ATTACHMENT D-2



Information Retrieval from Hypertext Using Dynamically Planned Guided Tours

Catherine Guinan and Alan F. Smeaton
School of Computer Applications, Dublin City University
Glasnevin, Dublin 9, Ireland
e-mail: smeaton@dcu.ie

Abstract

In using any hypertext system a user will encounter many technical problems which have been well-documented in the literature. Two of the more serious problems with using hypertext are user disorientation and the retrieval of information. Another less often addressed problem is that of the logical sequencing of nodes. In the work reported in this paper we address these three problems by combining Hammond and Allinson's guided tour metaphor and Frisse's information retrieval techniques to dynamically create guided tours for users in direct response to a user's query. One of the features of our method is that we take advantage of typing of information links in the hypertext to generate a tour which has a judicious sequencing of nodes rather than a simple presentation of hypertext nodes in order of similarity to the user's query. Our method was empirically tested on a population of 125 users who generated a total 973 individual tours and all user actions and responses to questions were logged. The results of this evaluation are presented in this paper.

Acknowledgement: CG would like to acknowledge the support of Telecom Éireann and the Irish-American partnership Scholars program for supporting her in this research. All correspondence regarding this work should be addressed to AFS.

Permission to copy without fee all or part of this material is granted provided that copies are not made or distributed for direct commercial advantage, the ACM copyright notice and the title of the publication and its date appear, and notice is given that copying is by permission of the Association for Computing Machinery. To copy otherwise, or to republish, requires a fee and/or specific permission.
©1992 ACM 0-89791-547-X/92/0011/0122/ $1.50

1 Introduction

In using any hypertext system an end-user or browser will encounter many technical problems which have been well-documented elsewhere [10]. Two of the more serious of these problems are disorientation and the quality of the information retrieved by the user from the hypertext. In disorientation a user may effectively get lost in the hypertext and not be able to return to a node they previously visited or follow a trail of nodes they found interesting. Related to this is the problem of actually retrieving relevant information from a hypertext. If a user is simply browsing around a hypertext with the sole purpose of finding any interesting or potentially useful information then the browsing metaphor which hypertext encourages is adequate. If, however, a user has a more definite purpose and seeks a specific piece of information from a hypertext then unless the hypertext has been very well-engineered then the user may not be able to retrieve relevant information [16].

In addition to the two problems with using hypertext mentioned above another, less often addressed problem is that of the logical sequencing of nodes as they are presented in a hypertext browse. An end-user of a hypertext has complete control of the sequence of nodes presented to him/her when browsing which is a facet of hypertext with much appeal which can also cause problems as that user tries to assimilate information contained in the nodes that have been viewed. If the logical sequence or the order of node presentation is askew or unbalanced in terms of information content then garnering an overview of the overall information presented will be made more difficult, even if the nodes that have been viewed are all relevant to the user's information requirements. For example, if a user is browsing a hypertext on database topics then it is much more

Google/YouTube Exhibit 1021/1121
Page 00176

sensible for a user to examine overview and introduction nodes before nodes detailing examples and syntax of SQL !

In this paper we explore a method which we believe directly addresses the three problems with browsing through hypertext that we have mentioned above, disorientation, information retrieval and the logical sequencing of nodes. We propose a method for dynamically generating a guided tour through a hypertext in response to a user's query which will plan a tour through a hypertext covering all the nodes the system believes relevant to the user's information need as expressed in a natural language query, which eases disorientation problems by using the guided tour metaphor first proposed by Hammond and Allinson [8] and which takes advantage of typing of information links in the hypertext to present the nodes on the tour in a logical fashion. Effectively we extend the guided tour metaphor by including the information retrieval features proposed by Frisse [5] and we add in logical sequencing of nodes on the tour to complete the process.

The rest of this paper is structured as follows. In the next section we give a brief overview of related work on guided tours, incorporating information retrieval into hypertext browsing and we look at how typing of links and/or nodes has been used in other work. The subsequent section details the mechanism we have devised for dynamically planning tours. In section 4 we give an outline of our experimental environment and in section 5 we present some of our results. A concluding section summarises our work and gives some ideas for future work.

2 Retrieving Information from Hypertext

The metaphor of providing a guided tour through a hypertext to ease problems of disorientation was first proposed by Hammond and Allinson [8] and also used by Trigg [15] in the NoteCards system. In this approach, guided tours were created by the hypertext author and were fixed, static features of the hypertext. Problems of authoring such guided tours have been well- documented in [9] and the notion of a guided tour has been extended and refined numerous times. For example, Zellweger has introduced the idea of scripted documents which are more complex than static guided tours in that scripted documents can have conditional and programmable paths, automated playback and active entries [18] but the common denominator is the approach of offering to guide a user through a hypertext if the user wants to follow the guide.

Traditional information retrieval functionality of ranking a set of documents or texts in response to a users query as described in [12] has been around for a long time and is reasonably well understood. Hypertext-based retrieval of information, effectively by browsing around an information space following authored links, is comparatively recent in popularity. The former is useful for querying, for satisfying user information needs where users know exactly what they are looking for while the latter is more effective where users don't know exactly what they are looking for and are browsing [16]. In between the two extremes there are user information needs which have elements of both of the above and because of this there have been some previous attempts at combining information retrieval and hypertext.

Methods for searching for information in a hypertext have been developed by Frisse [5] who used statistically-based information retrieval techniques to choose a starting node in a hypertext from which users could commence a browsing session. The computation to find the best starting node is based on a user's initial query to the system and recommends a starting point for a user but does not then provide any further guidence to that user in finding relevant information in the hypertext. Dunlop and van Rijsbergen [3] have developed a method for retrieving non- textual information from a hypertext, again using statistically-based approaches.

Coombs [2] describes a system for searching through a hypertext network using natural language queries and boolean based retrieval. Searching in this system can also be restricted to a particular area of the network instead of encompassing the entire information base. These ideas have been implemented and tested in IRIS Intermedia. α−Trellis by Furuta and Stotts [6] is a prototype hypertext browsing and authoring system which incorporates the users browsing experience into the nodes and links structure of hypertext. Petri nets are employed to facilitate this two way specification. Finally, Shepherd et al [14] have developed a system of transient hypergraphs for their citation network whereby the entire hypertext is represented as a hypergraph or a labelled directed graph. Hypergraphs are generated dynamically in response to a users query and are discarded at the end of the query session. Different perspectives of

Google/YouTube Exhibit 1021/1121
Page 00177

the hypertext can be gained by the user during each query session.

In order to increase the richness of knowledge representation in a hypertext the nodes and/or the links may be typed. The term *type* is somewhat overloaded as it can mean many things but in a hypertext context is means a classification of nodes and/or links into one of a pre-defined set of categories. Typing has become quite popular in hypertext systems because of the fact that in general it substantially enhances the quality of the representation of information in the hypertext. Typing has been used in systems like gIBIS, PHI, NEPTUNE, NoteCards and CONCORDE [1]. Ideally, a hypertext system incorporating typing should allow author-defined types as well as having a generic set of types common to most applications. Typing of nodes and/or links in the hypertext may subsequently prove useful in retrieval from hypertext and this is an active area of research in the field.

3 Dynamically Planning Guided Tours

The dynamic aspect of our guided tour comes from the fact that tour creation is postponed until the user enters a natural language search query. This differs from the static tour described earlier in which the hypertext author pre-defines all tours before any user has formulated any information requirements. The guided tour is also logically *planned* in such a way that attention is paid to the types on the information links connecting the individual nodes in the hypertext before a route through those selected nodes is computed.

The method used for selecting the nodes to be included in the tour is based upon the work done by Frisse described in [5]. However unlike Frisse's application, the hypertext we have used does not have a hierarchic topology but more of a network. Propagation of weights upwards as Frisse has done can not therefore apply directly in our case. However, as we shall see, the weights assigned to nodes do depend on the number of immediate neighbours and their weights so the concept of an extrinsic weight as proposed by Frisse still applies.

Upon entering the system the user is asked to input a natural language query from which all stopwords are removed and the remaining words stemmed using a standard algorithm from information retrieval research [11]. An inverse document frequency (IDF) weight is then calculated for each query term which assigns a higher weight to terms which occur less frequently throughout the collection. Each node in the hypertext is given a score which is initially the product of the term frequency or number of times a term occurs in that node, and the IDF weight ($tf * IDF$), for each of the query terms. This term weighting strategy used to assign scores to nodes has been shown to have excellent performance in terms of effectiveness for information retrieval and is also relatively undemanding in terms of computing resources.

The number of connections from each node is also considered to be important in determining which hypertext nodes to include in the tour. Not only must each selected node be relevant to the user query but it must also be well connected to the other nodes in the hypertext to allow the user the option of deviating from the tour. The *goodness of an area* as opposed to the *goodness of a node* is considered to be more important for retrieval purposes. For example, if the weighting mechanism chose as the highest scoring node one which had no connections to any other node in the hypertext this would not be deemed as an appropriate starting point in a guided tour compared to a node which scored less but was immediately connected to many other medium scoring nodes. Therefore, some method of combining a node's score with its neighbour's scores had to be used.

One method of incorporating a neighbours contents into each node as used by Frisse [5] is by calculating the average score of the neighbouring nodes and adding this figure to the current node to give a measure of the utility of each node. This procedure should be repeated for all nodes in the hypertext. In this way, some provision is made for calculating the *goodness of an area* as opposed to *goodness* of each individual node. Formally, the method of measuring the utility of a node can be given as

$$I_i = W_i + \frac{\sum_{j=1}^{n} W_j}{n}$$

where W_i is the $tf * IDF$ weight of node i and W_j is the $tf * IDF$ weight of one of the n nodes *connected* to node i via an authored information link. Having calculated a utility score for each node based on within-node query term frequency, inverse document frequency and contents of linked neighbours, one final adjustment is made to the node scores. In the hypertext we have used each node consists of a short descriptive title plus a body of text. If a node contains some of the query terms in its title then it is more likely that the con-

Google/YouTube Exhibit 1021/1121
Page 00178

tents of that node relate specifically to the search query and so should be more certain of inclusion in the tour. Increasing the weight is one way of ensuring that the node is included in the top ranked nodes.

Once each of the nodes in the hypertext have been assigned a utility score based on the user's query, it is necessary to establish a cut-off point (μ) below which all nodes whose utility score is less than are discounted from inclusion in the tour. All nodes whose weight is greater than or equal to this cut-off or threshold value would be selected for inclusion in the tour.

Initially it was not known what would be the ideal threshold value so this was one of the parameters whose optimal value we determined empirically. The threshold value would also vary for each user query as the strengths of the query-node similarities would vary between queries depending on how close they were to the information in the hypertext. In our experiments reported later, every time a tour is generated for a user, a threshold value was randomly chosen as some fraction of the utility score of the highest-scored node. The fractions used initially came from the set {0.1, 0.2, 0.3, 0.4, 0.5, 0.6}. If, for example, $\mu = 0.3$ was randomly selected, then before a node is selected for inclusion in the guided tour its utility score must be at least 30% of the score of the highest scored node. Depending on which value from the set is selected the actual number of nodes in the tour can vary greatly so the threshold value chosen actually controls tour length.

At this stage, the nodes for the guided tour have been dynamically chosen in response to a user's query and some form of logical ordering has to be imposed on the selected tour nodes. We decided to exploit the relationships between the nodes to plan an ordered path. As part of the hypertext authoring process, the link types between nodes as shown in Table 1 had been used.

Type-1	is_a a_kind_of is_contained_in
Type2	consists_of contains preceeds
Type3	has facilitates refers_to is_related_to

Table 1. Node-node Link Types

A precedence order was established among link types. Higher precedence is given to those link types which define a clear parent-child relationship thereby indicating a distinct hierarchical association between the nodes. Link types in this category are of type-1. Second in order of precedence are type-2 links which indicate that the nodes from which these links emanate should logically precede the destination node where both nodes are to be shown to a user. Lastly, checks are made for the remaining link types, type-3 links.

Once the nodes selected for inclusion in the tour have been ranked by their utility weights, the highest scoring node is examined for links which indicate that it is the child of a parent node also in the tour. These are type-1 links. If a link of this type is present it is followed and the destination node is then examined in the same way provided it is included in the tour. This process continues until the node highest in the tour hierarchy is found. This node becomes the first to be displayed in the tour. It is then examined for type-2 links which indicate that a definite child node exists which should be displayed next. If none exists then type-3 nodes are examined in the following order, *has*, *facilitates*, *refers_to*, and then *is_related_to*. dependThis procedure is followed until every node selected for inclusion in the tour has been positioned correctly relative to each other node in the tour. This positioning is facilitated by means of the link types as mentioned above.

In the next section we shall describe the experiments we ran to determine the optimal value of μ the threshold value for determining inclusion of a node in the tour.

4 Experimental Details

The hypertext browser we developed runs on SUN SPARC workstations using OpenWindows version 2. We used the ORACLE R.DBMS for storage management and the system was written in C with embedded SQL commands. The hypertext we used consisted of 551 nodes of information about the undergraduate course on Databases at Dublin City University. Among these nodes there are a total of 1566 typed links. These links were created manually using the ten distinct link types given earlier which were deemed to encompass the most frequent and important relationships existing between the various nodes. Some of these link types may be applicable to all hypertexts but some will be application dependant. Depending

Google/YouTube Exhibit 1021/1121
Page 00179

on the contents of each individual hypertext, the author will have to determine the relationships between the various nodes as there are no set guidelines on the creation and typing of links. Gray and Shasha devised links of type *example, critique, counter-argument, compared-with* and *continuation* for their NetBook system [7]. Yet another author might formulate different link types for the same system.

The browser we developed is meant to be used in tandem with the Databases lecture course. The user population consisted of 125 undergraduate students who used the system over a period of three months. Their usage of the browser was broken up into three separate batches or assignments. An initial assignment for students was used for familiarisation in which the user became acquainted with the material covered in the database and with how to actually use the browser tool. A user session consists of everything a user does *in one sitting*, including the search query and all the button presses made. A log file was maintained which contains details of every user action during each session. The familiarisation assignment was not logged and the results presented here are for what we term the first and second assigments. The log file details include username, the user's query, tour contents, button presses and their timestamps, etc.

At the end of each session, users were asked a series of questions about the generated tours to give us some feedback on what they thought of the guided tours. These questions asked about users' perceptions of tour length, information coverage and coherence and the responses were analysed. Responses to questions were mandatory in our browser in order to correctly exit the system.

Different tours, even for the same query, were generated by varying the threshold value at which nodes qualify for inclusion in the tour. In assessing and comparing the generated tours, three distinct characteristics can be identified.

- *Tour Length:* This deals with the number of nodes which have been selected for inclusion in the tour. Depending on the threshold value and on the search query the tour length can vary greatly. The more general is the users query, the wider the range of nodes which are eligible for inclusion in the tour while the more narrow or specific the query, the fewer nodes will qualify. Depending on the threshold value μ, which is randomly selected, the length of the tour can vary from consisting of only a few nodes to as many as 50. If a high threshold, say $\mu = 0.5$, is chosen, then fewer nodes will meet the entry criteria of being at least 50% of the highest scoring node than if $\mu = 0.1$ in which case many more nodes will be selected as their utility score only has to be at least 10% of the highest scoring node. The same query entered by two different users at the same time can result in two different tours.

- *Information Coverage:* This characteristic of a guided tour also deals with long versus short tours but is more concerned with the relevance of the retrieved information. For each query, there exists a certain set of relevant nodes and a larger set of irrelevant nodes. The ideal hypertext system would select for inclusion in the guided tour only those nodes which belong in the relevant set. Unfortunately, statistically-based information retrieval techniques like $tf * IDF$ weighting are not sophisticated enough to guarantee this [13]. Obviously, the threshold value influences the information coverage also as the longer the tour the more general will be the information coverage and the shorter a tour, the more specific will be the information coverage.

- *Connectivity:* This characteristic deals with how well-connected or how fragmented is the presentation order of the nodes in the guided tour. The connectivity of a tour can be measured in terms of the existence of authored information links between tour nodes. A tour is considered to be well-connected if each node in the tour is linked via an authored link to the node that follows it on the tour. The hypertext author is the only person who can explicitly define an information link. A tour is considered to be fully fragmented if each node in the tour has no information links to any of its neighbours on the tour. The well-connected tour is the type considered to be ideal for a hypertext used as a learning aid. In this case, each node leads logically to the next in line and no concept is discussed in detail until it has been fully explained in a previous node. The fragmented type of tour consists of nodes plucked from different areas of the hypertext, many of which may have no logical ordering but appear in a random fashion. Again the threshold value can affect this

Google/YouTube Exhibit 1021/1121
Page 00180

characteristic. If the tour is very long more nodes are included and so the chances of having a highly connected tour are greater. Conversely, if the tour is short, no avenue of discussion may be followed too deeply thus leading to a more fragmented type of tour. Theoretically, changing threshold values should have this effect but in reality, the situation may be very different.

To date, no tried and tested method of evaluating hypertext systems has been devised and so our results and analysis will be mainly based on observation of user behaviour and on the answers given to the questions asked at the end of the user session. The increased cognitive complexity of using hypertext systems makes them more difficult to evaluate than information retrieval systems [17]. Two of the characteristics of guided tours which we shall examine, tour length and information coverage will be evaluated by inspecting the users replies to the questions and so will be subject to human error and bias. However, it can be determined by examining these results if the tours have been useful to end users.

5 Experimental Results

There were 580 logged user sessions or tours generated in the first assignment and 393 in the second assignment. Each student on the course was expected to run at least 4 tours in each of the two assignments being logged though some students actually did more, some did less and some did none. Figures such as number of nodes visited and session length did not vary much across the two assignments. In both cases the pattern was that of an exponentially decreasing distribution, i.e. many users visited a few nodes and few users visited many nodes, a result which has been found elsewhere. The details are given below:

	Assign 1	Assign 2
Avg. total nodes seen	23.9	18.4
Avg. time per session	11.9 m	9.8 m

Table 2. Use of browser

Tour length was the first of the results we examined and the users answers to the questions in both assignments differ and are given in Table 3 with the responses *far too long, too long, just right, too short* and *far too short*. The averaged tour length for different values of μ are given in Table 4.

	FTL	TL	JR	TS	FTS
Assign 1	5%	25%	57%	10%	3%
Assign 2	3%	10%	63%	19%	5%

Table 3. User responses to questions on tour length

μ	Assign 1	Assign 2
0.1	34.6	–
0.2	24	–
0.3	16.4	15.6
0.4	12	11.7
0.5	9.1	7.9
0.6	–	5.4

Table 4. Avg. tour lengths for threshold values

In the first assignment, when μ is in the range 0.1 to 0.5, a sizable percentage (43%) of users replied that the tour length was not satisfactory, it was either too long or too short. In the second assignment, 37% of users replied that tour length was unsatisfactory. This may not seem like a large difference in unsatisfactory tour lengths between the two assignments but the important feature to note is how these figures are made up. For example, in assignment 1, 30% of users replied that the tour length was too long and only 13% said that it was too short. In assignment 2, only 13% of users replied that the tour length was too long whereas 24% said that the tour was too short. It could be argued that users were even more familiar with the browser tool in assignment 2 but the shift in pattern could not have been caused by users familiarity with the hypertext as users queries and hence tours, differed across assignments. We believe that the shift could only be caused by the changed set of values for μ as this was the only parameter to be modified between assignment 1 and assignment 2. After the first assignment, tours were made shorter by removing $\mu = 0.1$ and $\mu = 0.2$ from the set of values actually used and $\mu = 0.6$ was added. In relation to tour length, the most suitable threshold value seems to lie between $\mu = 0.3$ and $\mu = 0.4$ but until the tour generation algorithm is tested against more hypertexts this value cannot be regarded as universal.

Information coverage is based on what the user deems to be relevant or irrelevant on a tour with

Google/YouTube Exhibit 1021/1121
Page 00181

regard to their particular query. Trying to measure this characteristic exactly would be very difficult as it would be necessary to select all the nodes in the hypertext which were relevant to every user query. This is the same problem as faced in typical information retrieval experimentation where exhaustive relevance judgements on a collection of texts are ideal but not always available [12]. For this reason, it was decided to gauge information coverage based on user's replies to questions about the proportion of relevant nodes on the tour. A long tour is not necessarily better as it may contain a lot of information which is extraneous to the query thereby forcing the user to sift through all of the material in order to find the appropriate nodes. Likewise, even though a short tour may contain only those nodes which are relevant it may also omit several suitable nodes, thereby compelling the user to browse in order to find all the information relating to their query. Our task is to find a suitable mid-point between these two extremes. One pattern to notice in examining the user's replies to the question on information coverage is that as increases so does the number of users who replied that the tour nodes were highly relevant. Similarly, as μ increases, so does the number of users who replied that nodes visited outside the tour were relevant. This pattern adheres to the principle that as tours get shorter less irrelevant nodes are included in the tour. However, it also appears that some relevant nodes are being excluded from the tour. It seems that high threshold values do not lead to tours which contain enough information to satisfy the user's query. Likewise, when the tours were long, $\mu \epsilon \{0.1, 0.2\}$, the proportion of users replying that a high percentage of tour nodes were relevant was lower than when a high threshold value, $\mu \epsilon \{0.5, 0.6\}$, was used. By examining the results, it seems that when $\mu = 0.3$ the information coverage is enough to satisfy the users query but not too much that they are laden with material or too little that they have to go in search of it themselves.

In order to measure a third characteristic of guided tours, their connectivity, a scoring algorithm was devised which, using the link types between adjacent tour nodes, calculated a connectivity score for each generated tour in both assignments. The link types which were used to connect the nodes in the database were divided into three groups which represent how important each link type is deemed to be in providing a connected and logical path through the network of nodes. Most important are the link types which determine where each node should appear in the tour relative to its neighbours. Links in this category are *is_a, a_kind_of, consists_of* and *contains.* If two nodes are connected by any of these links then it is immediately apparent which one should come first in a tour. Second in terms of link strength are links which more loosely determine an order of precedence which include *precedes, has* and *facilitates.* Finaly are those links in which no attempt is made to establish the order in which links should be displayed.

Having thus ascertained the strengths of the various link types in a tour we then gave each generated tour a score based on its coherence. The formula to do this is based on assigning weights to each of the link categories; 3 for the first category, 2 for the second and 1 for the third. When all links in each tour have been taken into consideration the tour score is normalised by dividing by the total number of links in the tour. The following are the scores assigned to tours in each assignment. The scores are divided up into bands of 0.3, e.g. 0 to 0.3, 0.3 to 0.6, etc. and are given in Table 5.

μ value	Assign 1	Assign 2
0.0 – 0.3	8%	16%
0.3 – 0.6	28%	28%
0.6 – 0.9	43%	33%
0.9 – 1.3	15%	15%
1.3 – 1.6	5%	4%
1.6 – 3.0	1%	4%

Table 5. Connectivity scores for tours

In both assignments, the connectivity of most of the tours fell into the range 0.6 to 0.9. When these scores are compared with a control group of tours, we can see how ordering or sequencing the nodes on the tour using link types as outlined earlier, affects the connectivity of the tours. The control group was used to determine the connectivity scores which would be calculated without the logical ordering of nodes. More than 20% of the original user queries were taken as a sample for use in the control groups and tours were generated without paying attention to the link types described in section 3. The only criteria used for generating the control group tours were the individual nodes' similaritity to the query. The nodes in the control group tours were presented in decreasing order of node weight only. The results of

Google/YouTube Exhibit 1021/1121
Page 00182

this experiment can be seen in table 6 which compares connectivity scores between sequenced and unsequenced tours. Clearly, the overall scores are much lower for the control group than the assignments where sequencing of nodes was used.

μ value	User Sessions	Control Group
0.0 - 0.3	15%	63%
0.3 - 0.6	28%	21%
0.6 - 0.9	35%	7%
0.9 - 1.3	15%	3%
1.3 - 1.6	5%	2%
1.6 - 3.0	2%	4%

Table 5. Tour scores in user sessions v control

The figures in table 6 indicate that tours generated using the precedence ordering consistently obtain higher connectivity scores than those in the control groups suggesting that imposing a precedence order on a sequence of nodes improves their logical ordering.

By examining the patterns for each threshold value μ, it can be seen that the proportion of tours within each threshold value with connectivity scores above average generally increases as μ increases. This would indicate that the higher the value of μ the better. However, as μ increases the number of tours scoring below average also increases, e.g. 6% at $\mu = 0.1$ to 26% at $\mu = 0.6$. This indicates that as μ increases so does the number of low scoring tours. A suitable mid-point would seem to be where $\mu \approx 0.3$.

We cannot draw any definite conclusions just by examining users answers to the questions at the end of each session. However, we can gain some idea as to which type of tour is preferred by the users. From our users responses we see the tendency is towards short tours and then if necessary, deviate on their own. Our hypertext browser generated a recommended guided tour which users could follow if they chose and they could also deviate if they wished. In practice we found some of the user sessions (40%) contained no deviations from the recommended guided tour at all. However, on average, 7 deviations per session took place in the first assignment and 6 deviations per session in the second assignment. This suggests that users were using the hypertext browsing facility regularly in addition to following the guided tours.

6 Conclusions

Dynamically planning guided tours overcomes three problems with using hypertext in the following ways:

- *Getting lost:* Users don't need to worry about getting lost or confused in the hypertext as all they need to do is follow the tour which is generated in response to their query. If users want to digress and browse around the hypertext the option of returning to the tour at any time is always available.

- *Finding information:* When the user enters a search query in the form of a natural language statement it is matched to the nodes in the hypertext using standard information retrieval techniques. Unique hypertext characteristics such as connectivity and link types are also taken into account when determining which nodes should be included in the guided tour. By considering all characteristics of the hypertext we hope to incorporate the flexibility of browsing with the need to extract all relevant nodes.

- *Logical sequence of nodes:* When users are employing the hypertext as a learning aid it is important that there be a natural progression from the most basic information to the more complex so that the users do not become confused with the material. Our guided tours are planned so that the typed links between the nodes in the hypertext are considered in judiciously formulating the route. The most logical path through the network does not necessarily have to consist of nodes which are explicitly linked to one another but rather can be a combination of nodes selected from all parts of the hypertext. Selecting the nodes for inclusion is mainly an information retrieval task but planning the sequence of nodes depends on arranging the tour so that each node is positioned in the correct sequence relative to the other tour nodes.

User responses from nearly 1000 tours for 125 users have helped us refine our tour generation method. The present method generates a tour in response to a user's query irrespective of who the user is, their level of expertise or experience with the hypertext, and what he/she has seen already in the current or in previous sessions with

Google/YouTube Exhibit 1021/1121
Page 00183

the browser. The next step is to use this kind of information which is already stored in the log file to generate a user model and to use this to generate what we believe would be even more intelligently-planned dynamic guided tours. We are also considering ways of including relevance feedback during the tour traversal to dynamically re-compute a guided tour as has been done in [4]. We will also considerably expand the information coverage in the hypertext we use to allow us to involve an even larger population of end users.

References

[1] D. K. Barman, RelType: Relaxed Typing for Intelligent Hypermedia Representations, *Brown University Technical Report, CS–91–26,* April 1991.

[2] J.H. Coombs, Hypertext, Full Text, and Automatic Linking, *in: Proceedings of the 13th International Conference on Research and Development in Information Retrieval,* Brussels, Belgium, 83–98, 1990.

[3] M.D. Dunlop and C.J. van Rijsbergen, Hypermedia and Probabilistic Retrieval, *Proceedings of RIAO'91,* Barcelona, 337–356, 1991.

[4] M.E. Frisse and S.B. Cousins, Query by Browsing: An Alternative Hypertext Information Retrieval Method, *in: Proceedings of the 13th Annual Symposium on Computer Applications in Medical Care,* 388–391, Nov 1988.

[5] M.E. Frisse, Searching for Information in a Hypertext Medical Handbook, *Communications of the ACM, 31,* 881–886, 1988.

[6] R. Furuta and P.D. Stotts, Programmable Browsing Semantics in Trellis, *in: Proceedings of Hypertext '89,* Pittsburgh, 27– 42, 1989.

[7] S.H. Gray and D. Shasha, To Link or not to Link? Empirical Guidance for the Design of Nonlinear Text Systems, *Behavior Research Methods, Instruments & Computers, 21(2),* 326–333, 1989.

[8] N. Hammond and L. Allinson, The Travel Metaphor as Design Principle and Training Aid for Navigating around Complex Systems, *in: Proceedings of the 3rd Conference of the British Computer Society Human-Computer Interacion Specialist Group,* 75–90, 1987.

[9] C.C. Marshall and P.M. Irish, Guided Tours and On-Line Presentations: How Authors Make Existing Hypertext Intelligible for Readers, *in: Proceedings of Hypertext'89,* Pittsburgh, 1989.

[10] J Neilsen, Hypertext and Hypermedia, *Academic Press,* 1990.

[11] M.F. Porter, An Algorithm for Suffix Stripping, *PROGRAM, 14(3),* 130–137, 1980.

[12] G. Salton, Automatic Information Retrieval: The Transformation, Analysis and Retrieval of Information by Computer, *Addison– Wesley,* 1989.

[13] A. F. Smeaton, Prospects for Language-Based Information Retrieval, *Online Review, 15(6),* 373–382, 1992.

[14] M.A. Shepherd, C.R. Watters and Y. Cai, Transient Hypergraphs for Citation Networks, *Information Processing & Management, 26(3),* 395–412, 1990.

[15] R.H. Trigg, Guided Tours and Tabletops: Tools for Communicating in a Hypertext Environment, *ACM Transactions on Office Information Systems, 6(4),* 398–414, 1988.

[16] J.A. Waterworth and M.H. Chignell, A Model for Information Exploration, *Hypermedia, 3(1),* 35–58, 1991.

[17] P. Wright, Cognitive overheads and prostheses: some issues in evaluating hypertexts, *Proceedings of Hypertext '91,* San Antonio, 1991.

[18] P. Zellweger, Scripted Documents: A Hypermedia Path Mechanism, *Proceedings of Hypertext'89,* Pittsburgh, 1989.

Google/YouTube Exhibit 1021/1121
Page 00184

ATTACHMENT D-3

Screen Capture completed by J L Mullins from *WorldCat* on January 30, 2023

WorldCat®

Proceedings of the ACM Conference on Hypertext, Milano, Italy, November 30-December 4, 1992. Edited by D. Lucarella, J. Nanard, M. Nanard, P. Paolini

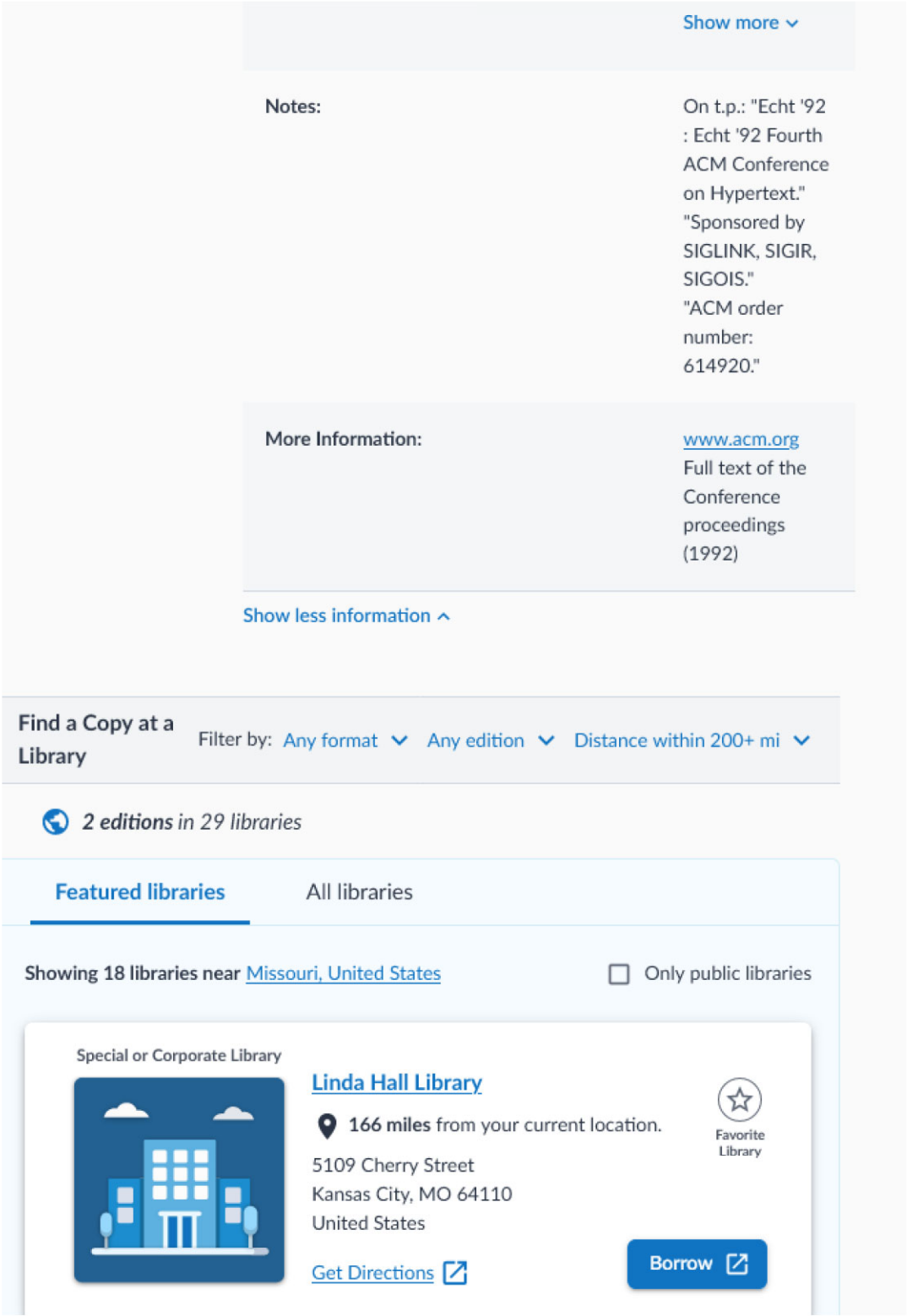
Show less

Authors: ACM Conference on Hypertext, Dario Lucarella, Association for Computing Machinery, SIGOIS (Group)

Print Book, English, ©1992
Edition: View all formats and editions
Publisher: Association for Computing Machinery, New York, N.Y., ©1992

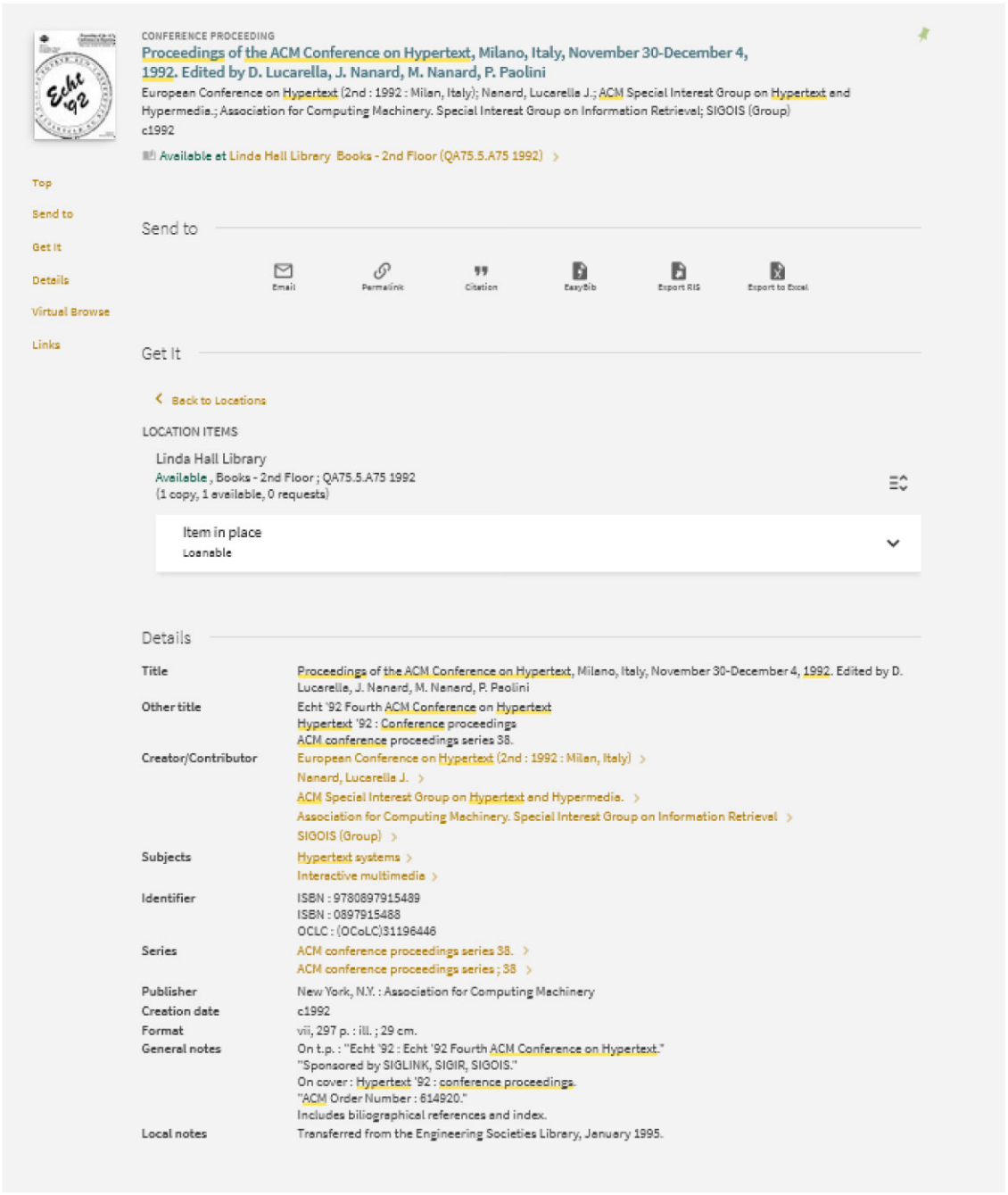
Genre:	Conference papers and proceedings
Physical Description:	vii, 297 pages : illustrations ; 29 cm
ISBN:	9780897915489, 9780897915472, 0897915488,... Show more
OCLC Number / Unique Identifier:	31196446
Subjects:	Conference papers and proceedings Hypertext systems... Show more

Screen Capture completed by J L Mullins from *WorldCat* on January 30, 2023



ATTACHMENT D-4

Screen capture completed by JL Mullins from Linda Hall Library OPAC on January 23, 2023



CONFERENCE PROCEEDING

Proceedings of the ACM Conference on Hypertext, Milano, Italy, November 30-December 4, 1992. Edited by D. Lucarella, J. Nanard, M. Nanard, P. Paolini

European Conference on Hypertext (2nd : 1992 : Milan, Italy); Nanard, Lucarella J.; ACM Special Interest Group on Hypertext and Hypermedia.; Association for Computing Machinery. Special Interest Group on Information Retrieval; SIGOIS (Group)

c1992

Available at Linda Hall Library Books - 2nd Floor (QA75.5.A75 1992) ›

Top
Send to
Get It
Details
Virtual Browse
Links

Send to

Email | Permalink | Citation | EasyBib | Export RIS | Export to Excel

Get It

‹ Back to Locations

LOCATION ITEMS

Linda Hall Library
Available , Books - 2nd Floor ; QA75.5.A75 1992
(1 copy, 1 available, 0 requests)

Item in place
Loanable

Details

Title	Proceedings of the ACM Conference on Hypertext, Milano, Italy, November 30-December 4, 1992. Edited by D. Lucarella, J. Nanard, M. Nanard, P. Paolini
Other title	Echt '92 Fourth ACM Conference on Hypertext Hypertext '92 : Conference proceedings ACM conference proceedings series 38.
Creator/Contributor	European Conference on Hypertext (2nd : 1992 : Milan, Italy) › Nanard, Lucarella J. › ACM Special Interest Group on Hypertext and Hypermedia. › Association for Computing Machinery. Special Interest Group on Information Retrieval › SIGOIS (Group) ›
Subjects	Hypertext systems › Interactive multimedia ›
Identifier	ISBN : 9780897915489 ISBN : 0897915488 OCLC : (OCoLC)31196446
Series	ACM conference proceedings series 38. › ACM conference proceedings series ; 38 ›
Publisher	New York, N.Y. : Association for Computing Machinery
Creation date	c1992
Format	vii, 297 p. : ill. ; 29 cm.
General notes	On t.p. : "Echt '92 : Echt '92 Fourth ACM Conference on Hypertext." "Sponsored by SIGLINK, SIGIR, SIGOIS." On cover : Hypertext '92 : conference proceedings. "ACM Order Number : 614920." Includes bibliographical references and index.
Local notes	Transferred from the Engineering Societies Library, January 1995.

ATTACHMENT E-1

MILLER
USING
COMPUSERVE
LIBRARY OF CONGRESS
0 005 442 373 1
FT MEADE
GenColl
QA 76
.57
.C65 M55
1994
COPY 2

SECOND EDITION

USING COMPUSERVE®

Get the Most from CompuServe's Services and Resources!

Save time and money—
learn what's available
on-line before you log on

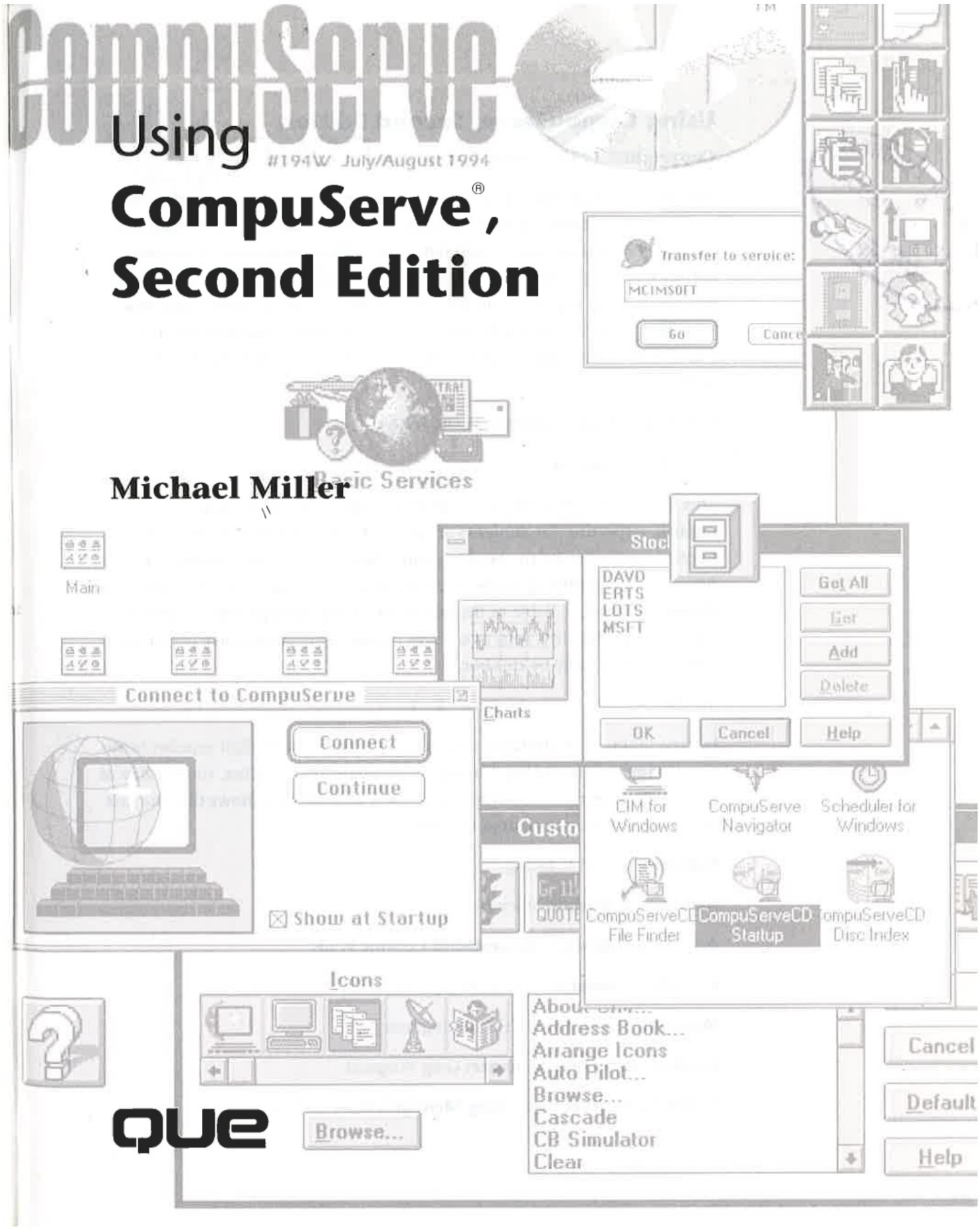
Discover how to use
new Internet services,
find information,
send E-mail, and more



que®

Over 30 Million Using *Books* Sold!

Google/YouTube Exhibit 1021/1121
Page 00192

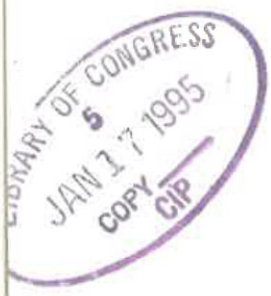


Using CompuServe®, Second Edition

Michael Miller

que

QA76
.57
.C65M55
1994
copy2



Using CompuServe, Second Edition

Copyright© 1994 by Que® Corporation

All rights reserved. Printed in the United States of America. No part of this book may be used or reproduced in any form or by any means, or stored in a database or retrieval system, without prior written permission of the publisher except in the case of brief quotations embodied in critical articles and reviews. Making copies of any part of this book for any purpose other than your own personal use is a violation of United States copyright laws. For information, address Que Corporation, 201 W. 103rd St., Indianapolis, IN 46290.

Library of Congress Catalog No.: 94-69589

ISBN: 0-7897-0079-4

This book is sold *as is*, without warranty of any kind, either express or implied, respecting the contents of this book, including but not limited to implied warranties for the book's quality, performance, merchantability, or fitness for any particular purpose. Neither Que Corporation nor its dealers or distributors shall be liable to the purchaser or any other person or entity with respect to any liability, loss, or damage caused or alleged to have been caused directly or indirectly by this book.

97 96 95 94 6 5 4 3 2 1

Interpretation of the printing code: the rightmost double-digit number is the year of the book's printing; the rightmost single-digit number, the number of the book's printing. For example, a printing code of 94-1 shows that the first printing of the book occurred in 1994.

Publisher: David P. Ewing

Associate Publisher: Stacy Hiquet

Associate Publisher—Operations: Corinne Walls

Publishing Director: Brad R. Koch

Managing Editor: Michael Cunningham

Product Marketing Manager: Greg Wiegand

Associate Product Marketing Manager: Stacy Collins

Contents

Introduction 1

What Is CompuServe? 1
Why Would You Use CompuServe? 1
Why Should You Read This Book? 2
What Will You Find in This Book? 2
Conventions Used in This Book 3

I Welcome to the On-line World: A Quick Tour of CompuServe 5

1 Getting Started: Setting Up a CompuServe Account 7

Are You Ready to Sign Up? 8
Joining CompuServe with the CompuServe Membership Kit 8
Installing the CompuServe Information Manager 9
Finding the Right Number 11
The Privileges and Costs of Membership 13
Get More from CompuServe with the Executive Option 16
Changing Your User Options 17
From Here... 18

2 Learning the Ropes: Basic CompuServe 19

How CompuServe Is Organized 20
Getting There with GO Commands 22
Finding Things You Can't Find 24
Changing Your Membership Information 25
Help! Help! Help! 26
From Here... 28

3 The Heart of CompuServe: Fun with Forums 29

What Is a Forum, Anyway? 30
A Short List of Popular Forums 30
Joining a Forum 32
Parts Is Parts: Forum Organization 34
Browsing through Forum Messages 35
Searching for Specific Messages 37
Replying to Messages 38
Creating New Messages 40

Finding Forum Files 41
Conversing in a Forum Conference 43
Proper Conference Conduct 45
From Here... 46

4 Beyond the Basics: Even More Things You Can Do with CompuServe 47

Sending Non-Snail Mail 48
Reading All the News That's Fit to Print 49
Taking Stock of the Situation 52
Browsing the Stacks of the Electronic Library 53
Making Travel Reservations 54
Shopping Till You Drop in the Electronic Mall 55
Venturing onto the On Ramp of the Information Superhighway 56
From Here... 58

II Getting Around: CompuServe's Basic Software Tools 59

5 The Windows Connection: CompuServe Information Manager for Windows 61

Getting the Latest and Greatest Version of WinCIM 62
The Grand Tour of WinCIM 68
Customizing Your Desktop Ribbon 70
Making the Connection 70
Browsing Through Essential Services 71
Clicking Your Way to CompuServe with the Desktop Ribbon 73
Doing the E-Mail Thing 76
Calling It Quits 79
From Here... 79

6 The DOS Connection: CompuServe Information Manager for DOS 81

Getting the Latest and Greatest Version of DOSCIM 82
The Grand Tour of DOSCIM 86
Making the Connection 87
Browsing Through Essential Services 88
How to Get Going 89
Finding What You Can't Find 90
Your Favorite Places 90

Google/YouTube Exhibit 1021/1121
Page 00196

Doing the E-Mail Thing 91
Calling it Quits 93
From Here... 94

7 The Mac Connection: CompuServe Information Manager for the Macintosh 95

Getting the Latest and Greatest Version of MacCIM 96
The Grand Tour of MacCIM 99
Making the Connection 101
Connecting to CompuServe for the First Time 101
Browse Through Essential Services 102
How to Get Going 104
Find What You Can't Find 104
Your Favorite Places 105
Doing the E-Mail Thing 107
Calling It Quits 109
From Here... 109

III Getting Around for Less Money: CompuServe's Other Navigational Tools 111

8 CompuServe on a Silver Platter: CompuServeCD 113

Do You Have the Right Stuff? 114
Let's Get Spinning: Obtaining and Installing CompuServeCD 115
Playing CompuServeCD 115
Between the Grooves: What's on CompuServeCD 117
Cutting CompuServe Access Time with File Finder 121
Searching for Files on CompuServeCD 124
Searching for CompuServe Services with the CompuServe Directory 125
From Here... 126

9 Making Your Sessions Automatic with CompuServe Navigator 127

What Is Navigator? 128
Getting Your Own Copy of Navigator—and Getting It to Work! 130
Launching and Exploring Navigator 131
Creating a Navigator Script 133
Going On-line with Navigator 138
Putting Navigator on a Daily Schedule 142
From Here... 144

Google/YouTube Exhibit 1021/1121
Page 00197

10 Other Ways to Make Your Sessions Automatic 145

A Little Background Info on Autopilot Programs 146
Which Autopilot Should You Use? 147
The Best Autopilot Program for Windows: NavCIS for Windows 148
Another Good Windows Program: GoCIS for Windows 149
An Old DOS Friend in Windows Clothing: OzCIS for Windows 150
The Best Autopilot Program for DOS: NavCIS for DOS 152
The DOS Standard: TAPCIS for DOS 153
A Better Old Program than the Standard: OzCIS for DOS 153
Some More Autopilot Programs 154
From Here... 155

IV Playing Postman with CompuServe's Electronic Mail 157

11 Pushing the Virtual Envelope: Sending and Receiving E-Mail 159

A Little Background on CompuServe Mail 160
Dissecting an E-Mail Message 162
Using WinCIM to Send and Receive E-Mail 163
Using CSNav to Send and Receive E-Mail 167
Sending Files via E-Mail 168
From Here... 169

12 Beyond CompuServe: E-Mailing Other On-line Services 171

Sending Mail Through Other Networks 172
Sending Mail to Other On-line Services 173
Sending and Receiving Mail via the Internet 174
Sending Mail in Other Formats 176
From Here... 178

13 Minding Your Manners: E-Mail Etiquette 179

Is This a Formal Affair? 180
Showing a Little Emotion in Your Correspondence 181
Putting Out the Flames 183
Putting Your Own Personal Signature on Your Messages 183
Getting Quoted in a Reply 184
From Here... 185

Google/YouTube Exhibit 1021/1121
Page 00198

V Surfing the Internet from CompuServe 187

14 Just What Is This Internet Thing? 189

What the Internet Is 190
What the Internet *Isn't* 190
Things You Can Do on the Net 191
Should You Connect to the Internet? 192
Interfacing to the Internet via CompuServe 193
From Here... 196

15 E-Mailing from CompuServe to the Internet 197

Understanding Internet Addresses 198
Sending E-Mail to Someone on the Net 199
E-Mailing *from* the Internet *to* CompuServe 200
Definitely Not Junk Mail: Internet Mailing Lists 202
From Here... 207

16 Forums on the Internet: USENET Newsgroups 209

What Is USENET? 210
If You Like Forums, You'll Love Newsgroups! 210
The Different Kinds of Newsgroups 212
The Internet Connection: Accessing USENET Newsgroups from CompuServe 214
From Here... 222

17 Files on the Internet: Using FTP 223

FTP: The Internet File Grabber 223
Using CompuServe's FTP Service 224
Miller's Recommended FTP Sites 232
From Here... 233

18 Other Internet Services: Now and in the Future 235

Operate Somebody Else's Computer with Telnet 235
Dig for Files with Gopher 236
The Future of the Internet—World Wide Web 238
Other Possible Internet Services from CompuServe 240
From Here... 242

VI CompuServe on the Road 243

19 Hooking Up from a Different Place 245

Preparing for a Trip 245
The Alien Connection: Using CompuServe in a Different Country 247
From Here... 251

20 Tips from an Old Road Warrior 253

Tip #1: Get the Number before You Leave ... 254
Tip #2: Pack a Toolkit to Make Your Connections ... 255
Tip #3: Pick the Right Hotel ... 256
Tip #4: Find the Number When You Get There ... 257
Tip #5: Connect to CompuServe via Cellular Modem ... 258
Tip #6: When You Can't Connect, Print and Fax ... 258
Tip #7: When All Else Fails, Leave Your Hotel to Connect ... 258
Tip #8: When You Can't Print, Send Yourself a Fax ... 259
Tip #9: Save Fax Charges with CompuServe ... 259
Tip #10: Use CompuServe to Check Weather and Flight Information ... 260
From Here... ... 262

VII Twenty Useful (and Fun!) Things to Do on CompuServe 263

21 Read Today's News, Sports, and Weather 265

Nothing Fancy: CompuServe's Plain-Vanilla News and Sports ... 265
Digging Deeper: More In-Depth News ... 269
How's the Weather? ... 274
From Here... ... 276

22 Get Help in Running a Small Business 277

Network with Other Business People in CompuServe Forums ... 277
Get Small Business Help from On-line Databases ... 280
From Here... ... 283

23 Manage Your Stock Portfolio 285

Get the Latest Quotes ... 285
Learn from History ... 291
Make Your Investments On-line ... 297
From Here... ... 297

24 Research Company Information 299

General News and Information ... 299
Information and Advice for Investors ... 302
Detailed Information for Mergers and Acquisitions ... 307
Information on International Companies ... 309
From Here... ... 310

Google/YouTube Exhibit 1021/1121
Page 00200

25 Look Up Important Facts 311

What to Look Up 311
Where to Look It Up 312
How to Look It Up 319
From Here... 324

26 Find a Lost Phone Number 325

Finding Personal Phone Numbers 325
Use CompuServe's Electronic Yellow Pages for Business Numbers 328
From Here... 330

27 Get Help with Your Computer Hardware and Software 331

What Can You Find on a Company Forum? 332
Checking Out Other Official Company Forums 337
Checking Out Other Useful Forums 340
From Here... 342

28 Get the Latest Entertainment News—and Chat About Your Faves 343

Entertainment Tonight (and This Morning, and This Afternoon) with CompuServe Entertainment News 344
Meet Other Fans on CompuServe Entertainment Forums 350
Direct from the Studios to You: Entertainment Drive 359
Thumbs Up with Roger Ebert's Movie Reviews 360
The Ultimate Movie Database: Magill's Study of Cinema 361
The Ultimate Music Database: All-Music Guide 362
The Ultimate Book Database: Books in Print 364
From Here... 365

29 Experience an On-line Magazine 367

What Exactly Is an On-line Magazine? 367
What Magazine Resources Are Available on CompuServe? 368
A Tour of *PC World* Online 369
From Here... 373

30 Find Others Who Share Your Special Interests 375

Getting Artsy: Art, Music, and Literature Forums 375
Getting Off Your Hobby Horse: Hobbyist Forums 378
Be a Good Sport: Sports Forums 381
From Here... 383

Google/YouTube Exhibit 1021/1121
Page 00201

31 Play a Game 385

Play Against CompuServe 385
Play Against Other CompuServers 390
From Here... 392

32 Talk with the White House 393

Speaking Your Mind on the White House Forum 393
Searching for Important White House Documents 395
Sending Mail to the White House 396
From Here... 398

33 Share Your Opinions on Important Issues 399

Rush to Debate the Issues on the Issues Forum 399
Solve All the World's Problems on the Global Crisis Forum 401
Make Strange Bedfellows on the Political Debate Forum 402
Declare Your Party Allegiances on the Democratic and Republican Forums 403
From Here... 403

34 Talk with Some On-line Friends 405

Hey, Good Buddy—All About CompuServe's CB Simulator 405
Using CB Simulator 409
From Here... 412

35 Download Some Neat New Software 413

Where to Find Good Software 414
Tracking Down Files with the PC File Finder 416
Searching Forum Libraries and Downloading Files 419
From Here... 421

36 Find a Pretty Picture 423

Get the Picture with CompuServe's Graphics Forums 423
Finding Graphics Files with the Graphics File Finder 433
Other Forums for Graphics Lovers 435
From Here... 437

37 Plan for Your Next Trip 439

Before You Go, Do Your Research 439
Booking Your Travel, with Reservations 442
From Here... 449

Google/YouTube Exhibit 1021/1121
Page 00202

38 Go Shopping **451**

Hitting the Mall 451
Shop Without Buying Anything 455
Get a Shopper's Advantage 455
Visit a Virtual New Car Showroom 456
Get New Software NOW! 461
Order CompuServe Stuff 461
Before You Buy, Check It Out First in *Consumer Reports* 462
From Here... 464

39 Place a Classified Ad **465**

Browse the Classified Ads 465
Place Your Own Ad 467
Look for a Job via CompuServe 468
From Here... 469

40 Talk to Us at Que **471**

About Macmillan Computer Publishing 471
And What Is the MCP Forum? 472
A Variety of Message Sections 473
Cool Stuff in Our Libraries 476
From Here... 477

Index **479**

Google/YouTube Exhibit 1021/1121
Page 00203

SECOND EDITION

USING COMPUSERVE®

Includes a Free Introductory Membership

Make the most of CompuServe's Information Manager!



Discover expert tips and techniques for using CompuServe's many services!

CompuServe is bigger and more popular than ever, and this is the most up-to-date guide to exploring this exciting electronic community!

This book shows you how to save time and money—you learn the best ways of doing things on-line before you log on. Discover how to get started with CompuServe software tools and new Internet services. Learn step by step how to use CompuServe for all it's worth—you can get up-to-date news, find information, download software, chat with other members, go shopping, get computer assistance, and much more!

Maximize your time on-line with Using CompuServe *from Que!*

- Save money by exploring what's on-line before going on-line
- Learn what CompuServe has to offer in entertainment, computing, news, business, travel, and more
- Discover how to take advantage of new Internet services such as USENET newsgroups and FTP file transfers

Category: Communications/On-Line
User Level: Beginning-Intermediate
Covers: CompuServe Information Manager for DOS, Windows & Macintosh

$19.99 USA / $26.99 CAN / £18.49 Net UK

ISBN 0-7897-0079-4

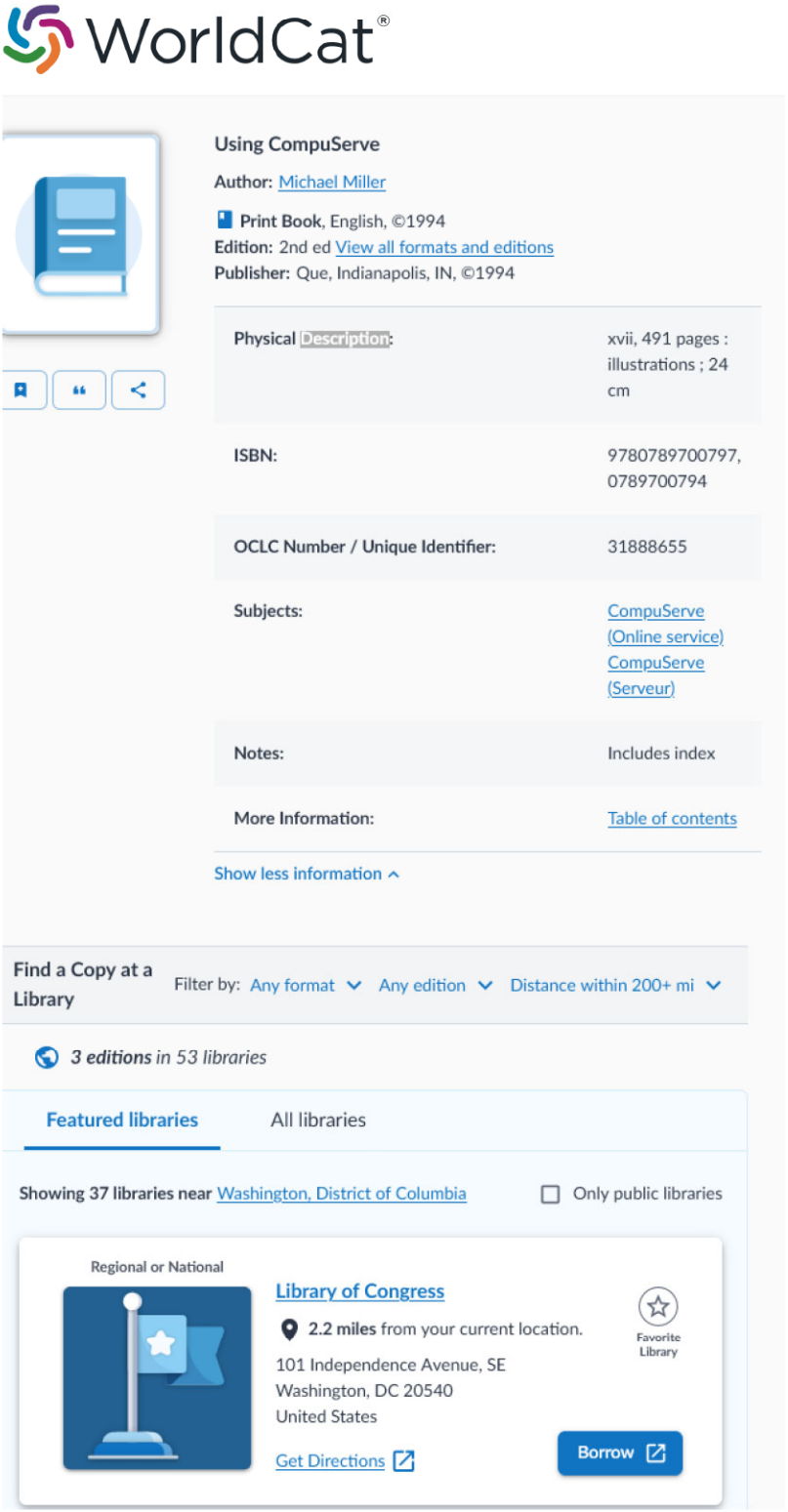
9 780789 700797 90000

que®

Google/YouTube Exhibit 1021/1121
Page 00204

ATTACHMENT E-2

Screen capture completed by JL Mullins from *WorldCat* on January 28, 2023



ATTACHMENT E-3

LIBRARY | CATALOG

Search Navigation ▾ < 4 of 5 >

BOOK

Using CompuServe

Full Record MARC Tags

Personal name

Miller, Michael, 1958-

Main title

Using CompuServe / Michael Miller.

Edition

2nd ed.

Published/Created

Indianapolis, IN : Que, c1994.

Request this Item | LC Find It

More Information

LCCN Permalink	https://lccn.loc.gov/94069589
Description	xvii, 491 p. : ill. ; 24 cm.
ISBN	0789700794 :
LC classification	QA76.57.C65 M55 1994

Google/YouTube Exhibit 1021/1121
Page 00208

LC Subjects	CompuServe (Online service)
Browse by shelf order	QA76.57.C65
Notes	Includes index.
LCCN	94069589
Dewey class no.	025.04
Type of material	Book

Item Availability

CALL NUMBER	QA76.57.C65 M55 1994 FT MEADE Copy 1
Request in	Jefferson or Adams Building Reading Rooms - STORED OFFSITE
Status	Not Charged

CALL NUMBER	QA76.57.C65 M55 1994 FT MEADE Copy 2
Request in	Jefferson or Adams Building Reading Rooms - STORED OFFSITE
Status	Not Charged

Google/YouTube Exhibit 1021/1121
Page 00209

ATTACHMENT E-4

LIBRARY | CATALOG

Search Navigation ▾ < 4 of 5 >

BOOK

Using CompuServe

Full Record **MARC Tags**

000		00979cam a2200289 a 4500
001		2071936
005		19951024145336.3
008		950410s1994 inua 001 0 eng
035	__	**|9** (DLC) 94069589
906	__	**|a** 7 **|b** cbc **|c** orignew **|d** 2 **|e** opcn **|f** 19 **|g** y-gencatlg
955	__	**|a** pb18 04-10-95 to cat.;jf00 04-12-95; jf11 to sl 04-21-95;jf12 05-09-95
010	__	**|a** 94069589
020	__	**|a** 0789700794 : **|c** $19.99 ($26.99 Can.)
040	__	**|a** DLC **|c** DLC **|d** DLC
050	00	**|a** QA76.57.C65 **|b** M55 1994
082	00	**|a** 025.04 **|2** 20
100	1_	**|a** Miller, Michael, **|d** 1958-
245	10	**|a** Using CompuServe / **|c** Michael Miller.
250	__	**|a** 2nd ed.
260	__	**|a** Indianapolis, IN : **|b** Que, **|c** c1994.
300	__	**|a** xvii, 491 p. : **|b** ill. ; **|c** 24 cm.
500	__	**|a** Includes index.
650	_0	**|a** CompuServe (Online service)
920	__	**|a** ** LC HAS REQ'D # OF SHELF COPIES **
922	__	**|a** co
991	__	**|b** c-GenColl **|h** QA76.57.C65 **|i** M55 1994 **|t** Copy 1 **|w** BOOKS
991	__	**|b** c-GenColl **|h** QA76.57.C65 **|i** M55 1994 **|p** 00054423731 **|t** Copy 2 **|w** CCF

Google/YouTube Exhibit 1021/1121
Page 00211

Request this Item | LC Find It

Item Availability

CALL NUMBER	QA76.57.C65 M55 1994 FT MEADE Copy 1
Request in	Jefferson or Adams Building Reading Rooms - STORED OFFSITE
Status	Not Charged

CALL NUMBER	QA76.57.C65 M55 1994 FT MEADE Copy 2
Request in	Jefferson or Adams Building Reading Rooms - STORED OFFSITE
Status	Not Charged

Google/YouTube Exhibit 1021/1121
Page 00212

ATTACHMENT F-1

USING
UNIX
SPECIAL
EDITION

FT MEADE
GenColl

QA 76
.76
.U63 U74
1994

LIBRARY OF CONGRESS
0 003 464 531 0

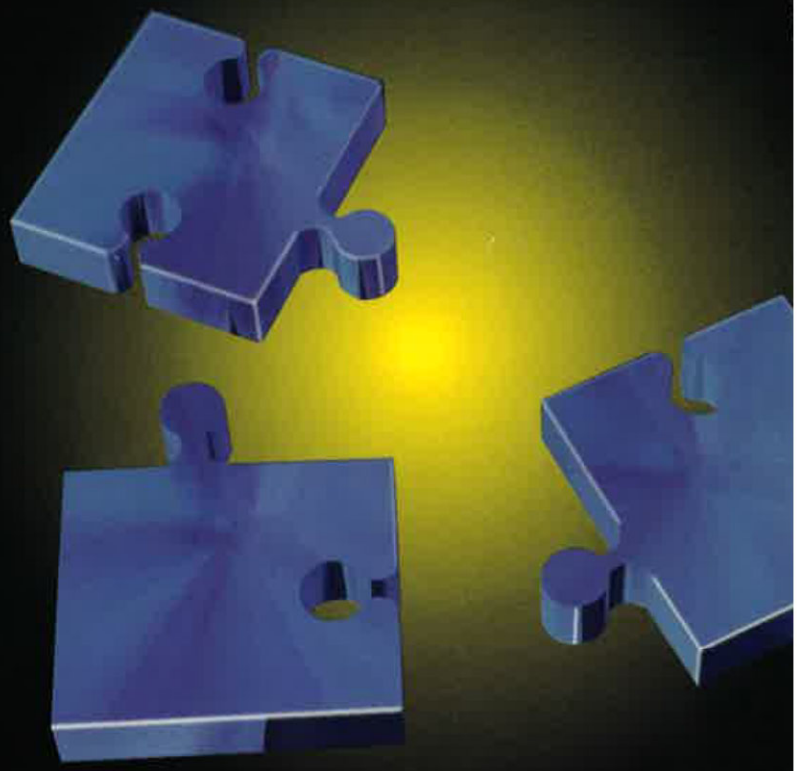
SPECIAL EDITION

USING UNIX®

The Most Comprehensive Reference to UNIX System Management!

Learn expert tips on every essential UNIX topic, from files and shells to multiuser systems

Integrate UNIX into a NetWare® environment, master client/server systems, and access the Internet



Over 30 Million Using *Books Sold!*

que®

Google/YouTube Exhibit 1021/1121
Page 00215

Using UNIX, Special Edition

Ernest Ackermann
Steve Glines
Ralph Roberts
Peter Kuo
Eddie Kee
Frank de Monbrun
George Mayleben
Marvin Tanner
Kamran Husain
Ben Hunsberger

With Contributing Authors:

Keith Blanton
Mary Ann Pike
William A. Tolhurst

Technical Edit By:

Larry Schumer
Chris Negus

LIBRARY OF CONGRESS
JUL 18 1994
COPYRIGHT OFFICE
COPY

QUE

Google/YouTube Exhibit 1021/1121
Page 00216

QA76
.76
.O63U74
1994

Using UNIX, Special Edition

Copyright© 1994 by Que® Corporation

All rights reserved. Printed in the United States of America. No part of this book may be used or reproduced in any form or by any means, or stored in a database or retrieval system, without prior written permission of the publisher except in the case of brief quotations embodied in critical articles and reviews. Making copies of any part of this book for any purpose other than your own personal use is a violation of United States copyright laws. For information, address Que Corporation, 201 W. 103rd Street, Indianapolis, IN 46290.

Library of Congress Catalog No.: 94-65890

ISBN: 1-56529-619-2

This book is sold *as is*, without warranty of any kind, either express or implied, respecting the contents of this book, including but not limited to implied warranties for the book's quality, performance, merchantability, or fitness for any particular purpose. Neither Que Corporation nor its dealers or distributors shall be liable to the purchaser or any other person or entity with respect to any liability, loss, or damage caused or alleged to be caused directly or indirectly by this book.

97 96 95 94 5 4 3 2 1

Interpretation of the printing code: the rightmost double-digit number is the year of the book's printing; the rightmost single-digit number, the number of the book's printing. For example, a printing code of 94-1 shows that the first printing of the book occurred in 1994.

Publisher: David P. Ewing

Associate Publisher: Michael Miller

Publishing Director: Joseph B. Wikert

Managing Editor: Michael Cunningham

Product Marketing Manager: Ray Robinson

Contents

Introduction 1

Who Should Use This Book? 2
How To Use This Book 3
Conventions Used in This Book 6

I Introduction to UNIX 9

1 What Is UNIX? 11

Why Use UNIX? 11
UNIX Versions Covered in This Book 12
USL UNIX SVR4.2 12
Flexible GUI 13
An Overview of UNIX Features 14
Multitasking 14
Multiprocessing 16
Multiuser 16
Programmable Shells 17
Device Independence 18
Communications and Networking 19
Open Systems Portability 20
A Brief History of UNIX 20
AT&T 21
BSD 21
USL 21
Standard Versions of UNIX 22
Summary 23

II Installing UNIX 25

2 Hardware Issues 27

Key Terms Used in This Chapter 28
Understanding System Hardware 31
The CPU 31
Memory 33
Controller Cards 34
Understanding Peripheral Hardware 35
Disk Drives 36
Tape Drives 39
CD-ROMs and Optical Drives 40

Terminals 41
Printers 42
Modems 44
The Mouse 44
Choosing the Right Level of Hardware 45
PCs (CISC) 47
Workstations (RISC) 49
Summary 49

3 Software Issues **51**

An Introduction to Software 51
Key Terms Used in This Chapter 53
Understanding System Software 54
Operating System Software 55
Utilities 56
Understanding Development Software 58
Compilers 58
Source Code Control System (SCCS) 60
The *make* Program 61
Understanding Application Software 62
Word Processing 63
Accounting 64
Order Entry 64
Inventory Control 65
Machine Control 65
Database Management 65
Spreadsheets 66
CAD/CAM 66
Putting It All Together 67
Summary 67

4 Single-User Installations **69**

Key Terms Used in This Chapter 70
Understanding the Single-User Concept 70
Multiuser versus Multitasking 71
UNIX on Personal Computers 73
RISC Workstations 74
Using the Single-User Installation Concept 75
Multiscreens and Additional Terminals 75
GUIs 77
Summary 78

III Controlling UNIX **79**

5 Manipulating the GUI **81**

Starting the GUI 82
Understanding the X Windows System 82

Selecting OPEN LOOK or Motif 83
Comparing Motif and OPEN LOOK 85
Starting the GUI Manually 89
Operating the Mouse 90
Mouse Types 90
Mouse Buttons 90
Mouse Functions 91
Mouse Attributes 93
Changing the Window with the Mouse 94
Using the Keyboard 95
Handling Windows 95
Working within a Window 96
Requesting Mouse Functions from the Keyboard 97
Changing Screen Resolution 98
Controlling Your Desktop 99
Changing the Backdrop and Colors 100
Changing the GUI Appearance 103
Changing GUI Resources 105
Automatic Application Startup 106
Using the GUI Tools 107
Using the Clock 107
Using the Calculator 109
Using the Terminal Window 109
Summary 113

6 Using the UNIX Command Environment 115

Understanding UNIX Command Processing 116
Shells 117
The Environment 117
Understanding the UNIX Process 124
Understanding UNIX Command Parsing 125
Commands, Flags, and Parameters 125
Filename Generation 127
Shell Variable Substitution 128
Command Substitution 129
Command Groups, Subshells, and Other Commands 130
Background Processing 131
Understanding Command Feedback 134
Summary 135

7 Understanding UNIX File and Directory Systems 137

Understanding Filenames 137
Looking at Types of Files 139
Ordinary Files 139
Directory Files 140
Links 140
Special Files 142
File Permissions 142

Looking at UNIX Standard Directories 147
Classic UNIX Directories 148
UNIX System V Release 4 and UnixWare Directories 150
Summary 150

8 Managing Files and Directories 151

Listing Files 151
Organizing Files 154
Copying Files 155
Moving and Renaming Files 156
Removing Files or Directories 156
Viewing the Contents of a File 158
Using *cat* To View a File 158
Using *more* To View a File 159
Using *pg* To View a File 159
Viewing Files in Other Forms 160
Searching for Files 161
Changing File Time and Date Stamps 163
Compressing Files 164
Manipulating Files with the GUI 165
Listing Files with the GUI 166
Organizing Files with the GUI 167
Copying Files in the GUI 168
Moving and Renaming Files in the GUI 168
Removing Files and Folders 168
Viewing the Contents of Files in the GUI 169
Summary 169

9 Printing 171

Sending a File to a Printer 171
Printing Files in the LP System 172
Checking Printer Status 176
Canceling a Print Job 178
Printing from the GUI 180
Summary 182

IV Working with UNIX Command-Line Tools 183

10 Understanding UNIX Shells 185

Examining UNIX Shells 186
Redirecting Input and Output 186
Completing Filenames with Wild Cards 188
Connecting Processes with Pipes 190
Arranging for Processes To Run in the Background 191

Google/YouTube Exhibit 1021/1121
Page 00221

Looking at Different Shells 191
Which Shells Are Available? 194
Working with UNIX Shells 195
Creating a Shell Script 196
Using *echo* 197
Using Comments 198
Writing Programs with the Shell 199
Programming with Control 206
Customizing UNIX Shells 213
Exporting Variables to the New Shell 213
Defining Command Aliases 215
Summary 216

11 Managing Multiple Processes 217

Understanding Multitasking 218
Initiating Multiple Processes 219
Starting Multiple Processes 220
Starting a Background Process 220
Using Pipes To Start Multiple Processes 221
Using the Scheduling Commands 222
Running Commands at Specified Times with *at* 222
Running Long Tasks with *batch* 224
Scheduling Commands with *cron* and *crontab* 225
Reporting on and Monitoring the Multitasking Environment 229
Finding Out Who Is On the System with *who* 230
Reporting on the Status of Processes with *ps* 232
Controlling Multiple Processes 235
Using *nohup* with Background Processes 235
Scheduling the Priority of Commands with *nice* 236
Scheduling the Priority of Running Processes with *renice* 237
Terminating Processes with *kill* 238
Managing Processes in the GUI 241
Summary 242

12 Using the *vi* Editor 245

Introducing *vi* 246
What is *vi*? 246
Understanding the Editing Process 247
Using *vi* 249
Looking at *vi*'s Two Modes 250
Creating Your First *vi* File 250
Starting *vi* by Using an Existing File 252
Exiting from *vi* 253
Undoing a Command 255
Writing Files and Saving the Buffer 256
Positioning the Cursor 258

Google/YouTube Exhibit 1021/1121
Page 00222

Adding Text 262
Deleting Text 265
Changing and Replacing Text 266
Searching 268
Copying, Cutting, and Pasting 269
Repeating Commands 270
Setting the *vi* Environment 271
Using *set* To See and Set Options 272
Setting the *showmode* Option 273
Setting Toggle Options 274
Changing Options for Every *vi* Session 274
A Survey of Other Editors 274
Looking at UnixWare's Text Editor 275
Looking at *emacs* 276
Looking at *joe* 277
Looking at *pico* 277
Summary 278

13 Working with E-Mail **279**

Understanding E-Mail 280
Sending E-Mail 282
Writing a Message while Sending E-Mail 283
Canceling a Message 284
Sending a Prepared Message 285
Sending the Result of a Command or Program by E-Mail 286
Reading Your Mail 287
Using *mail* To Read Mail 287
Using *mailx* To Read Mail 287
Reading E-mail from Other Files 290
Sending Mail while Reading 290
Printing Mail Messages 291
Quitting the Mail Program 291
Quitting and Saving Changes 291
Quitting and Not Saving Changes 292
Getting Help 293
Getting Help with *mail* 293
Getting Help with *mailx* 293
Filing and Saving Mail Messages 295
Saving Files with *mail* 296
Saving Files with *mailx* 296
Deleting Mail Messages 297
Deleting Messages with *mail* 297
Deleting and Undeleting Messages with *mailx* 297
Replying to Mail 298
Replying to Mail with *mailx* 299
Routing Mail to Others with *mailx* 300
Forwarding Messages 300

Sending a Copy with *mailx* 301
Using Aliases and Mailing Lists 303
Customizing Your *mailx* Environment 304
Using UnixWare's Mail Utility 306
Using the Manager Window 307
Using the Reader Window 307
Using the Sender Window 308
Using the Alias Manager Window 309
Summary 309

14 Using UNIX Remote Communications 311

Looking at Kinds of Networks 311
Using UUCP 312
Understanding UUCP 313
Finding Site Names 315
Using UUCP To Send Mail 316
Sending and Receiving Files with *uuto* and *uupick* 317
Using *uucp* To Transfer Files 319
Using *uustat* 324
Connecting to Other Systems Using *cu* 325
Using *rcp* for Remote Copying on the LAN 327
Copying a File from Your System with *rcp* 329
Copying Several Files from Your System with *rcp* 330
Copying Files from Another System to Your System with *rcp* 330
Copying Files from One Network System to Another Network System with *rcp* 331
Using Options with *rcp* 331
Logging in to Remote Systems with *rlogin* 332
Logging In and Logging Out with *rlogin* 332
Using a Different Login Name with *rlogin* 333
Executing Commands on Other Systems with *rsh* 333
Using *rsh* To Execute Multiple Commands 334
Using *rsh* with Pipes and I/O Redirection 334
Using Remote Communications from the GUI 335
Summary 337

V Using the Internet 339

15 Understanding the Structure of the Internet 341

A Dynamic Organization of Computers 341
The Name Structure 343
Labels 344
Subdomain Field 356
User or Account Field 358

Google/YouTube Exhibit 1021/1121
Page 00224

IP Address 359
Aliases 362
The Data Storage Structure 363
File Structure 363
File Ownership and Access 364
An Overview of DNS Operation 366
Name Server 366
Resolver 367
Master Files 367
Zones 368
Host Registration 368
Finding and Verifying a Registered Host 369
Online Domain Information 372
The Flow of Information from Host to Host 372
Jumping across Network Boundaries 372
Layers of Software 374
Sharing the Interconnection Space 375
The Host Administrator 376
Establishing or Reconfiguring Accounts 376
Controlling Service Access 376
Handling Trouble 377
Summary 377

16 Finding and Using Internet Resources 379

Organizations that Set Internet Standards and Policies 380
The Internet Society (ISOC) 381
Internet Architecture Board (IAB) 382
Internet Engineering Task Force (IETF) 383
Online Internet Documentation 384
RFC: Request For Comments Series 385
FYI: For Your Information Series 386
STD: Standards Series 387
IMR: Internet Monthly Reports 388
I-D: Internet Drafts 388
Major Internet Nodes You Can Access 389
Defense Data Network Network Information Center (DDN NIC) 390
SRI, International Network Information Systems Center (SRI NISC) 390
Merit Network, Inc. Network Information Center (Merit NIC) 390
SURAnet Network Information Center (SURAnet NIC) 391
InterNIC Directory and Database Services 391
Corporation for National Research Initiatives (CNRI) 391
Mac Internet Tour Guide Visitors Center 392

Computer-Based Tutorials for Using the Internet 392
Merit's Cruise of the Internet 392
NNSC's Internet Tour 393
Several Books and Periodicals of Special Interest 394
The Whole Internet User's Guide & Catalog 394
Internet: Getting Started 395
Connecting to the Internet 395
The Internet Companion 395
The Matrix 396
TCP/IP Network Administration 396
Using UUCP and Usenet 397
!%@:: A Directory of Electronic Mail Addressing and Networks 397
The Mac Internet Tour Guide 397
Internet World Magazine 398
Internet Society News Newsletter 398
CD-ROMs Useful to Internet Users 398
Atlantis Internet CD-ROM 399
SRI International Internet CD-ROM 400
InfoMagic Internet CD-ROMs 401
Summary 402

17 Using Internet E-Mail 403

What Is E-Mail? 403
The Format of an E-Mail Message 404
Destination Header Lines 405
Originator Header Lines 406
Other Mandatory Headers 407
Optional Mail Headers 408
Addressing E-Mail Messages 408
User and Host Names 408
How To Find the E-Mail Address for a User 410
Direct Contact 411
The *whois* Databases 412
USENET Addresses Server 413
Looking Up Addresses at Colleges and Universities 414
Other Tools and Techniques for Finding Addresses 415
Determining the Host Address 416
Getting Access to Electronic Mail 417
Public Access Sites 417
Off-Line Mail Readers 419
Setting up a Local Mail System 420
Integrating with Existing Networks 421
Examples of Different Mail Systems 423
Examples of the Pine Mail System 423
Examples of the MH System 425
Examples of the WinNET Mail System 426

Using Electronic Mail 428
Mailing Lists 428
Moderated Mailing Lists 429
Mailing List Digests 430
Finding Mailing Lists 430
Mailing List Etiquette 430
Sending Non-Text Data 431
Multimedia Electronic Mail 432
Retrieving Files Using Electronic Mail 433
Other Services by Electronic Mail 434
Common Problems with Electronic Mail 435
Mail Addressing Problems 436
Mail Configuration Problems 438
Unwanted Mail Messages 438
Mail Security Issues 439
Forging of Mail Messages 440
Mail Message Authentication and Privacy 441
Summary 442

18 Using *ftp* and *telnet* with the Internet 443

Using ftp To Access Files of Remote Network Computers 444
Anonymous ftp 446
A Sample ftp Session 447
Summary of ftp Commands 450
Starting an ftp Session 451
Getting Help on ftp Commands 451
Establishing and Terminating an ftp Connection 452
Changing Directories and Examining Their Contents 453
Getting Files from a Remote Computer 454
Putting Files on a Remote Computer 456
Selecting the File Transfer Mode 457
Deleting Files on a Remote Computer 458
Getting Status Information 458
Executing Commands on the Local Computer in an ftp Session 460
Non-Interactive ftp through E-Mail 460
Capabilities and Limitations of ftpmail 461
A Sample ftpmail Request 462
Summary of ftpmail Commands 463
Typical Problems Encountered with ftp 465
Logging in to Remote Network Computers Using *telnet* 467
Summary of *telnet* Commands 469
Starting a *telnet* Session 470
Establishing a Connection with a Remote Computer 471
Ending a *telnet* Session 471
Exiting *telnet* 471
Suspending *telnet* 471

Obtaining Help on Using *telnet* Commands 472
Selecting Character or Line Mode 472
Showing the Current Status of a *telnet* Session 472
Sending One or More Special Character Sequences to the Remote Host 472
Showing the Settings of One or More *telnet* Variables 472
Setting the Value of a *telnet* Variable 473
Unsetting the Value of a *telnet* Variable 473
Toggling the Value of a *telnet* Variable 473
Summary 474

19 Using USENET 475

What Is the Network News? 475
The Structure of Netnews 476
News Group Organization 476
Contributing to a News Group 477
News Distributions 478
The Process of Reading and Posting News 480
Subscribing to News Groups 480
Reading News Articles 480
Posting a Follow-Up Article 481
Replying to an Article with E-mail 481
Posting an Original Article 482
The Culture of USENET 484
The Culture of a Particular News Group 486
Problems with News Group Discussions 488
Netiquette 488
Expressing Emotions without Visual Cues 490
Using Abbreviations in Your Articles 491
Dealing with Problem Users 491
How Do You Access USENET? 492
Examples of News Readers 492
Common News Reader Features 492
Expiring Articles 492
The rn News Reader 493
The tin News Reader 495
The WinNET Mail News Reader 496
The PSILink News Reader 498
A Brief History of Netnews 500
News Transport Systems 500
News Reader Systems 502
News Group Creation 502
How To Receive Netnews 505
Public-Access News Sites 506
Remotely Reading News with NNTP 507
Getting a Limited Number of Groups through Electronic Mail 508
Getting a Full or Partial News Feed from NNTP 510
Summary 512

20 Determining the Level of Internet Service You Need 515

Deciding Which Internet Services You Need 516
Electronic Mail 516
Network News 517
Interactive Access to Remote Computers 518
Network Navigation Aids 518
Real-Time Textual Chatting 518
Teleconferencing over the Internet 519
Allowing Network Users To Access Your Computer 519
You Already May Have Internet Access and Not Know It 520
Educational Institutions 520
Employers 521
Professional Societies 522
Local Users' Groups 523
Types of Internet Service Providers 524
BBS, UUCP, and Other Polled Services 524
Online Services and Terminal Servers 525
SLIP and PPP Service 526
Dedicated Connections 527
Determining the Network Performance You Need 528
Who Will Use Your Internet Connection? 529
What Data Transfer Rate Will Work for You? 529
How Often and How Long Will You Connect to the Network? 530
What Systems Administration Burdens Can You Handle? 531
Evaluating a Specific Provider 532
Summary 534

21 Making Connections Beyond the Internet 535

The Internetwork Cross-Reference 536
Getting the Cross-Reference from the Internet 536
Using This Chapter's Network Cross-Reference 537
Summary 551

VI Working with Applications 553

22 Loading UNIX Applications 555

Key Terms Used in This Chapter 556
Loading Major Applications 557
Understanding the System Administrator and Superusers 558
Installing Software 560
Looking for Supported Software 562

Google/YouTube Exhibit 1021/1121
Page 00229

Reviewing File Permissions 563
Solving Problems 563
Updating Applications 564
Removing Applications 564
Loading Small Applications 565
Summary 566

23 Running DOS Applications 567

Key Terms Used in This Chapter 568
Understanding and Using DOS-under-UNIX 569
Looking at DOS Emulations on Sun Systems 570
Looking at DOS Emulation on the Intel Platform 572
Device Drivers 573
The Virtual PC 574
Merge 386/486 for UNIX 575
VP/ix 577
Understanding Memory Management for DOS Emulation 577
Summary 579

24 Running Windows Applications 581

Key Terms Used in This Chapter 582
Understanding UNIX-over-Windows 582
Wabi 584
SoftWindows 585
Other Windows-under-UNIX Products 586
Running Windows with DOS Emulation 587
Summary 589

VII UNIX Networking 591

25 UNIX Networking Concepts 593

What is Networking? 594
Open Systems Interconnection Model 594
Department of Defense Model 597
Understanding UNIX Networking Protocols 598
Process/Application Layer Protocols 599
Host-to-Host Layer Protocols 606
Internet Layer Protocols 608
Network Access Layer Protocols 611
Internetworking 612
Repeater 612
Bridge 612
Router 614
Brouter 614
Gateway 615
Looking at an IP Routing Example 615
Summary 616

26 UNIX in a NetWare World 617

Integrating UNIX and NetWare Services 617
Connecting NetWare Clients to UNIX Servers 618
LAN WorkPlace for DOS 619
LAN WorkGroup for DOS 622
NetWare NFS Gateway 626
Connecting UNIX Clients to NetWare Servers 627
NetWare NFS and NetWare FLeX/IP 627
UnixWare 631
Other UNIX-to-NetWare Networking Options 632
NOVIX 632
Ipswitch 633
SoftNet Client 634
NetWare for UNIX 634
PopTerm/NVT 635
Summary 636

27 TCP/IP 637

History of TCP/IP 637
Internet Terminology 638
Looking at the TCP/IP Protocol Stack 639
IP Addresses 641
IP Address Classes 641
Network Naming 646
Subnetworks 648
Subnet Masks 649
Routing 650
Routing Information Protocol (RIP) 650
Network Segmentation 651
Setting Up Internet Networks 652
Types of Connections 652
Choosing a Networking Configuration 655
Network Configuration Guidelines 656
Routers and Bridges 657
Summary 658

28 UNIX Administration in a Networked Environment 661

Defining the Role of the Network Administrator 662
Hardware and Software Issues 662
Common Networking Administrative Tasks 663
Training the Administrator 665
Managing Users 666
Adding Users 666
Moving Users 668
Deleting Users 669

Google/YouTube Exhibit 1021/1121
Page 00231

Configuring Peripherals 669
Printers 669
Communications 670
Optimizing UNIX Performance 672
Choosing the Right Hardware 672
Tuning System Performance 673
Setting the Sticky Bit 673
Altering Internal Parameters 674
Developing a Secure System 676
Controlling the Root 676
Daily Routines for the Computer 676
Bringing Down the System 677
Working Smart 678
Security Issues 679
Backups 683
Summary 687

VIII UNIX Multiuser Systems 689

29 Understanding Multiuser Concepts 691

Understanding Centralized Processing Systems 692
Elements of the Centralized Processing Model 693
Understanding Distributed Processing Systems 694
Elements of the Distributed Processing Model 695
Looking at Topologies 696
Star Topology 696
Bus Topology 697
Ring Topology 698
Hybrid Topology 698
Understanding the Client/Server Model 698
Summary 699

30 UNIX Administration in a Multiuser Environment 701

Looking at the Importance of Proper Administration 701
Common Administrative Tasks 703
Understanding User Management 704
Working with Users 704
Working with Groups 711
Adding Users with UnixWare's Graphical Desktop 712
Working with Serial Devices—Terminals and Modems 714
Adding a Serial Device 714
Modifying Configuration Files 714
Working with Printers 717
Performing System Backups 718
Considering Backup Tips 720
Planning a Backup Schedule 720
Performing Backups and Restoring Files 722

Training 728
System Administrator Training 728
User Training 728
Implementing a Training Program 729
Shutting Down the System 730
Using shutdown 731
Shutting Down from the UnixWare Desktop 732
Understanding System Security 733
Physical Security 734
Password Security 734
Login Security 737
Security Threats 739
Summary 740

IX Command Reference **741**

Command Reference **743**

Appendix **927**

Resources for UNIX Users and Administrators 927

Index **941**

SPECIAL EDITION

USING UNIX®

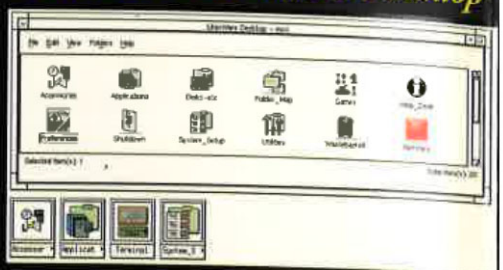
Technical review performed by industry experts Larry Schumer & Chris Negus

Achieve the Perfect System with Expert Information on UNIX!

For complete, up-to-date coverage of every facet of UNIX system management, no book is more thorough than Que's *Using UNIX*, Special Edition. You learn exactly how to get the most from UNIX—with numerous professional tips and techniques to bring you to advanced mastery.

Issue UNIX commands efficiently. Master the UNIX shells, *vi* editor, and printing. Run DOS and Windows applications under UNIX. Effectively manage UNIX networks and UNIX multiuser systems. Get the most from Internet services. Integrate UNIX into NetWare environments with TCP/IP. Whatever your needs, whatever your goals—this book is your comprehensive guide to achieving them.

Master the UnixWare 1.1 desktop



- Explore the features, commands, and shortcuts of UNIX
- Discover the secrets behind successful system management
- Follow professional strategies on UNIX integration and client/server systems
- Get the most from remote communication tools, Internet access, and multiuser concepts

Discover just what UNIX can do for you with **Using UNIX**, *Special Edition from Que!*

$39.99 USA / $52.95 CAN / £36.99 Net UK

ISBN 1-56529-619-2

90000

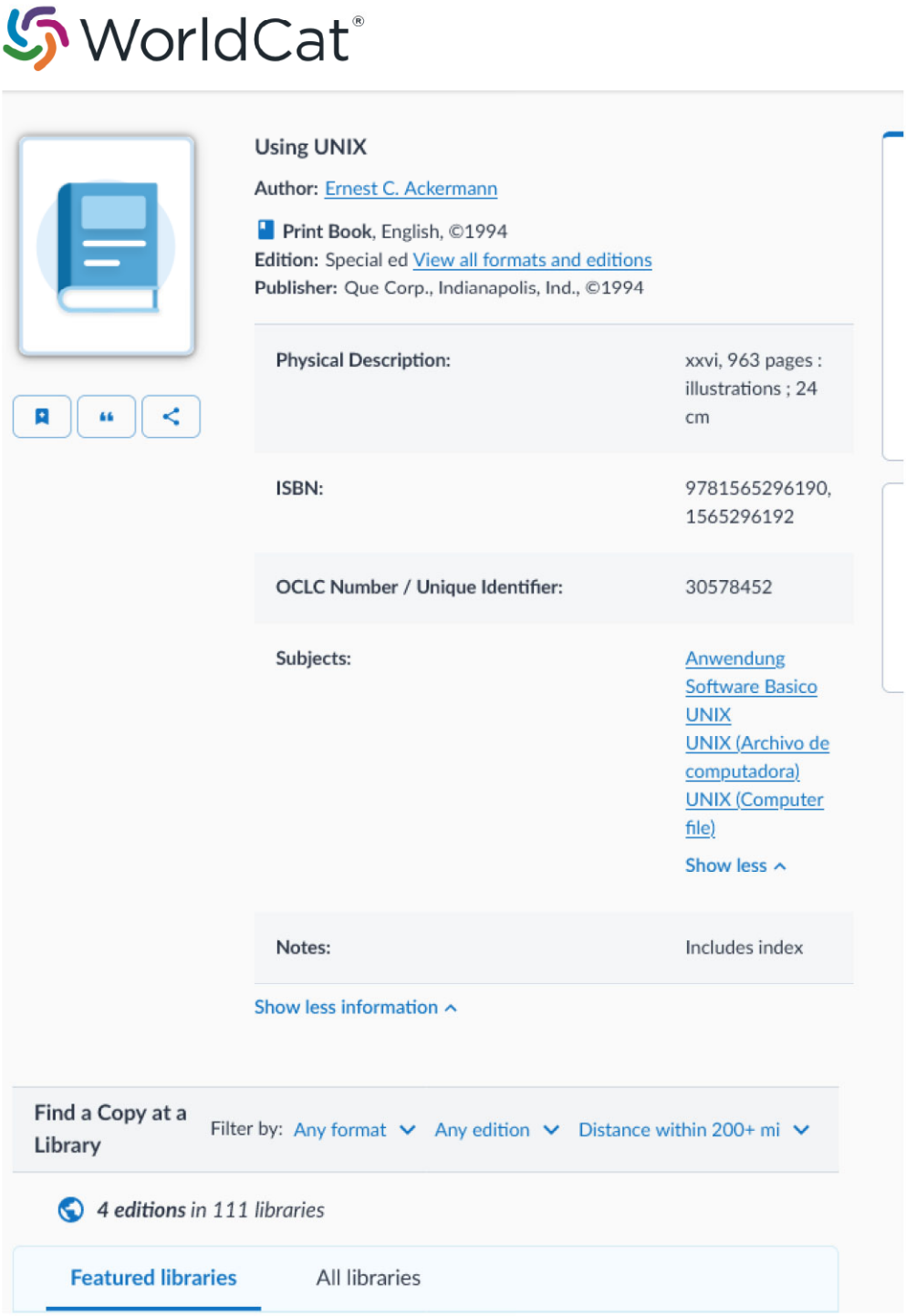
9 781565 296190

Category: Operating Systems
User Level: Intermediate-Advanced
Covers: System V

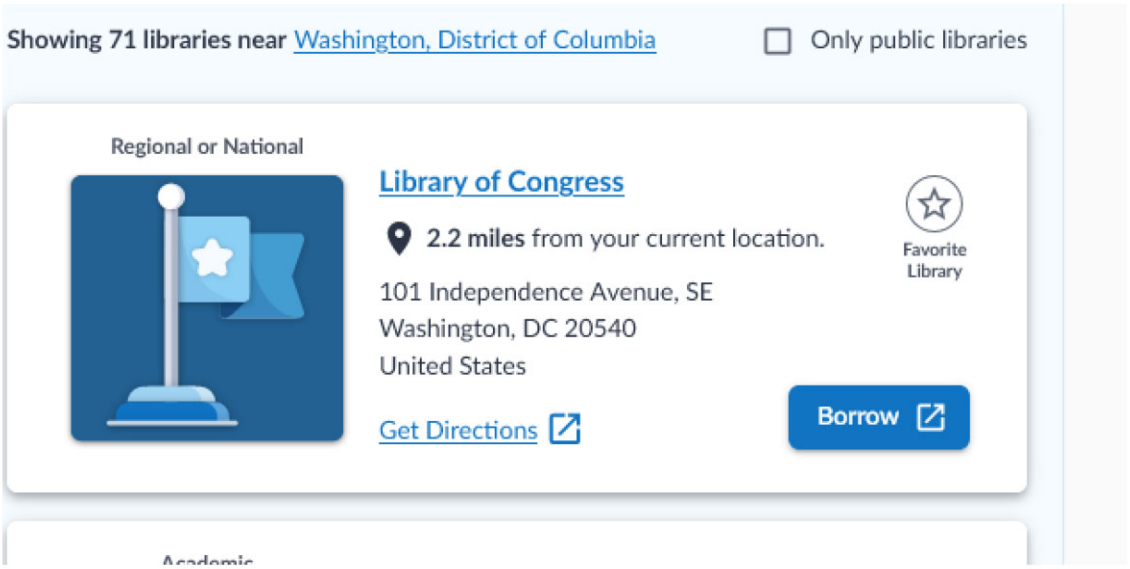
que®

ATTACHMENT F-2

Screen capture completed by J L Mullins from *WorldCat* on January 28, 2023



Screen capture completed by J L Mullins from *WorldCat* on January 28, 2023



ATTACHMENT F-3

LIBRARY | CATALOG

1 of 1

BOOK

Using UNIX

Full Record MARC Tags

Main title

Using UNIX / Ernest Ackermann ... [et al.] ; with contributing authors, Keith Blanton ... [et al.].

Edition

Special ed.

Published/Created

Indianapolis, Ind. : Que Corp., c1994.

Request this Item | LC Find It

More Information

LCCN Permalink	https://lccn.loc.gov/94065890
Description	xxvi, 963 p. : ill. ; 24 cm.
ISBN	1565296192 :
LC classification	QA76.76.O63 U74 1994
Related names	Ackermann, Ernest C.

Google/YouTube Exhibit 1021/1121
Page 00239

LC Subjects	UNIX (Computer file)
Browse by shelf order	QA76.76.O63
Notes	Includes index.
LCCN	94065890
Dewey class no.	005.4/3
Other system no.	(OCoLC)30482993
Type of material	Book

Item Availability

CALL NUMBER	QA76.76.O63 U74 1994 LANDOVR Copy 1
Request in	Jefferson or Adams Building Reading Rooms - STORED OFFSITE
Status	Not Charged

CALL NUMBER	QA76.76.O63 U74 1994 FT MEADE Copy 2
Request in	Jefferson or Adams Building Reading Rooms - STORED OFFSITE
Status	Not Charged

Google/YouTube Exhibit 1021/1121
Page 00240

ATTACHMENT F-4

LIBRARY | CATALOG

1 of 1

BOOK

Using UNIX

Full Record **MARC Tags**

000		01087cam a2200301 a 4500
001		3963144
005		19950815154025.6
008		940311s1994 inua 001 0 eng d
035	__	|**9** (DLC) 94065890
906	__	|**a** 7 |**b** cbc |**c** copycat |**d** 2 |**e** opcn |**f** 19 |**g** y-gencatlg
955	__	|**a** pn08 03-11-94; jf00 09-07-94; jf06 to subj 09-13-94; jf11 to sl 09-19-94; jf12 09-21-94 to ddc; aa20 9-27-94
010	__	|**a** 94065890
020	__	|**a** 1565296192 : |**c** $39.99 ($52.95 Can.)
035	__	|**a** (OCoLC)30482993
040	__	|**a** DFDI |**c** DFDI |**d** CoD |**d** DLC
042	__	|**a** lccopycat
050	00	|**a** QA76.76.O63 |**b** U74 1994
082	00	|**a** 005.4/3 |**2** 20
245	00	|**a** Using UNIX / |**c** Ernest Ackermann ... [et al.] ; with contributing authors, Keith Blanton ... [et al.].
250	__	|**a** Special ed.
260	__	|**a** Indianapolis, Ind. : |**b** Que Corp., |**c** c1994.
300	__	|**a** xxvi, 963 p. : |**b** ill. ; |**c** 24 cm.
500	__	|**a** Includes index.
630	00	|**a** UNIX (Computer file)
700	1_	|**a** Ackermann, Ernest C.

Google/YouTube Exhibit 1021/1121
Page 00242

920	__	**|a** **LC HAS REQ'D # OF SHELF COPIES**
922	__	**|a** co
991	__	**|b** c-GenColl **|h** QA76.76.O63 **|i** U74 1994 **|p** 00034645310 **|t** Copy 1 **|w** BOOKS

Request this Item | LC Find It

Item Availability

CALL NUMBER	QA76.76.O63 U74 1994 LANDOVR Copy 1
Request in	Jefferson or Adams Building Reading Rooms - STORED OFFSITE
Status	Not Charged

CALL NUMBER	QA76.76.O63 U74 1994 FT MEADE Copy 2
Request in	Jefferson or Adams Building Reading Rooms - STORED OFFSITE
Status	Not Charged

Google/YouTube Exhibit 1021/1121
Page 00243

ATTACHMENT G-1

LIBRARY OF CONGRESS
0 051 394 112 2

MRC

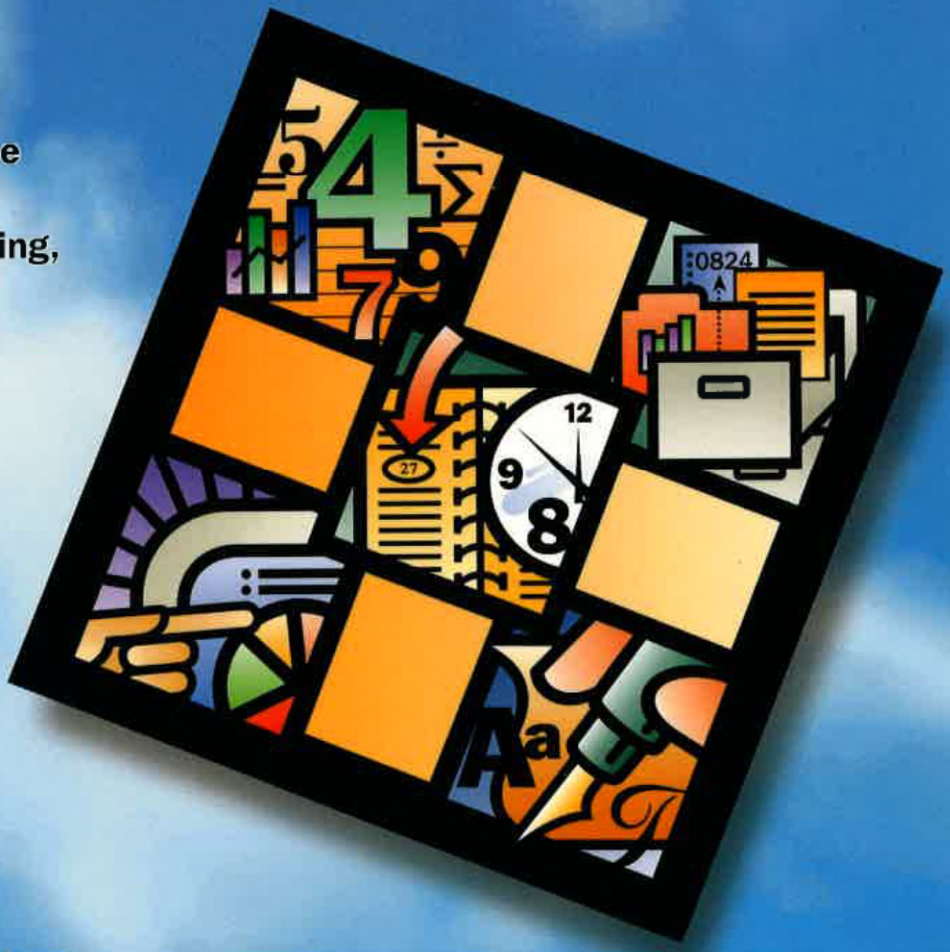
MICROSOFT
OFFICE
FOR WINDOWS 95
RESOURCE KIT

QA 76
.76
.I57 M49
1995

MICROSOFT® PROFESSIONAL EDITIONS

The Professional's Companion to Microsoft Office for Windows 95

The Technical Resource for Installing, Configuring, and Supporting Microsoft Office for Windows 95, Professional Edition



Microsoft® Office for Windows® 95 Resource Kit

Microsoft Press

Google/YouTube Exhibit 1021/1121
Page 00246

MICROSOFT® PROFESSIONAL EDITIONS



The Technical Resource

for Installing, Configuring,

and Supporting

Microsoft Office

for Windows 95,

Professional Edition

Microsoft® Office for Windows® 95 Resource Kit

Microsoft Press

Google/YouTube Exhibit 1021/1121
Page 00247

LIBRARY OF CONGRESS
AUG 20 1995
COPY
CIP

QA76
.76
.I57 M49
1995
MRC

LCCC #
95-37699

PUBLISHED BY
Microsoft Press
A Division of Microsoft Corporation
One Microsoft Way
Redmond, Washington 98052-6399

Copyright © 1995 by Microsoft Corporation

All rights reserved. No part of the contents of this book may be reproduced or transmitted in any form or by any means without the written permission of the publisher.

Library of Congress Cataloging-in-Publication Data pending.

Printed and bound in the United States of America.

1 2 3 4 5 6 7 8 9 QMQM 0 9 8 7 6 5

Distributed to the book trade in Canada by Macmillan of Canada, a division of Canada Publishing Corporation.

A CIP catalogue record for this book is available from the British Library.

Microsoft Press books are available through booksellers and distributors worldwide. For further information about international editions, contact your local Microsoft Corporation office. Or contact Microsoft Press International directly at fax (206) 936-7329.

PostScript is a trademark of Adobe Systems, Inc. America Online is a registered trademark of America Online, Inc. Apple and Macintosh are registered trademarks of Apple Computer, Inc. AutoCAD is a registered trademark of Autodesk, Inc. dBASE, MultiMate, and Paradox are registered trademarks and Quattro Pro is a trademark of Borland International, Inc. cc:Mail is a trademark of cc:Mail, Inc., a wholly owned subsidiary of Lotus Development Corporation. CompuServe is a registered trademark of CompuServe, Inc. CorelDRAW is a registered trademark of Corel Systems Corporation. Kodak is a registered trademark of Eastman Kodak Company. GEnie is a trademark of General Electric Corporation. HP is a registered trademark of Hewlett-Packard Company. Intel is a registered trademark of Intel Corporation. DisplayWrite and PROFS are registered trademarks of International Business Machines Corporation. 1-2-3, Lotus, and Lotus Notes are registered trademarks of Lotus Development Corporation. MapInfo is a registered trademark of MapInfo Corporation. FoxPro, Microsoft, MS-DOS, Multiplan, PivotTable, PowerPoint, Windows, TipWizard, Visual Basic, Win32, Win32s, and Wingdings are registered trademarks and Rushmore, Visual C++, and Windows NT are trademarks of Microsoft Corporation. NetWare and WordPerfect are registered trademarks of Novell, Inc. RC4 Algorithm is a registered trademark of RSA Data Security, Inc. Harvard Graphics is a registered trademark and HyperShow is a trademark of Software Publishing Corporation. Timex is a registered trademark of Timex Corporation. PC Paintbrush is a registered trademark of Wordstar Atlanta Technology Center. WordStar is a registered trademark of WordStar International Incorporated.

Acquisitions Editor: Casey D. Doyle
Project Editor: Brenda L. Matteson

This material may be protected by Copyright law (Title 17 U.S. Code)

Contents

Welcome to the Microsoft Office for Windows 95 Resource Kit ix
What's in the Office for Windows 95 Resource Kit x
Conventions xi

A Guided Tour to Microsoft Office for Windows 95 1
Windows 95 Support 2
Focus on Your Work, Not Your Software 5
Share Information Easily Between Applications 22
Communicate in a Connected World 28
Building Solutions with Microsoft Office 30

Part 1 Architecture

Chapter 1 Microsoft Office Architecture 35
Coordination of Applications 35
Implementation of OLE 36
Interoperability with Electronic Mail 42
Shared Application Tools 44
Shared Code 46
Shared Services 56

Chapter 2 Microsoft Access Architecture 61
Application Layer 61
Database Layer 66
Database Objects 68
Where Microsoft Access Components Reside 70
How Microsoft Access Resolves Conflicts 71

Chapter 3 Microsoft Excel Architecture 73
Overall Structure 73
Where Components Are Stored 79
Microsoft Excel Data Map 84
How Microsoft Excel Resolves Conflicts 88

Chapter 4 Microsoft PowerPoint Architecture 91
Application Layer 91
Understanding Templates 92
Presentation Layer 95
How PowerPoint Resolves Conflicts 95

Chapter 5 Microsoft Schedule+ Architecture 97
Schedule+ Components 98
Running Schedule+ in Stand-Alone Mode 105
Running Schedule+ in Group-Enabled Mode 105
How Schedule+ Resolves Conflicts 107
How Schedule+ Works with Microsoft Exchange Server 108

Chapter 6 Microsoft Word Architecture 111
Template Layer 112
How Word Resolves Conflicting Settings 118
Where Components Are Stored 119
Managing Styles, AutoText Entries, Macros, and Toolbars 126
Wizards 126
Add-ins 127

Part 2 Installing Microsoft Office for Windows 95

Chapter 7 Guide to Deploying Microsoft Office for Windows 95 131
Overview of the Process 131
Review and Install Windows 133
Review Office for Windows 95 136
Assemble the Planning Team and Tools 137
Specify the Preferred Client Configuration 139
Conduct the Lab Test 144
Plan the Pilot Rollout 148
Conduct the Pilot Rollout 152
Finalize the Rollout Plan 153
Roll Out Office for Windows 95 155
Maintenance and Support 156

Chapter 8 Installing Microsoft Office 157
Installation Planning 157
Client Installation from Physical Media 166
Client Installation Over the Network 170
Installation Issues 179
Client Installation Example 187

Chapter 9 Customizing Client Installations 189
About the Setup Program 189
Modifying Client Setup with the Network Installation Wizard 192
Giving Users Access to the Modified STF File 203
Client Customization Installation Example 211

Chapter 10 Upgrading to Office for Windows 95 215
Upgrading to Microsoft Office for Windows 95 215
Upgrading to Microsoft Access for Windows 95 219
Upgrading to Microsoft Excel for Windows 95 254
Upgrading to Microsoft PowerPoint for Windows 95 258
Upgrading to Microsoft Schedule+ for Windows 95 265
Upgrading to Microsoft Word for Windows 95 267

Part 3 Maintaining and Supporting Microsoft Office

Chapter 11 Maintaining, Customizing, and Optimizing Office 279
Updating Software 279
Customizing the User Environment 283
Optimizing Microsoft Access for Windows 95 284
Optimizing Microsoft Excel for Windows 95 303
Optimizing Microsoft PowerPoint for Windows 95 305
Optimizing Microsoft Schedule+ for Windows 95 305
Optimizing Microsoft Word for Windows 95 306

Chapter 12 Support and Troubleshooting 309
Supporting Microsoft Office 309
Supporting Microsoft Excel 320
Supporting Microsoft PowerPoint 330
Supporting Microsoft Schedule+ 349
Supporting Microsoft Word 351
Registry Settings and .Ini Files 359
Long Filenames 360
Porting Your 16-Bit Office-Based Solutions to 32-Bit Office 360
Frequently Asked Questions 377

Part 4 Running Multiple Versions of Office and Using Office in a Workgroup

Chapter 13 Running Multiple Versions of Microsoft Office 381
Running Multiple Versions of Microsoft Access in a Workgroup 381
Running Multiple Versions of Microsoft Excel in a Workgroup 386
Running Multiple Versions of Microsoft PowerPoint in a Workgroup 391
Running Multiple Versions of Microsoft Schedule+ in a Workgroup 395
Running Multiple Versions of Microsoft Word in a Workgroup 398

Chapter 14 Coexistence with Microsoft Office for the Macintosh 403
Microsoft Office Binders 403
Microsoft Access 404
Microsoft Excel 405
Microsoft PowerPoint 405
Microsoft Word 406

Chapter 15 Using Workgroup Features and Applications with Office 413
Finding and Managing Documents within a Workgroup 413
Interoperability with Electronic Mail 418
ODBC and Client/Server Operations 427
Using External Data with Office for Windows 95 436
Workgroup Features for Microsoft Access 442
Workgroup Features for Microsoft Excel 473
Workgroup Features for Microsoft PowerPoint 476
Workgroup Features for Microsoft Word 480

Chapter 16 Microsoft Access Database Replication 485
Why Replicate Databases? 485
Tools for Implementing Replication 489
Architecture of Database Replication 490
Planning for Replication 498
Managing Replicas 500
Troubleshooting Conflicts 502

Part 5 Switching from Other Applications

Chapter 17 Switching to Microsoft Access 509
Using Microsoft Access 509
Switching from dBASE 524
Switching from FoxPro 532
Switching from Paradox 535
Running Multiple Data Access Applications 541
Built-in Drivers and ODBC Drivers 542

Chapter 18 Switching to Microsoft Excel 545
Converting File Formats 545
Switching from Lotus 1-2-3 548
Borland Quattro Pro for MS-DOS Compatibility 587
Borland Quattro Pro for Windows Compatibility 588
Multiplan Compatibility 589
Microsoft Works Compatibility 593

Chapter 19 Switching to Microsoft PowerPoint 595
Translating Presentations Created in Other Programs 595
Harvard Graphics Translation Features 596
Lotus Freelance Translation Features 608

Chapter 20 Switching to Microsoft Word 619
Using Microsoft Word 620
Converting File Formats 621
Switching from Word for MS-DOS 631
Switching from WordPerfect 650
Switching from DisplayWrite 695
Switching from MultiMate 704
Switching from Microsoft Write for Windows 719
Switching from RFT-DCA Format Documents 719
Switching from Text with Layout Format Documents 723
Switching from Microsoft Works 725
Switching from WordStar 730
Importing Documents from Microsoft Excel 733
Importing Documents from Lotus 1-2-3 734
Troubleshooting 735

Appendixes

Appendix A Setup Command Line Options and File Format 739
Setup Command Line Options 739
Setup Process Flow 741
Setup File Formats 742

Appendix B Registry Keys and Values 789
Using the Registry Editor 790
Microsoft Access Registry Keys and Values 790
Microsoft Excel Registry Keys and Values 817
Microsoft Office Registry Keys and Values 830
Microsoft PowerPoint Registry Keys and Values 835
Schedule+ Registry Keys and Values 846
Microsoft Word Registry Keys and Values 855
Find Fast Registry Keys and Values 858

Appendix C List of Installed Components 861
Custom Installation 861
Typical Installation 872
Compact Installation 877
Run from Network Server 878
Run from CD 879

Appendix D Contents of the Office Resource Kit CD 881

Appendix E System Requirements for Office for Windows 95 883
Microsoft Office Standard 883
Microsoft Office Professional 884
Individual Office Applications 885

Appendix F Resources 889
Getting Support from Microsoft 889
The Microsoft Support Network 891
Microsoft Download Service (MSDL) 895
Microsoft Knowledge Base 898
Microsoft Consulting Services 905
Microsoft Developer Network 907
Training Resources 915
Reference Materials 917

Index 919

Google/YouTube Exhibit 1021/1121
Page 00254

Welcome to the Microsoft Office for Windows 95 Resource Kit

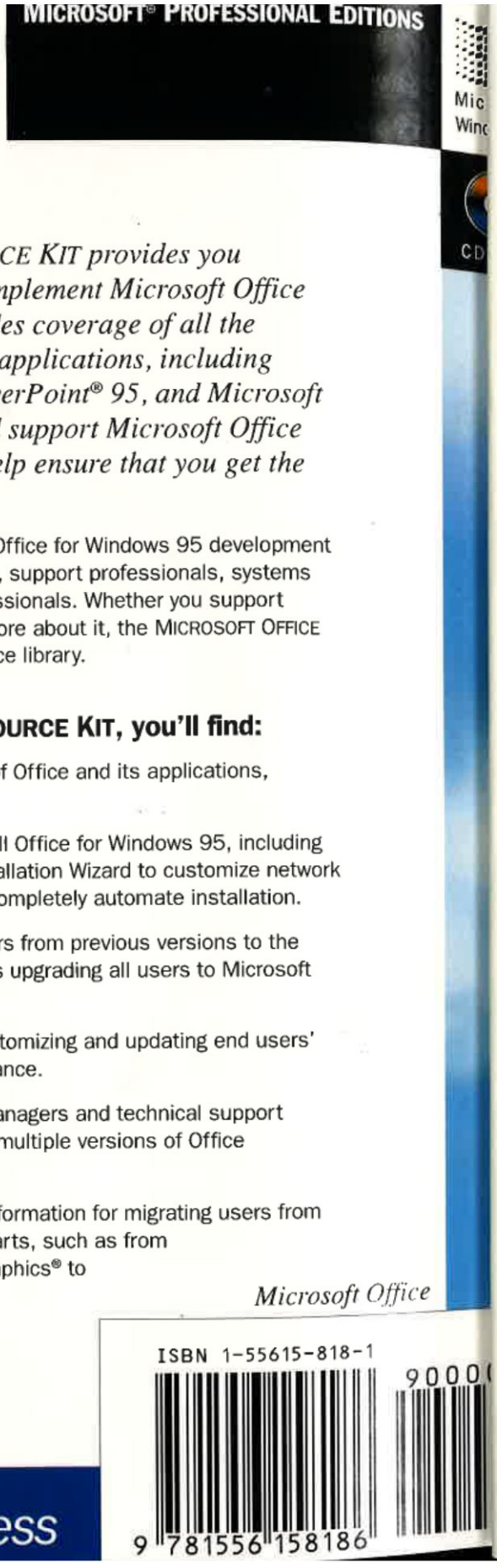
The *Microsoft Office for Windows 95 Resource Kit* is written for administrators and MIS professionals. It provides the information required for rolling out, supporting, and understanding Microsoft® Office for Windows® 95. This book is being published both in bound form and on CD, and it is posted in the Microsoft Office Resource Kit forum on the Microsoft Network (MSN). For late-breaking, up-to-date information about Office for Windows 95, MSN is the place to look. MSN has a forum for each of the Office applications, and one for Office for Windows 95, too. For information about accessing MSN, see Appendix F, "Resources."

In the past three to five years, much has changed in terms of how an MIS department treats desktop applications. Five years ago, departmental LANs were sprouting up all over organizations. Individual departments, and even individual users, were deciding which applications they would use. In choosing an application, their primary criterion was the set of tasks the application could do. Today, however, departments are increasingly interested in how well an application allows people within a workgroup to share data.

Two factors have contributed to this change. First, the use of LANs and WANs is much more widespread, and MIS departments are now managing them centrally rather than departmentally. Second, in the autumn of 1993, Microsoft Office 4.0 was launched. Office 4.0 provided much more consistency and ease of use than has been available before in a group of integrated desktop applications. This spurred many organizations to standardize on Office. In standardizing on a single, integrated solution, MIS organizations appreciate the control they have over their departmental desktops, yet they also recognize the importance of supporting and maintaining this software to reap the benefits that standardization provides.

The purpose of this Resource Kit is to provide the information that the MIS professional or administrator needs to support Microsoft Office for Windows 95. This includes planning for deployment of Office for Windows 95, deciding which configurations are best for your organization, and understanding issues regarding migrating from earlier versions of Office or from competitive applications.

Google/YouTube Exhibit 1021/1121
Page 00255



Complete Technical Information for the Support Professional

The MICROSOFT® OFFICE FOR WINDOWS® 95 RESOURCE KIT provides you with all of the information necessary to plan for and implement Microsoft Office for Windows 95 in your organization. This book includes coverage of all the Microsoft Office for Windows 95 Professional Edition applications, including Microsoft Word 95, Microsoft Excel 95, Microsoft PowerPoint® 95, and Microsoft Access 95. Details about how to install, configure, and support Microsoft Office for Windows 95 will save you hours of time and will help ensure that you get the most from your computing investment.

This exclusive Microsoft publication, written in cooperation with the Office for Windows 95 development team, is the perfect technical companion for network administrators, support professionals, systems integrators, consultants, advanced users, and other computer professionals. Whether you support Office for Windows 95 within an organization or just want to know more about it, the MICROSOFT OFFICE FOR WINDOWS 95 RESOURCE KIT is a valuable addition to your reference library.

Inside the MICROSOFT OFFICE FOR WINDOWS 95 RESOURCE KIT, you'll find:

Office for Windows 95 Architecture—an overview of the structure of Office and its applications, including details on components shared between applications.

Installing Office for Windows 95—details and tools needed to install Office for Windows 95, including steps for choosing a strategy for installation, using the Network Installation Wizard to customize network installations, and using Microsoft Systems Management Server to completely automate installation.

Upgrading to Office for Windows 95—techniques for upgrading users from previous versions to the current version of Office for Windows 95, whether the organization is upgrading all users to Microsoft Office at one time or only groups at a time.

Configuring for Optimal Performance—technical information for customizing and updating end users' software and for tuning Office for Windows 95 for optimum performance.

Using Microsoft Office in a Workgroup—information to help MIS managers and technical support personnel when their workgroups include multiple platforms and/or multiple versions of Office applications.

Switching from Other Applications to Microsoft Office—detailed information for migrating users from non–Microsoft Office applications to their Microsoft Office counterparts, such as from WordPerfect® to Word, Lotus® 1-2-3® to Microsoft Excel, Harvard Graphics® to PowerPoint, or dBASE® to Microsoft Access.

Support and Troubleshooting—resources, utilities, and answers.

Microsoft Office

ISBN 1-55615-818-1

U.S.A. **$49.95**
U.K. £46.99 [V.A.T. included]
Canada $67.95
[*Recommended*]

Microsoft Press

Google/YouTube Exhibit 1021/1121
Page 00256

ATTACHMENT G-2

Screen capture completed by J L Mullins from *WorldCat* on January 28, 2023

WorldCat®



Microsoft Office for Windows 95 resource kit : the technical resource for installing, configuring, and supporting Micros...

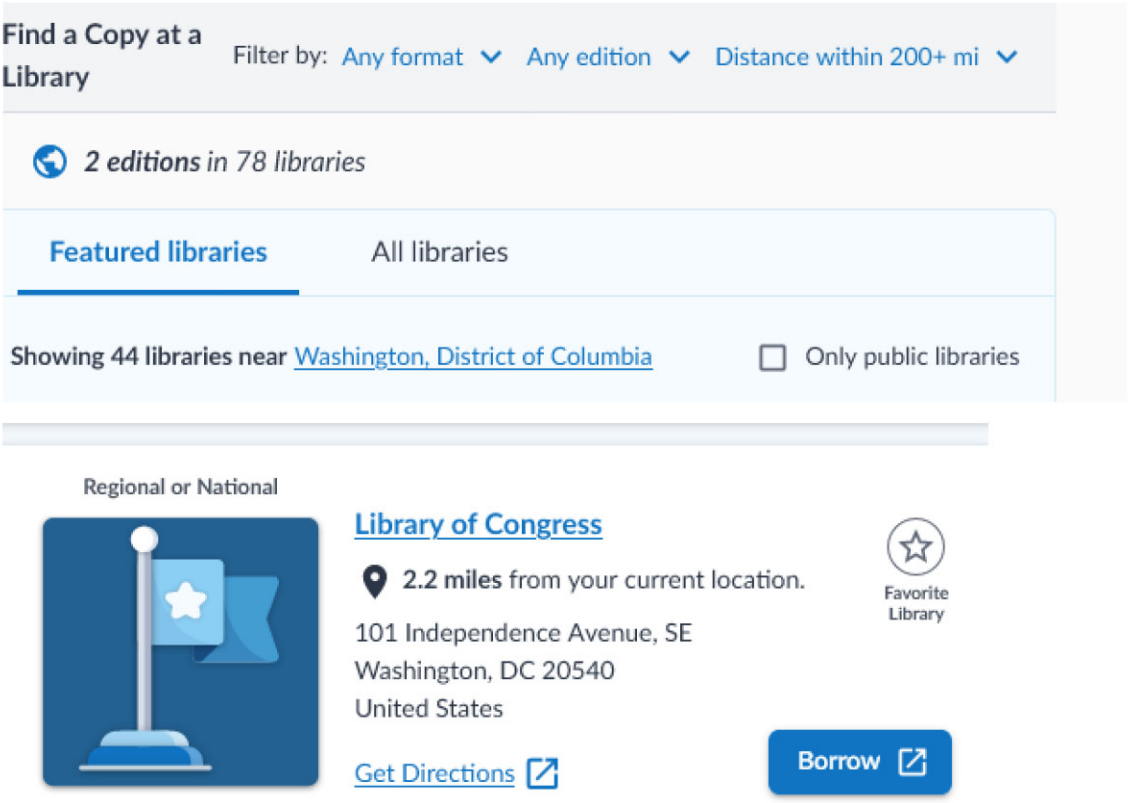
Show more

Author: Microsoft Corporation

Print Book, English, ©1995
Edition: View all formats and editions
Publisher: Microsoft Press, Redmond, Wash., ©1995

Series:	Microsoft professional editions
Physical Description:	xi, 940 pages : illustrations ; 23 cm + 1 computer optical disc (4 3/4 in.).
ISBN:	9781556158186, 9781556159428, 1556158181,... Show more
OCLC Number / Unique Identifier:	32968833
Subjects:	Integrated software Logiciels intégrés Microsoft Office Microsoft Windows (Computer file) Software, Application Programs applications computer software

Screen capture completed by J L Mullins from *WorldCat* on January 28, 2023



ATTACHMENT G-3

LIBRARY | CATALOG

1 of 1

BOOK

Microsoft Office for Windows 95 resource kit : the technical resource ...

Full Record MARC Tags

Main title

Microsoft Office for Windows 95 resource kit : the technical resource for installing, configuring, and supporting Microsoft Office for Windows 95 professional edition / [Microsoft Corporation].

Published/Created

Redmond, Wash. : Microsoft Press, c1995.

Request this Item | LC Find It

More Information

LCCN Permalink	https://lccn.loc.gov/95037699
Description	xi, 940 p. : ill. ; 23 cm. + 1 computer laser optical disc (4 3/4 in.)
ISBN	1556158181
LC classification	QA76.76.I57 M49 1995
Related names	Microsoft Corporation.
LC Subjects	Microsoft Office.

Google/YouTube Exhibit 1021/1121
Page 00261

Microsoft Windows (Computer file)
Integrated software.

Browse by shelf order	QA76.76.I57
Notes	Includes index.
Computer file info	System requirements for accompanying computer disc: Microsoft Windows 95 operating system or Microsoft Windows NT Workstation operating system version 3.51 or later.
Series	Microsoft professional editions
LCCN	95037699
Dewey class no.	005.369
Type of material	Book

Item Availability

CALL NUMBER	QA76.76.I57 M49 1995 Copy 1
Request in	See Reference Staff. By Appt in Jefferson Main RR (MRC)
Status	Not Charged

Google/YouTube Exhibit 1021/1121
Page 00262

ATTACHMENT G-4

LIBRARY | CATALOG

1 of 1

BOOK

Microsoft Office for Windows 95 resource kit : the technical resource ...

Full Record MARC Tags

000		01419cam a2200301 a 4500
001		2088796
005		20190123125547.0
008		950728s1995 waua 001 0 eng
906	__	|**a** 7 |**b** cbc |**c** orignew |**d** 1 |**e** ocip |**f** 19 |**g** y-gencatlg
925	0_	|**a** acquire |**b** 1 shelf copy |**x** policy default
955	__	|**a** pc20 to ja00 07-28-95; jf03 to Comp. Files 07-28-95; jf03 to Subj. 08-01-95; jf11 to sl 08-01-95; jf14 08-03-95; CIP ver. pv08 12-04-95
010	__	|**a** 95037699
020	__	|**a** 1556158181
035	__	|**9** (DLC) 95037699
040	__	|**a** DLC |**c** DLC |**d** DLC
050	00	|**a** QA76.76.I57 |**b** M49 1995
082	00	|**a** 005.369 |**2** 20
245	00	|**a** Microsoft Office for Windows 95 resource kit : |**b** the technical resource for installing, configuring, and supporting Microsoft Office for Windows 95 professional edition / |**c** [Microsoft Corporation].
260	__	|**a** Redmond, Wash. : |**b** Microsoft Press, |**c** c1995.
300	__	|**a** xi, 940 p. : |**b** ill. ; |**c** 23 cm. + |**e** 1 computer laser optical disc (4 3/4 in.)
440	_0	|**a** Microsoft professional editions
538	__	|**a** System requirements for accompanying computer disc: Microsoft Windows 95 operating system or Microsoft Windows NT Workstation operating system version 3.51 or later.
500	__	|**a** Includes index.

Google/YouTube Exhibit 1021/1121
Page 00264

650	_0	|**a** Integrated software.
630	00	|**a** Microsoft Office.
630	00	|**a** Microsoft Windows (Computer file)
710	2_	|**a** Microsoft Corporation.
991	__	|**b** c-MRC |**h** QA76.76.I57 |**i** M49 1995 |**t** Copy 1 |**w** BOOKS

Request this Item | LC Find It

Item Availability

CALL NUMBER	QA76.76.I57 M49 1995 Copy 1
Request in	See Reference Staff. By Appt in Jefferson Main RR (MRC)
Status	Not Charged

Google/YouTube Exhibit 1021/1121
Page 00265