interviewed felt that their current information needs were met. Current information requirements included configuration, hardware, and operating systems specifications, patches, problem solving, troubleshooting, and upgrades. Secondary topics were communications technology, operations/systems errors, problem solving, technical resources and upgrades. Areas of future interest included price quotes, up-to-date technology offerings, new product requirements, problem resolution, remote and instant access to recent documents, satellite systems, and security management.

Ironically, information that was never or hardly used included trouble shooting and configuration guides, hardware and operating manuals, application-development documents, new product releases, system commands, and software applications that are written for the novice level programmer.

Finally, information needs that were presently unmet but were, in fact, accessible on the vendor's website included,

- remote and instant access to recent documents;
- electronic documents for older products;
- training manuals;
- software integration;
- reliable backups;
- storage capacity;
- alerts on fixes;
- better software documentation; and
- e-mail notifications on patches.

These survey results indicate general satisfaction in meeting overall technical documentation needs. However, curiously, even the UNIX professionals who access these data frequently are not aware of the full range of data available.

APPENDIX A: HOW THE STUDY WAS CONDUCTED

Hewlett-Packard (HP) asked D. H. Brown Associates, Inc. (DHBA) to undertake a study of a documentation management system to manage the technical information within its organization. Specifically, HP was interested in determining the need for a single-source information base to replace all of the hard copy documentation it provides with its products. This information base would be a web-based application, accessible via the Internet. DHBA was engaged to determine if such a need exists among IT UNIX professionals by determining what technical information is currently available and how it is used.

To accomplish this study, DHBA developed a list of IT managers in companies that own at least 10,000 PCs onsite. While this list of Chief Information Officers is nationwide, DHBA focused on those companies in the tri-state area (NY-NJ-CT) plus other major metropolitan cities in the U.S. DHBA successfully reached IT professionals with varying levels of experience and from a broad range of industry sectors. In addition, DHBA included programmers, system administrators, or IT managers identified by HP.

From this list, DHBA conducted in-depth interviews with fifty-four IT managers, more specifically UNIX professionals. The data were originally analyzed for two distinct groups: 1) HP UNIX professionals, and 2) UNIX users of competitors such as Compaq, Digital, IBM, Sun and Silicon Graphics. Because there were no major differences in responses between these two groups of vendors, this report aggregates the data into one group in an effort to formulate a broader overview of information preferences among UNIX professionals.

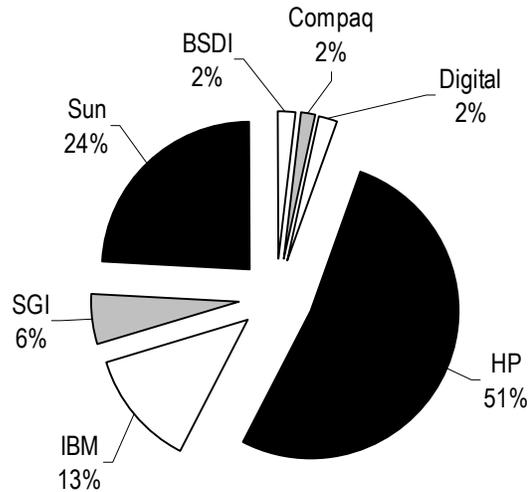
The Table on the next page provides a breakdown. Of the fifty-four people interviewed, twenty-eight used HP as their primary vendor, while the remaining twenty-six employed competitors. The fifty-four respondents were as follows:

TABLE 2: Survey Participants by Title and Years of Experience

Title	Vendor	Years of UNIX Experience
1. Senior Architect	BSDI	5
2. Systems Engineer	Compaq	11
3. Chief Executive Officer	HP	1
4. Computer Specialist	HP	15
5. Consultant	HP	1
6. Consultant	HP	8
7. Director Technical Support	HP	10
8. Director Technical Support	HP	20
9. Infrastructure Analyst	HP	5
10. IT Manager	HP	27
11. Lead Technical Analyst	HP	3
12. QA Consultant	HP	11
13. Senior Basis Analyst	HP	6
14. Senior Engineer	HP	4
15. Senior Project Manager	HP	3
16. Senior Software Engineer	HP	15
17. Senior UNIX Systems Engineer	HP	7
18. Systems Administrator	HP	12
19. Systems Administrator	HP	5
20. Systems Administrator	HP	10
21. Systems Administrator	HP	8
22. Systems Administrator	HP	14
23. Systems Administrator	HP	10
24. Systems Administrator	HP	4
25. Systems Administrator	HP	1
26. Systems Administrator	HP	8
27. Systems Analyst	HP	5
28. Systems Manager	HP	7
29. Systems/Technical Support	HP	15
30. Technical Support	HP	8
31. Director Systems Integration	IBM	10
32. Network Systems Programmer	IBM	20
33. Project Leader	IBM	7
34. Senior Systems Administrator	IBM	12
35. Systems Administrator	IBM	18
36. Systems Engineer	IBM	6
37. UNIX DB Administrator	IBM	4
38. Support Specialist	SGI	4
39. Systems Administrator	SGI	7
40. Systems Engineer	SGI	3
41. UNIX Systems Administrator	SGI	6
42. Design Engineer	Sun	15
43. IT Principal	Sun	15
44. Manager, Storage Administration	Sun	4
45. Managing Partner	Sun	20
46. Open Systems Team Leader	Sun	7
47. Operating Systems Manager	Sun	2
48. Senior IT Manager	Sun	1
49. Senior Project Manager	Sun	9
50. Senior Technical Manager	Sun	10
51. Systems Administrator	Sun	1
52. Technical Services Manager	Sun	10
53. UNIX Network Administrator	Sun	8
54. UNIX Systems Administrator	Sun	2

This survey analyzes information preferences for each type of medium as well as how IT managers use their present documentation. Statistics on the product lifecycle and how vendor websites are regarded are also provided. Since this survey was originally developed for HP, slightly over half of the total respondents used HP (51%), while 24% percent employed Sun and 13%, IBM.

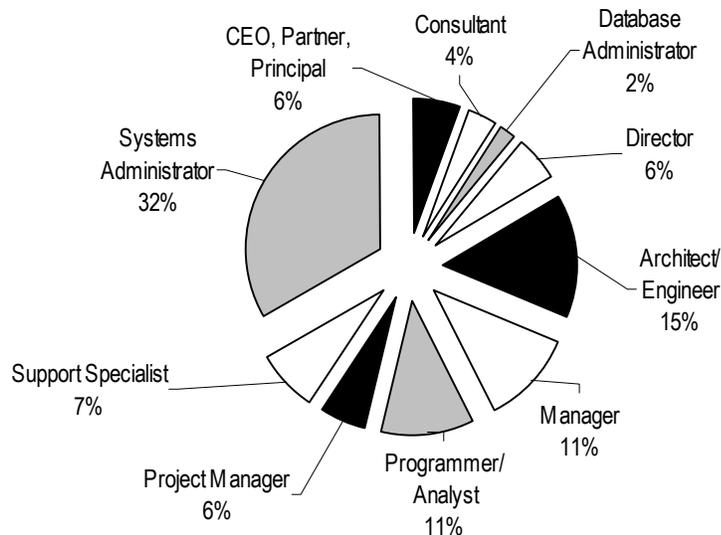
FIGURE 20:
*Survey Distribution
by Vendor*



DISTRIBUTION BY JOB TITLE

There were thirty-four job titles among the fifty-four IT professionals who participated in the survey. In order to narrow down the number of titles, jobs that had similar functions were grouped together. For instance, those who were in the highest managerial levels, such as CEO, Partner, or Principal were combined, as were Architect/Engineer and Programmer/Analyst. The highest concentration of IT professionals was System Administrators, consisting of eighteen members, representing 32% of the total group. The next three highest groups were Architect/Engineers, Managers, and Programmer/Analysts, comprising 15%, 11% and 11% of the total participants, respectively.

FIGURE 21:
*Survey Distribution
by Job Title*



APPENDIX B: THE CASE FOR AND AGAINST HARD COPY

While hard copy fared well in start-up scenarios, it was not widely preferred as a medium. The main arguments against hard copy were, 1) manuals are never updated and are therefore of little value after the initial purchase; 2) online information offers a broader breadth of information; 3) online information is significantly more accessible and convenient for remote systems; and, 4) if one pays for products and services, most UNIX managers receive free technical support and therefore do not need the hard copy.

On the other hand, the case for hard copy is still strong. IT managers told us:

- The vendor website content is often different from hard copy and not as well developed as the hard copy. I need both because they tend to complement one another.
- I like knowing I have hard copy in case the system crashes and I have hard copy as a back up.
- I will always buy hard copies simply for the convenience factor and the fact that they are good learning tools and references.
- A single source is fine when and if it is available. But if I have a single point of failure, I am in trouble.

Taking into account these contradictory viewpoints, DHBA concludes that there is obviously a need for both hard copy and web access to information. However, if a single-source database can incorporate the information requirements of today's IT manager while providing timely updates and a much-improved search engine, the case for hard copy may dissipate. Note that a majority feel that having everything on a single-source information base would enable a more efficient use of time and resources.

DATA ACCESS IS TIME CONSUMING

As background on the presence and easy availability of technical data – including hard copy – consider this information from a previous survey. The inability to access or share information and the downtime spent searching for documentation costs corporations a significant amount of money. Moreover, global corporations or those companies that have operations beyond one location must be able to access information at all times. The following statistics are from a study conducted by the Association for Information and Image Management:

- The majority of records four years old are retrieved less than four times per month.
- The average executive spends on average two and a half hours per week looking for lost documents.
- Ninety percent of corporate memory is paper-based.

- Only 32% of a company's documentation is in use; 3% of that documentation is misfiled or in other words, lost.
- The time to locate a missing document is ten minutes to two hours.
- The cost of locating a missing document is \$6 to \$120.

Corporations are experiencing a need to improve their grasp on their own internally generated knowledge in a time of high employee turnover and corporate mergers, acquisitions, and downsizing.